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Critical Firm-based Enablers-Mediators-Outcomes (CFEMOs): A New Integrated Model for Product Innovation Performance Drivers in the Context of U.S. Restaurants

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Critical Firm-based Enablers-Mediators-Outcomes (CFEMOs): A New Integrated Model for Product Innovation Performance Drivers in the Context of U.S. Restaurants

By

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Critical Firm-based Enablers-Mediators-Outcomes (CFEMOs): A New Integrated Model for Product Innovation Performance Drivers in the Context of U.S. Restaurants

Mohamed Farouk Shehata Ali

Abstract

This study develops an original theoretical model of critical managerially controllable factors that have high potential for achieving significant improvements in the (intermediate and ultimate) outcome(s) of product innovation efforts. To this end, the author draws on the relevant empirical literature and integrates four complementary theoretical perspectives, namely; the critical success factors (CSFs) approach, the resource-based view (RBV), the input-process-output (IPO) model, and the system(s) approach. The model (hereafter CFEMOs) aims to explicate the simultaneous direct and indirect/mediated interrelationships among the product innovation's critical firm-based enablers (new-product fit-to-firm's skills and resources, internal cross-functional integration, and top-management support), process execution proficiency, and performance outcomes (operation-level performance, product-level performance, and firm-level performance). Additionally, it aims to predict the variations of the process execution proficiency and the performance outcomes.

The CFEMOs model was empirically tested using an online survey that was completed by 386 U.S. restaurants owners/senior executives on their recently innovated new menu-items. By utilising a partial least squares structural equation modelling, the statistical analysis substantiated that, compared to the models of the extant relevant empirical studies, the CFEMOs model has a broader scope and a superior predictive power. It simultaneously explains 72% of the process execution proficiency, 67% of the new menu-item superiority (quality, speed-to-market, and cost-efficiency), 76% of new menu-item performance (customer satisfaction, sales, and profits), and 75% of the new menu-item contribution to the overall restaurant performance (sales, profits, and market share). Furthermore, this study established that those restaurateurs who concurrently succeed in enhancing their internal cross-functional integration, top-management support, and new-product fit-to-firm's skills and resources, descendingly ranked, would achieve high process execution proficiency, which subsequently would grant them superior operation-level performance, product-level performance, and firm-level performance. This thesis concludes by providing several key original contributions and crucial implications to product innovation research and practice, as well as offering several promising avenues for future research.

Dedication

To my:

Great mother and father,

Wonderful family,

Outstanding supervisory team,

Best friends and colleagues,

Thank you for your precious love, sacrifice, and support

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The foremost thanks and praise go to Allah, the Almighty, the most Beneficent and Merciful, for empowering and enabling me to complete this thesis.

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Finally yet importantly, my full thanks and praise are to Allah for his grace upon me in all my life.

Author Declaration

I declare that this thesis has not been previously submitted for a degree or any other qualification either in this university or in any other university. In addition, I declare that all of the work done in this thesis is my own work. The Egyptian Government primarily financed this study.

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List of Abbreviations

Abbreviation	Full Term
AVE	Average Variance Extracted
CB-SEM	Covariance-Based Structural Equation Modelling
CFEMOs	Critical Firm-based Enablers-Mediators-Outcomes
CFEs	Critical Firm-based Enablers
CRBT	Capabilities Resource-Based View Theory
CrosFI	Internal Cross-Functional Integration
CSFs	Critical Success Factors
FirmLP	Firm-Level Performance
FM	Full Mediation
HTU	High Technological Uncertainty
IPO	Input-Process-Output
LTU	Low Technological Uncertainty
MAProf	Marketing Activities Execution Proficiency
MFit	New-Product Fit-to-Firm’s Marketing Skills and Resources
NP	New Product
NPD	New-Product Development
NPDCS	New-Product Development and Launching Cost Superiority
NPDT	New-Product Development Timelines
NPDTS	New-Product Development and Launching Time Superiority
NPQS	New-Product’s Quality Superiority
NS	Insignificant Relationship
OLS	Ordinary Least Squares
OperLP	Operational-Level Performance
PEProf	Product Innovation Process Execution Proficiency
PFit	New-Product Fit-to-Firm’s Skills and Resources
PLS	Partial Least Squares
PLS-SEM	Partial Least Squares Structural Equation Modelling
PM	Partial Mediation
PreAProf	Predevelopment Activities Execution Proficiency
ProdLP	Product-Level Performance
QLIM	Qualitative and Limited Dependent Variable Model
R&D	Research and Development
RBV	Resource-Based View
ROI	Return On Investment
SAS	Statistical Analysis System
SEM	Structural Equation Modelling
SMEs	Small and Medium-sized Enterprises
SPP	Sources of Advantage, Positional Advantage, and Performance
SPSS	Statistical Package for the Social Sciences
TAProf	Technical Activities Execution Proficiency
TFit	New-Product Fit-to-Firm’s Technical Skills and Resources
TMI	Top-Management Involvement
TMS	Top-Management Support
U.S.	United States of America
VIFs	Variance Inflation Factors

Glossary

Term	Description
Critical Firm-based Enablers-Mediators-Outcomes (CFEMOs)	An original theoretical model of critical managerially controllable factors that have high potential for achieving significant improvements in the (intermediate and ultimate) outcome(s) of product innovation efforts. It draws on the relevant empirical literature and integrates four complementary theoretical perspectives, namely; the critical success factors (CSFs) approach, the resource-based view (RBV), the input-process-output (IPO) model, and the system(s) approach. It explicates the simultaneous direct and indirect/mediated interrelationships among the product innovation's critical firm-based enablers (new-product fit-to-firm's skills and resources, internal cross-functional integration, and top-management support), process execution proficiency, and performance outcomes (operation-level performance, product-level performance, and firm-level performance). Additionally, it predicts the variations of the process execution proficiency and the performance outcomes.
Firm-Level Performance (FirmLP)	The extent of achieving the desired outcomes – for developing and introducing a new-product (NP) into the marketplace – along firm-level performance (FirmLP) in terms of NP's contributions to enhance the firm's overall sales, profits, and market share.
Internal Cross-Functional Integration (CrosFI)	The extent of joint goals achievement, open and frequent communications, as well as sharing ideas, information, and resources among the internal firm's functions/departments (e.g., R&D, production, and marketing) to develop and introduce a new-product into the marketplace.
Marketing Activities Execution Proficiency (MAProf)	How well or adequately the product innovation process's *marketing activities* are carried out – to develop and introduce a new-product into the marketplace – in terms of searching for and generating new-product ideas, conducting a detailed study of market potential, customer preferences, purchase process, etc., testing the new-product under real-life conditions, and introducing the new-product into the marketplace; advertising, promotion, selling, etc.

New Menu-Item/ New Product (NP)	A food or beverage item that is not currently exist in a restaurant menu and is developed and launched into market by that restaurant for the first time, even if such an item is available somewhere else, (e.g., new sandwich, meal, drink, pizza, etc.). A new menu-item can be totally original, adapted from inside the restaurant based on incremental modifications or improvements in existing products, adapted from outside the restaurant based on incremental modifications or improvement in competitors' products, or it can be pure adoption from outside the restaurant as a "me too" product from competitors.
New-Product Development and Launching Cost Superiority (NPDCS)	Is a subjective measure from the perspective of a firm top-management on the extent to which its new-product is superior to competitors' products in terms of the extent to which the cost of developing and launching the new-product is equal to or below the estimated budget, and below the cost of similar products the firm has previously developed and launched.
New-Product Development and Launching Time Superiority (NPDTS)	Is a subjective measure from the perspective of a firm top-management on the extent to which its new-product is superior to competitors' products in terms of the degree to which the new-product is developed and launched on or ahead of the original schedule, and faster than similar competitors' products.
New-Product Fit-to-Firm's Marketing Skills and Resources (MFit)	The extent to which the suggested new-product's innovation requirements fit-well-with the available firm's marketing skills and resources in terms of marketing research, sales force, advertising and promotion.
New-Product Fit-to-Firm's Skills and Resources (PFit)	The extent to which the suggested new-product's innovation requirements fit-well-with the available firm's technical (R&D and production) and marketing (marketing research, sales force, advertising and promotion) skills and resources.
New-Product Fit-to-Firm's Technical Skills and Resources (TFit)	The extent to which the suggested new-product's innovation requirements fit-well-with the available firm's technical skills and resources in terms of R&D and production.
New-Product Innovativeness	Is a subjective measure from the perspective of a firm top-management on the level of new-product newness (low, moderately, or highly innovative) in relation to its innovating firm rather than the market.

New-Product Quality Superiority (NPQS)	Is a subjective measure from the perspective of a firm top-management on the extent to which its new-product is superior to competitors' products in terms of the extent to which the new product offers some unique features or attributes to customers, and has a higher quality than competing products.
Operational-Level Performance (OperLP)	The extent of achieving the desired outcomes – for developing and introducing a new-product (NP) into the marketplace – along operational-level performance (OperLP) in terms of new-product's quality superiority (NPQS), new-product development and launching time superiority (NPDTS), and, new-product development and launching cost superiority (NPDCS).
Product Innovation	A form/type of innovation by which firms can be able to innovate (e.g., conceptualise, develop, and launch) their new products, by executing relevant marketing and technical activities along the various stages of product innovation, such as idea-generation, screening, development, testing, and commercialisation.
Product Innovation Critical Firm-based Enablers (CFEs)	The few (not all) firm-based (not outside the firm) variables (i.e., PFit: new-product fit-to-firm's skills and resources, CrosFI: internal cross-functional integration, and TMS: top-management support) that their utilisations in developing and launching a new product (and/or their achievements) are critical (lead to significant improvements) in achieving the desired product innovation intermediate and/or ultimate outcome(s).
Product Innovation Performance	The extent of achieving the desired outcomes – for developing and introducing a new-product (NP) into the marketplace – along three sequential (interrelated, yet distinctive) dimensions: (1) *operational-level performance* (OperLP: NPQS, new-product's quality superiority; NPDTS, new-product development and launching time superiority; and NPDCS, new-product development and launching cost superiority), then (2) *product-level performance* (ProdLP: NP's customer satisfaction, sales, and profits), and finally (3) *firm-level performance* (FirmLP: NP's contributions to enhance the firm's overall sales, profits, and market share).

Product Innovation Process Execution Proficiency (PEProf)	How well or adequately the overall product innovation process is carried out – to develop and introduce a new-product into the marketplace – in terms of *marketing activities (MAProf)*; (a1) searching for and generating new-product ideas, (a2) conducting a detailed study of market potential, customer preferences, purchase process, etc., (a3) testing the new-product under real-life conditions, and (a4) introducing the new-product into the marketplace; advertising, promotion, selling, etc., as well as *technical activities (TAProf)*; (b1) developing and producing the new-product's exemplar/prototype, (b2) testing and revising the new-product's exemplar/prototype according to the desired and feasible features, and (b3) executing new-product's production start-up.
Product-Level Performance (ProdLP)	The extent of achieving the desired outcomes – for developing and introducing a new-product (NP) into the marketplace – along product-level performance (ProdLP) in terms of NP's customer satisfaction, sales, and profits.
Technical Activities Execution Proficiency (TAProf)	How well or adequately the product innovation process's *technical activities* are carried out – to develop and introduce a new-product into the marketplace – in terms of developing and producing the new-product's exemplar/prototype, testing and revising the new-product's exemplar/prototype according to the desired and feasible features, and executing new-product's production start-up.
Top-Management (TM)	A group of managers who occupy formally defined positions of authority and have decision-making responsibilities over NPD-related activities.
Top-Management Support (TMS)	The extent of support provided by top-management – to develop and introduce a new-product into the marketplace – through top-management's resources dedication, commitment, and involvement.
U.S. Restaurants Context	Comprises U.S. commercial restaurants that have developed and launched a new-menu item within the previous five years that has been in the market for at least 12 months, and classified under the 2012's North American Industry Classification System (NAICS)'s code 722511 for full-service restaurants (e.g., fine dining and casual restaurants) and 722513 for limited-service restaurants (e.g., fast casual and quick service/fast food restaurants).

Chapter 1: Introduction

1.1. Research Background and Scope

Scholars and practitioners alike have devoted great attention and efforts to the successful management and best practices of product innovation as both of them agree that continuous and successful innovation of new products is crucial for a firm success and even survival. However, in light of the common firms constraints (e.g., limited resources, fierce competition, highly volatile technology and market-opportunities, shortened product life-cycles, continuously changing and increasing customers' expectations), product innovation is deemed an imperative and challenging endeavour as it is frequently accompanied by high costs, complexity, risks, and failures (e.g., Cooper, 2001; Feltenstein, 1986; Fuller, 1994; Gubman & Russell, 2006; Harrington *et al.*, 2009; Hsu & Powers, 2002; Johnson *et al.*, 2005; Jones & Wan, 1992; Kotler & Armstrong, 2012; Ottenbacher & Harrington, 2007, 2009a, b).

Therefore, it is not surprising that performance rests at the heart of product innovation literature (García *et al.*, 2008). Specifically, the primary focus for product innovation researchers and managers is on the identification of the critical success factors and their relative effects on the different outcomes of product innovation efforts. However, achieving this aim necessitates, first, an understanding of what constitutes a successful product innovation, as diverse meanings and classifications of a successful product innovation can yield diverse findings (Craig & Hart, 1992; Huang *et al.*, 2004).

Thus, product innovation researchers and managers alike need a comprehensive conceptualisation of product innovation performance (Montoya-Weiss & Calantone, 1994). Without measurable product innovation success, the zeal for developing and launching new products will diminish from both new product development (NPD) team and top-management (O'Dell & Grayson, 1999).

Measuring the outcomes of NPD efforts is vital to understand, explain, predict, and manage the organisational behaviours and resources allocation associated with firms product innovation efforts. NPD team and top-management will be motivated to perform the necessary NPD activities well and will be more willing to allocate the needed resources for developing and launching their new products if they believe and expect that doing so will lead to desired outcomes (Huang *et al.*, 2004). In this respect, special consideration needs to be devoted to the measurements and drivers of product innovation performance along its outcomes (Alegre *et al.*, 2006).

There is a consensus among scholars that product innovation is a disciplined problem-solving process (Atuahene-Gima, 2003; Brown & Eisenhardt, 1995), and inherently a multifaceted phenomenon that encompasses complex and simultaneous direct and indirect interrelationships among product innovation's enablers, process, and performance outcomes (e.g., Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Campbell & Cooper, 1999; Cooper, 1979; Cooper & Kleinschmidt, 1995a; Chryssochoidis & Wong, 1998; García *et al.*, 2008; Healy *et al.*, 2014; Kong *et al.*, 2014; Langerak *et al.*, 2004a, b; Song & Parry, 1997a; Thieme *et al.*, 2003).

However, surprisingly, until very recently, few empirical studies, which were mostly focused on the manufacturing firms, have tried to empirically investigate the simultaneous direct (i.e., Calantone & di Benedetto, 1988, 2012; Calantone *et al.*, 1996; Lee & Wong, 2011; Millson & Wilemon, 2002, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1997a, 1999; Song *et al.*, 2011) and indirect/mediated (i.e., Kleinschmidt *et al.*, 2007; Lee & Wong, 2010; Song & Parry, 1997b; Song *et al.*, 1997a, c; Thieme *et al.*, 2003) relationships among some measurements/dimensions of product innovation's critical firm-based enablers, process execution proficiency, and performance outcomes. Consequently, it is challenging to have a holistic understanding of the simultaneous interrelationships among these variables in light of the fragmented findings, varied focus and level of analysis for most of these studies.

Thus, there is a desperate need for an integrative model based on a system approach (Brown & Eisenhardt, 1995; Calantone & di Benedetto, 1988; Kessler & Chakrabarti, 1996; Song & Montoya-Weiss, 2001; Song & Noh, 2006; Song & Parry, 1997a; Tatikonda & Montoya-Weiss, 2001; Thieme *et al.*, 2003) that can provide product innovation researchers and managers with a holistic view for better and comprehensive understanding of the simultaneous and complex interrelationships among these core variables, which in turn could have crucial theoretical and practical implications for guiding and significantly improving the product innovation's planning, organisation, resources allocation, and process execution proficiency, as well as the operational, product, and firm performance. To this end, the present study aims to do so in a new and crucial context as detailed next.

Drawing on the relevant empirical literature and grounded on the integration of the complementary theoretical perspectives of the critical success factors (CSFs) approach, the resource-based view (RBV) of the firm theory, and the input-process-output (IPO) model, together, under the system(s) approach umbrella, the present study proposes and develops an original theoretical model of those critical, managerially controllable factors that have high potential for achieving the majority of the significant improvements in the desired (intermediate and ultimate) outcome(s) of product innovation efforts.

Besides accounting for the effects of firm size, firm age, and new product innovativeness as control variables, this study model (i.e., critical firm-based enablers mediators outcomes: CFEMOs), primarily, aims to comprehensively: (1) explicate the simultaneous direct and indirect/mediated interrelationships among the product innovation's critical firm-based enablers (CFEs: PFit; new-product fit-to-firm's skills and resources, CrosFI; internal cross-functional integration, and TMS; top-management support), process execution proficiency (PEProf), and performance outcomes (OperLP: operation-level performance, ProdLP: product-level performance, and FirmLP: firm-level performance), as well as (2) explain/predict the variation of the PEProf, OperLP, ProdLP, and FirmLP.

The research context for the current study comprises U.S. commercial restaurants that have developed and launched a new-menu item within the previous five years that has been in the market for at least 12 months, and classified under the 2012's North American Industry Classification System (NAICS)'s code 722511 for full-service restaurants (e.g., fine dining and casual restaurants) and 722513 for limited-service restaurants (e.g., fast casual and quick service/fast food restaurants). U.S. *commercial restaurants context* is considered an advantageous context for the current study's empirical investigation for the following main reasons.

Firstly, the adoption of U.S. commercial restaurants as a research context is deemed suitable for the sake of complementarity and comparability with, and enhancement of, the theoretical and practical outcomes of, the few relevant previous studies on product innovation literature that their research is mainly focused on: (1) a qualitative exploration of a limited number and type of U.S. commercial restaurants (e.g., Feltenstein, 1986; Gubman & Russell, 2006; Miner, 1996; Ottenbacher & Harrington, 2008, 2009a, b); and (2) a quantitative investigation of U.S. manufacturing firms (e.g., Calantone & di Benedetto, 1988, 2012; Calantone *et al.*, 1996; Kleinschmidt *et al.*, 2007; Millson & Wilemon, 2002, 2006; Song & Parry, 1997a; Song *et al.*, 2011).

Secondly, the United States of America (U.S.A.) is one of the top-ranked (high-income and innovative) countries according to the Global Innovation Index (GII) since its launch in 2007 (Dutta *et al.*, 2014). Additionally, U.S. commercial restaurants are generally more innovative than, for example, their UK's counterparts (Jones & Wan, 1992). *Thirdly*, product innovation is considered a key activity for U.S. commercial restaurants to achieve sustained competitive advantages and growth (Ottenbacher & Harrington, 2009b).

Fourthly, U.S. commercial restaurants have high status and crucial multiple-impacts (e.g., economic, social) both internationally and nationally. On an international level, despite the recent financial crisis, which strongly affected many markets and industries, the global restaurant industry has experienced strong growth in recent years. In 2014, the global restaurant industry's sales grew by 6.2% to reach a value of $2,737.1 billion, and the number of the global restaurant industry's employees grew by 1.8% to reach a volume of 65,461,900 employees. Additionally, in 2019, it is expected to have a sales value of $3,805.8 billion, and to have a volume of 70,624,400 employees, an increase of 39% and 7.9%, since 2014, respectively (MarketLine, 2015a).

Furthermore, from the total global restaurant industry's sales value ($2,737.1 billion) in 2014, U.S. restaurant industry's share comes first by accounting for $683.4 billion (25%), followed by the Chinese restaurant industry for a further $609 billion (22.25%). Moreover, with regard to the global restaurant industry, all the four leading global companies in 2014 (i.e., Doctor's Associates Inc., McDonald's Corporation, Starbucks Corporation, and Yum! Brands, Inc.), were based in the U.S.A. (MarketLine, 2015, a, b, c).

Turning to the national level, *"Our nation's restaurants continue to be an essential part of Americans daily lives and play a vital role in every community across the country"*, said Dawn Sweeney, President and CEO of the National Restaurant Association. She added that *"Although operators will continue to face a range of complex challenges …, the restaurant and foodservice industry remains a fundamental driver of the nation's economy, while providing valuable careers and opportunities to (over) 14 million Americans"*. U.S. restaurant industry is an essential part of the Americans daily lives: 90% of consumers enjoy going to restaurants; 50% of consumers regard restaurants as an essential part of their lifestyle; 70% of consumers believe that their favourite restaurant foods provide flavours they cannot easily duplicate at home; and 80% of consumers consider dining out with family and friends is a better use of their leisure time than cooking and cleaning up. U.S. restaurant industry is mainly comprised of small businesses (over 90% of restaurants have fewer than 50 employees; over 70% of restaurants are single-unit operations) with a large impact on U.S. nation’s economy (National Restaurant Association, 2015a, b, c, d).

U.S. restaurant industry has $1.8 billion daily sales, 47% share from U.S. food dollar, and, according to the National Restaurant Association’s 2016 Restaurant Industry Forecast, is projected to employ 14.4 million individuals in over one million restaurants, and remain the nation’s second largest private-sector employer, representing about 10% of the total U.S. workforce. It is expected to outpace the total U.S. job growth for the 17th consecutive year, keeping it among U.S. economy’s leaders in job creation. In the next decade, it is expected to add 1.7 million new positions. Additionally, while the operating environment will remain challenging, the total U.S. restaurant industry sales are expected to reach a value of $782.7 billion in 2016 and equal 4% of U.S. Gross Domestic Product (GDP), marking the seventh consecutive year of real sales growth for the industry. Remarkably, out of the $782.7 billion total sales, 92.04% ($720.4 billion) goes for the commercial sector in general, and specifically for the full- and limited-service restaurants (excluding lodging’s restaurants) which comprise 74.43% ($536.2 billion) of the total commercial sector’s sales value (National Restaurant Association, 2016a, b, c, d, e, f). Based on the aforementioned reasoning, the context of U.S. commercial restaurants was deemed a worthy candidate for study.

1.2. Research Motivation and Significance

Continuous and successful innovation of new menu-items is crucial for a restaurant success and even survival; however, restaurateurs typically face high costs, complexity, risks, and failures throughout developing and launching their new menu-items (e.g., Cooper, 2001; Feltenstein, 1986; Fuller, 1994; Gubman & Russell, 2006; Harrington *et al.*, 2009; Hsu & Powers, 2002; Johnson *et al.*, 2005; Jones & Wan, 1992; Kotler & Armstrong, 2012; Ottenbacher & Harrington, 2007, 2009a, b).

Restaurants' new menu-items either fail commercially in the marketplace, or cancelled prior to its launch. Innovating new menu-items represents a monumental investment for a restaurant, both in money and human resources. Product innovation resources are too valuable and scarce to waste on the wrong new menu-items. The odds against success are disheartening and result in wasted time, money and human resources. The rewards, on the other hand, can mean the continued profitability of the restaurant (Jones & Wan, 1992; Fuller, 1994; Cooper, 2001; Harrington *et al.*, 2009).

Restaurant operators must reduce their risk, because new menu-items' failure can be very costly. Each year, companies lose an estimated $20 billion to $30 billion on failed food products alone (Kotler & Armstrong, 2012). Failure in new menu-items can cut a restaurant's sales by as much as 50 percent and consequently may lead to closure of a restaurant (Johnson *et al.*, 2005; Ottenbacher & Harrington, 2007). Product innovation in restaurants is a complicated process. Trials of many ideas are often required to achieve just one successful new menu-item in the marketplace. Although many new menu-items are tested, few become successful in the marketplace. For example, the McLean low-fat hamburger was rolled out with much fanfare by McDonald's but subsequently failed completely (Hsu & Powers, 2002).

Not only small restaurants have problems in NPD management, but large and usually successful restaurants have also had several NP failures. For example, McDonald's has not been free of NP failures. McDonald's, with several billion dollars in sales annually, removed several new menu-items a short time after their introduction. McLean Deluxe, Arch Deluxe, fajitas, and pizza have been marketplace flops for McDonald's in the past. Not only were these fiascos expensive with many wasted resources, the corporate image was damaged as well. Therefore, in this high-risk situation, greater care should be taken to control the product innovation process and ensure successful outcomes (Gubman & Russell, 2006; Ottenbacher & Harrington, 2007, 2009a, b).

Although *their* endeavours to achieve sustained competitive advantages and growth through innovating new menu-items are critically challenging (i.e., commonly accompanied by high costs, complexity, risks, and failures), *U.S. restaurateurs* still have to seek continuous and successful innovation of new menu-items as U.S. restaurants' market: (1) is highly volatile, mature and competitive; (2) many of its menu-items have reached the end of their life cycles; and (3) has numerous restaurants with similar structures, limited available-resources, offering similar menu-items at similar prices, in a low-margin environment, whereby consumers incur no switching costs when changing their foodservice providers (Feltenstein, 1986; Gubman & Russell, 2006; Hsu & Powers, 2002; Jones & Wan, 1992; MarketLine, 2015c; Miner, 1996).

In an endeavour to mitigate these high costs, complexity, risks, and failures, this study aims to develop and empirically test – for the first time (both generally and specifically within the context of U.S. restaurants) – an integrated, theory-informed model of critical managerially controllable factors that have high potential for achieving the majority of the significant improvements in the desired (intermediate and ultimate) outcome(s) of product innovation efforts.

Such a model could comprehensively explicate the simultaneous direct and indirect/mediated interrelationships among the product innovation's critical firm-based enablers (CFEs: PFit, CrosFI, and TMS), process execution proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP), as well as explain/predict the variations of the PEProf, OperLP, ProdLP, and FirmLP. Therefore, conducting the current study is considered to be crucially pertinent to product innovation researchers and managers who seek clearer and comprehensive understanding of the simultaneous and complex interrelationships among these core variables.

Through the present study's findings, a clarification of these simultaneous and complex interrelationships, as well as a better explanation/prediction of the variation of the PEProf, OperLP, ProdLP, and FirmLP, might be achieved, which in turn could have crucial theoretical and practical implications, both generally and specifically within the context of U.S. restaurants, for guiding and significantly improving the product innovation's planning, organisation, resources allocation, and process execution proficiency, as well as the operational, product, and firm performance.

1.3. Research Outline

This thesis comprises seven chapters as outlined below:

Initially, ***Chapter 1*** is an introductory chapter that aims to provide a brief overview of the research background, scope, motivation, significance, and outline.

Chapter 2 provides a critical review for two extant literature streams that underpin this study. The first part of this chapter introduces the current literature on product innovation in restaurants (the first literature stream), synthesises its contents, and identifies research gaps and shortcomings. The second part of this chapter introduces the existing literature models that empirically investigate the direct and/or indirect (mediated) interrelationships among the product innovation's CFEs, PEProf, and performance outcomes (the second literature stream). Additionally, the second part of this chapter synthesises the contents and identifies the research gaps and shortcomings in this research stream. Finally, based on these identified research gaps and shortcomings, this chapter ends by providing the research questions, aim, and objectives.

Chapter 3 introduces the current study's theoretical underpinnings, conceptual framework (Critical Firm-based Enablers-Mediators-Outcomes: CFEMOs model, section 3.2.10), investigated variables, hypotheses development, and control variables. Besides the significant relationships identified from the relevant empirical studies (section 3.3), the hypothesised direct and indirect/mediated relationships of the CFEMOs model are based on integrating the complementary theoretical perspectives of the Critical Success Factors (CSFs) approach; the Resource-Based View (RBV) of the firm theory; and the Input-Process-Output (IPO) model, together, under the system(s) approach's umbrella (section 3.2).

Chapter 4 introduces and justifies the adopted research: philosophical worldview (post-positivism); approach (deductive); design (quantitative); strategy (survey); and method (self-completed, web-based via email, questionnaire survey). Additionally, it explains and rationalises the utilised research: population (U.S. commercial restaurants); unit/level of analysis (restaurants new menu-items); level of respondents seniority (restaurants owners/senior executives); and ethical considerations. Furthermore, it describes and substantiates the questionnaire’s design, measures, validation (pre-testing and piloting), and the final questionnaire’s content. Moreover, it explains the access to target respondents and final questionnaire’s deployment and data collection. Finally, it ends by detailing the utilised data analysis technique (multivariate: SEM), SEM type (PLS-SEM); and PLS-SEM software program (WarpPLS v. 4).

Following the completion of data collection (section 4.10.2), ***Chapter 5*** starts with assessing the quality of these collected data (section 5.2). Next, it describes the sample characteristics (section 5.3). Followed by presenting this study’s constructs and items scores (mean and standard deviation), and the significance, sign, and magnitude of its constructs intercorrelations (section 5.4). Additionally, it provides the selected PLS-SEM algorithmic options and parameters estimates settings (section 5.5.1). Furthermore, it details the validation of this study’s formative measurement model (section 5.5.2) and structural model (section 5.5.3). Moreover, it explains the hypotheses testing based on conducting comprehensive mediation analyses explicating the total, direct, total indirect, specific indirect, and sequential indirect effects among the investigated constructs of this study (section 5.5.4). This chapter ends with further analysis, by conducting an Importance-Performance Matrix Analysis (IPMA) for the formative constructs by their items; target constructs by their predictor constructs; and target constructs by their predictor constructs items (section 5.5.5).

By taking the current study's *Research Questions* (RQ1 to RQ6, section 2.5) as an *outline*, ***Chapter 6*** aims to discuss the answers to these research questions in light of this study's theoretical underpinnings and model (CFEMOs, section 3.2), research hypotheses (H1 to H14c, section 3.3), and empirical findings within U.S. restaurants context (sections 5.5.3.5, 5.5.4, and 5.5.5), as well as the (dis)similar findings of the previous, relevant empirical studies on product innovation literature within the manufacturing context (sections 2.3, 3.2, and 3.3).

Finally, ***Chapter 7*** concludes the thesis by, concisely, recalling the present study's main empirical findings (section 7.1). Next, it provides several key original contributions and crucial implications to product innovation's research and practice (section 7.2). Finally, it offers promising avenues for future research based on the current study's limitations (section 7.3).

Chapter 2: Literature Review

2.1. Introduction

The main aim of this study is to develop and empirically test, within a U.S. restaurants context, an integrated, theory-informed model comprehensively: (1) explicating the simultaneous direct and indirect (mediated) interrelationships among the product innovation's Critical Firm-based Enablers (CFEs: PFit, CrosFI, and TMS), Process Execution Proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP); as well as (2) explaining/predicting the variation of the PEProf, OperLP, ProdLP, and FirmLP. To this end, this chapter provides a critical review for two extant literature streams that underpin this study. The first part of this chapter introduces the current literature on product innovation in restaurants (the first literature stream), synthesises its contents, and identifies its research gaps and shortcomings. The relevant previous research contents are analysed based on their research focus and key findings, as well as research methodology including data collection method(s), and sample.

In an endeavour to complement some of the research gaps and shortcomings in the first literature stream, the second part of this chapter introduces the existing literature models that empirically investigate the direct and/or indirect (mediated) interrelationships among the product innovation's CFEs, PEProf, and performance outcomes (the second literature stream). Additionally, the second part of this chapter synthesises the contents and identifies the research gaps and shortcomings in this research stream. The relevant previous research contents are analysed based on their (1) main research variables definitions and operationalisation, (2) investigated relationships, key research findings, and models explanatory/predictive power, (3) employed theories/frameworks, and (4) utilised research methodology including data collection method(s), sample and respondents, and data analysis method(s) and software. Drawing on the conducted critical literature review, this chapter outlines the main research gaps and shortcomings in the previous studies along both literature streams. Finally, based on these identified research gaps and shortcomings, this chapter ends by providing the research questions, aim, and objectives.

2.2. Previous Research on Product Innovation in Restaurants

This section introduces the current literature on product innovation in restaurants, synthesises its contents, and identifies its research gaps and shortcomings. The relevant previous research contents are analysed based on their research focus and key findings, as well as research methodology including data collection method(s) and sample.

Previous research on product innovation in restaurants, as shown in Table 2.1, have primarily focused on an exploratory investigation of the characteristics (stages and activities) of the adopted product innovation process in restaurants by: (1) following a case study approach in five U.S. quick-service restaurant chains (Feltenstein, 1986); (2) utilising secondary data based on a published report conducted by Technomic's Chicago-based restaurant consulting firm; Technomic's survey of the top-200 U.S. restaurant chains (Miner, 1996); (3) conducting semi-structured interviews in: (a) 12 German Michelin-Starred Chefs fine-dining restaurants (Ottenbacher & Harrington, 2007); (b) 12 German and four U.S. Michelin-Starred Chefs fine-dining restaurants (Ottenbacher & Harrington, 2008); (c) 12 German, four U.S. and four Spanish Michelin-Starred Chefs fine-dining restaurants (Ottenbacher & Harrington, 2009a); and (d) six U.S. quick-service restaurant chains (Ottenbacher & Harrington, 2009b).

In addition, two studies have investigated the nature of product innovation practices in restaurants by following: (1) a mixed method approach based on a survey of published reports, magazine and journal articles, restaurant chains annual reports and in-house materials, and supported by eight in-depth interviews and 12 questionnaires in 12 UK quick-service restaurant chains (Jones & Wan, 1992); and (2) a case study approach in one U.S. quick-service restaurant chain (i.e., McDonald's; Gubman & Russell, 2006).

Table 2.1. Previous research on product innovation in restaurants

Studies	Research Focus	Research Methodology/Method	Research Sample
Feltenstein (1986)	Product Innovation Process Characteristics (Stages & Activities)	Case Study	5 U.S. quick-service restaurant chains
Jones and Wan (1992)	Nature of Product Innovation Practices	Mixed Methods; Interviews, Questionnaire-Survey, and Secondary Data	8 in-depth interviews and 12 questionnaires in 12 UK quick-service restaurant chains
Miner (1996)	Product Innovation Process Characteristics (Stages & Activities)	Secondary Data	Based on a published report conducted by Technomic's Chicago-based restaurant consulting firm (Technomic's survey of the top-200 U.S. restaurant chains)
Gubman and Russell (2006)	Nature of Product Innovation Practices	Case Study	1 U.S. quick-service restaurant chain (McDonald's)
Ottenbacher and Harrington (2007, 2008, 2009a)	Product Innovation Process Characteristics (Stages & Activities)	Semi-Structured Interviews	12 German, 4 U.S. and 4 Spanish Michelin-Starred Chefs' fine-dining restaurants
Ottenbacher and Harrington (2009b)	Product Innovation Process Characteristics (Stages & Activities)	Semi-Structured Interviews	6 U.S. quick-service restaurant chains

Both Jones and Wan (1992) and Gubman and Russell (2006) investigated the nature of product innovation practices in restaurants. Jones and Wan (1992) studied the nature of product innovation practices in UK foodservice chains by following a mixed method approach based on a survey of published reports, magazine and journal articles, restaurant chains annual reports and in-house materials, and supported by eight in-depth interviews and 12 questionnaires in 12 UK quick-service restaurant chains. Jones and Wan (1992) explored the nature of product innovation practices in UK restaurant chains along four dimensions, namely the adopted research and development approach, the nature of external scanning, the product design approach, and the creation of a supportive internal environment for innovation.

Within UK-based restaurant chains, Jones and Wan (1992) reported that there is relatively little formal in-house research and development, and that research and development activities are carried out either by suppliers, the parent company in the U.S.A., or on a trial-and-error basis. They also found that companies that are most likely to scan the external environment systemically and regularly, as well as to engage in product design activities, are UK affiliates of large multinational U.S.-based restaurant chains, while UK-based ones are not engaged in such scanning or product design activities. In addition, they indicated that, except for one small company, because of its top-management innovation commitment, no company, regardless of its size, has explicitly created such an internal environment that really supported innovation. Furthermore, they concluded that: (1) product innovation in UK restaurant chains is – largely – *ad hoc* rather than systematic practice; (2) the type of product innovation is mainly an imitation from competitors rather than original; and (3) restaurants in the U.S.A. are generally more innovative than UK-based ones, as U.S. restaurants market is considered more mature, thus, many products have reached the end of their life-cycle, beside the firm-size and available resources that are considerably larger (Jones & Wan, 1992).

By following a case study approach, Gubman and Russell (2006) investigated the nature of product innovation practices in just one U.S. quick-service restaurant chain (i.e., McDonald's). Gubman and Russell (2006) stated that in order to increase its chances for developing and launching a successful new menu-item, McDonald's bases its products innovations on four main practices, namely the innovation centre, the innovation council, the strategic innovation process, and a customer-focused innovation. The innovation centre is a huge establishment that has several model kitchens. The centre works on changes that are two-to-five years away, and takes ideas from around the world and puts them into a restaurant setting.

After testing the new product, the company pilots it in 50 to 100 restaurants to test and update the menu, the operating platform, and all the associated restaurant's systems. In order to decide the company's future innovation direction, the innovation council holds regular meetings that include owner-operators, employees from different levels, suppliers, and entrepreneurs. The strategic innovation process is a disciplined, stage-gate process, designed to bring new products to the market faster and to provide direction to what will stay on, or be excluded from, the menu. Owner-operators are actively involved in every stage, from idea-generation to concept-development, testing and lastly to rollout. A customer-focused innovation is emphasised by building more capability to study customers and run the company through the customer's eyes in terms of creating differentiated new products relative to competitors (Gubman & Russell, 2006). In an attempt to help restaurateurs increase their chances for developing and launching successful new menu-items, previous studies (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b), have collectively outlined four models for product innovation process in restaurants, as shown below in Table 2.2.

Table 2.2. Product innovation process models in restaurants

<table>
<tr><th>Studies</th><th>Feltenstein (1986)</th><th>Miner (1996)</th><th>Ottenbacher and Harrington (2007, 2008, 2009a)</th><th>Ottenbacher and Harrington (2009b)</th></tr>
<tr><td rowspan="14">Stages/Activities</td><td>Assemble new-product task-force</td><td rowspan="3">Product ideas</td><td rowspan="3">Idea generation</td><td rowspan="2">Category strategy</td></tr>
<tr><td>Set new-product priorities</td></tr>
<tr><td>Generate new-product ideas</td><td>Idea generation</td></tr>
<tr><td>Screen and select ideas</td><td>Initial evaluation</td><td>Screening</td><td>First screening</td></tr>
<tr><td rowspan="8">Develop products</td><td rowspan="3">Consumer reaction</td><td rowspan="4">Trial and error</td><td>Concept test</td></tr>
<tr><td>Second screening</td></tr>
<tr><td>Prototypes</td></tr>
<tr><td rowspan="3">Sensory testing</td><td>Third screening</td></tr>
<tr><td rowspan="2">Concept development</td><td>Concept refinement/development</td></tr>
<tr><td>Fourth screening</td></tr>
<tr><td rowspan="2">Field testing</td><td>Final testing</td><td>Test market</td></tr>
<tr><td>Training</td><td>Final pre-launch screening</td></tr>
<tr><td rowspan="2">Plan marketing and rollout campaigns</td><td rowspan="2">Product introduction</td><td rowspan="2">Commercialisation</td><td>Launch</td></tr>
<tr><td>Evaluate performance</td></tr>
</table>

In order to be able to develop and launch their new menu-items, restaurateurs have to utilise a product innovation process, which can be in one form or another as shown in Table 2.2. The stages that restaurateurs typically execute in this process may vary in terms of name, number, order, length, depth and breadth. These variations in product innovation's process stages mirror the variations in: (1) new menu-item type and sophistication; (2) restaurant's type, size, strategy, as well as available time, resources, and skills; and (3) target market's characteristics with reference to customers and competitors.

However, drawing on a synthesis of the relevant previous studies (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b), there are five basic and essential product innovation's process stages for any restaurant operator to be able to develop and launch a new menu-item.

The product innovation process starts with *idea generation* (i.e., the systematic search for new menu-item ideas). Next is *screening*, which reduces the number of new menu-item ideas based on the restaurant's own criteria. New menu-item ideas that pass the screening stage continue through to *development* in which new menu-item developers create, in an iterative process, various, detailed, and materialised versions of the new menu-item concepts (i.e., prototypes/exemplars). In the next stage (i.e., *testing*), new menu-item prototypes are tested, in an iterative process, both in-house, as well as with a group of target customers, to determine whether a new menu-item is feasible and has a strong customer appeal prior to launch. The final stage is *launching*, in which a strong new menu-item, with the highest potentials, is introduced into the market, as detailed next.

Idea Generation:

The product innovation process starts with *idea generation*. To do so, restaurateurs typically get inspiration from a variety of sources (e.g., customers, food trends, competitors, employees, suppliers, and franchisees). Based on trends and inspiration of ingredients, production techniques, presentation techniques, and taste combinations, new menu-item developers start generating large numbers of new menu-item ideas via brainstorming (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b).

Screening:

After generating large numbers of new menu-item ideas, next comes *screening*, which reduces these numbers based on evaluating and ranking each new menu-item idea along three main dimensions: (1) its appeal to the target market; (2) its compatibility with the restaurant's resources and skills regarding innovation, production, and marketing; and (2) its potential benefits to the restaurant in terms of sales, profitability, and market share. Thus, new menu-item ideas with low potentials along these three dimensions are eliminated to focus the restaurant's limited and valuable resources on those new menu-item ideas with star potentials (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b).

Development:

New menu-item ideas that pass the screening stage continue through *development*, in which new menu-item developers create, in an iterative process, various, detailed, and materialised versions of the new menu-item concepts (i.e., prototypes/exemplars). Each prototype has a code/name, based on different combinations in terms of the cooking style, as well as the harmony among the main and supplementary ingredients, flavour, texture, colour, shape, size, and temperature. The number of created prototypes can vary from one new menu-item and/or restaurant to another.

While most restaurateurs create two-to-four prototypes, large restaurants operators (especially for highly sophisticated new menu-items) create 15-25 prototypes, or even 60 prototypes. Developing prototypes involves deciding a name and the ingredients to use, creating recipes, calculating food costs and pricing, and mapping operational issues regarding new menu-item supply, preparation, storing, selling, and serving (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b).

Testing:

After developing various new menu-item prototypes, the next stage is *testing*, in which new menu-item prototypes are tested, in an iterative process, both in-house, as well as with a group of target customers, in order to reduce uncertainties and failure's risks by a closer determination of whether a new menu-item is feasible and has a strong customer appeal before its launch.

New menu-items developers can test and evaluate their prototypes before the full-launch through taste panels, focus groups, and trial selling. Restaurateurs typically test their new menu-items in the form of menu specials, trials, or free samples to get customers feedback about their new menu-items. Alongside the in-house testing, in order to have a real and true feedback about their prototypes, new menu-items developers pilot and test their prototypes in a "real" environment by doing product and customer testing in, two-to-three restaurants, or even 50-100 restaurants for large restaurants operators, especially for highly sophisticated new menu-items. This helps new menu-items developers to test, evaluate, optimise, and fine-tune a new menu-item culinary aspects, recipe, packaging, food safety, name, and pricing, as well as its operational procedures in relation to supply, preparation, storing, selling, and serving. When a new menu-item is finally introduced into the market, customers see redesigned, reformulated, and perfected version of the original new menu-item idea (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b).

Launching:

After completing all the previous product innovation's process stages, next comes *launching* as the final stage, in which only the strongest new menu-items with the highest potential are introduced into the market. Once the decision has been made to launch the new menu-item, plans for introducing the new menu-item should be completed and implemented. These launching plans should clearly detail the timing, support, and tactics for introducing and marketing the new menu-item. Restaurateurs typically launch the new menu-item into the market by adding the new menu-item into their formal menus and start selling it to customers in all of their restaurants (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b).

Based on reviewing the extant relevant literature regarding product innovation in restaurants (Feltenstein, 1986; Gubman & Russell, 2006; Jones & Wan, 1992; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b), it is evident that there are both merits and shortcomings in these works. From a pioneering perspective, Feltenstein's (1986) study is considered to be the first study that has investigated product innovation in restaurants. Specifically, Feltenstein's (1986) study investigated the characteristics (stages and activities) of the adopted product innovation process in restaurants by following a case study approach in five U.S. quick-service restaurant chains. In a similar vein, Jones and Wan's (1992) study is considered to be the second study that has investigated product innovation in restaurants in general, but the first and the only study that has investigated the nature of product innovation practices in UK foodservice chains in particular. Specifically, Jones and Wan (1992) investigated the nature of product innovation practices in UK foodservice chains by following a mixed method approach based on a survey of published reports, magazine and journal articles, restaurant chains annual reports and in-house materials, and supported by eight in-depth interviews and 12 questionnaires in 12 UK quick-service restaurant chains.

In terms of the relative recency and coverage, Ottenbacher and Harrington's (2007, 2008, 2009a, b) studies are considered to be the last four (out of eight) studies that have examined product innovation in restaurants. These studies have investigated the characteristics (stages and activities) of the product innovation process adopted by restaurants utilising semi-structured interviews in: a) 12 German Michelin-Starred Chefs fine-dining restaurants (Ottenbacher & Harrington, 2007); b) 12 German and four U.S. Michelin-Starred Chefs fine-dining restaurants (Ottenbacher & Harrington, 2008); c) 12 German, four U.S. and four Spanish Michelin-Starred Chefs fine-dining restaurants (Ottenbacher & Harrington, 2009a); and d) six U.S. quick-service restaurant chains (Ottenbacher & Harrington, 2009b).

Despite the great efforts and valuable insights provided by the prior works (Feltenstein, 1986; Gubman & Russell, 2006; Jones & Wan, 1992; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b) on the nature of product innovation practices and the characteristics (stages and activities) of the adopted product innovation process in restaurants, these studies still have some research gaps and shortcomings, as follow.

Over the past three decades, only eight studies have investigated product innovation in restaurants. Additionally, to date, since Ottenbacher and Harrington's (2009b) study, there have been no more studies on product innovation in restaurants. Furthermore, these prior studies are mainly: (1) exploratory and qualitative, with a lack of theory-informed and/or theory-testing quantitative studies utilising advanced statistical analysis techniques, such as Structural Equation Modelling (SEM); (2) based on small-sample and narrow-coverage regarding both the numbers and types of the investigated restaurants; and (3) focused on investigating the nature and the characteristics (stages and activities) of the adopted product innovation process in restaurants, with an absence of an empirical investigation of the causal direct and indirect (mediated) interrelationships among the product innovation *process*, *its* antecedents (e.g., Critical Firm-based Enablers; CFEs), and consequences (e.g., performance outcomes).

Thus, to address the aforesaid research gaps and shortcomings, regarding investigating product innovation in restaurants, there is still a need for more: (1) recent studies; (2) quantitative studies utilising advanced statistical analysis techniques, such as SEM; (3) large-sample and wide-coverage studies with reference to the numbers and types of the investigated restaurants; (4) theory-informed, theory-development, and theory-testing studies; (5) empirical studies comprehensively investigate the causal direct and indirect (mediated) interrelationships among the product innovation *process*, *its* antecedents (e.g., CFEs), and consequences (e.g., performance outcomes).

2.3. Previous Research Models that Empirically Investigate the Direct and/or Indirect (Mediated) Interrelationships among the Product Innovation's Critical Firm-Based Enablers, Process Execution Proficiency, and Performance Outcomes

In an endeavour to complement some of the aforementioned research gaps and shortcomings in the extant product innovation literature in restaurants (the first literature stream), this section introduces the existing literature models (the second literature stream) that empirically investigate the direct and/or indirect (mediated) interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes (i.e., *empirical studies models in which one or more of the PEProf's measures is both affected by one or more of the CFEs, and has an effect on one or more of the product innovation performance dimensions*). Additionally, it synthesises the contents and identifies the research gaps and shortcomings in this second research stream.

The relevant previous research contents are analysed based on their (1) main research variables definitions and operationalisation, (2) investigated relationships, key research findings, and models explanatory/predictive power, (3) employed theories/frameworks, and (4) utilised research methodology; including (a) data collection method(s), (b) sample and respondents, and (c) data analysis method(s) and software.

2.3.1. Previous Research Models that just Focus on the Direct Relationships

As outlined in Table 2.3, and explained in the following paragraphs, this section introduces the extant literature models that empirically investigate the direct interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes.

Table 2.3. Previous research's models that just focus on the direct effects

Study	Key Investigated Variables' Relationships (Findings)	Control Variables	Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
	Direct Effects						
Calantone and di Benedetto (1988)	MFit→MAProf (+), TFit→TAProf (+), TAProf→NPQS (+), MAProf→NP Performance (+), Launch Proficiency→NP Performance (NS), TAProf→NP Performance (+), NPQS→NP Performance (+)		System of 6 Equations, 3-Stage Least Squares (3SLS) Analysis		Mail Questionnaire Survey	Convenience Sample, 189 NPD Projects from South-Eastern U.S. Firms in Electronic Equipment, Communications Equipment Manufacturing, Power Equipment, Boat Construction, Aircraft Construction, NASA Suppliers, and Nuclear Power Suppliers Industries	Senior Managers (63%)
Calantone et al. (1996)	MFit→MAProf (+), TFit→TAProf (+), TAProf→NPQS (NS), MAProf→NP Performance (+), TAProf→NP Performance (+), NPQS→NP Performance (U.S.: NS, China: +)		Covariance-Based SEM (EQS 3)		Mail Questionnaire Survey	Random Sample, 142 NPD Projects from 142 U.S. Firms, and 470 NPD Projects from 248 Chinese Firms in Manufacturing and Consumer Goods Industries	Senior Managers (U.S.: 41%, China: 85.8%)

Table 2.3. Previous research's models that just focus on the direct effects *(Continued)*

Study	Key Investigated Variables' Relationships (Findings): Direct Effects	Control Variables	Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
Song and Parry (1997a)	TFit→TAProf (+), MFit→Idea Development and Screening Proficiency (+), MFit→Business and Market-Opportunity Analysis Proficiency (+), MFit→Product Testing Proficiency (+), MFit→Product Commercialisation Proficiency (+), CrosFI→Idea Development and Screening Proficiency (+), CrosFI→Business and Market-Opportunity Analysis Proficiency (+), CrosFI→TAProf (+), CrosFI→Product Testing Proficiency (+), CrosFI→Product Commercialisation Proficiency (+), TMS→Idea Development and Screening Proficiency (+), TMS→Business and Market-Opportunity Analysis Proficiency (+), TMS→TAProf (+), TMS→Product Testing Proficiency (Japan: +, U.S.: NS), TMS→Product Commercialisation Proficiency (+), Idea Development and Screening Proficiency→NPQS (Japan: NS, U.S.: –), Business and Market-Opportunity Analysis Proficiency→NPQS (+), TAProf→NPQS (+), Product Testing Proficiency→NPQS (+), Product Commercialisation Proficiency→NPQS (Japan: NS, U.S.: +), NPQS→NP Profitability (High MFit: +, High TMS: +, High Market Potential: +, High Competitive Intensity: –), NPQS→NP Sales (High MFit: +, High TMS: +, High Market Potential: +, High Competitive Intensity: –), NPQS→Market Share (High MFit: +, High TMS: +, High Market Potential: +, High Competitive Intensity: –)		OLS Regression Analysis	Day and Wensley's (1988) Framework of Sources of Advantage, Positional Advantage, and Performance (SPP)	Mail Questionnaire Survey	Random Sample, 788 NPD Projects from 404 Japanese High-Tech Manufacturing Firms, 612 NPD Projects from 312 U.S. High-Tech Manufacturing Firms	Senior Managers (Japan: 81%, U.S.: 62.4%)

Table 2.3. Previous research's models that just focus on the direct effects *(Continued)*

Study	Key Investigated Variables' Relationships (Findings) — Direct Effects	Control Variables	Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
Song and Parry (1999)	MFit→MAProf (+), TFit→TAProf (+), MAProf→NPQS (+), TAProf→NPQS (+), NPQS→NP Market Performance (+)		Covariance-Based SEM (LISREL)		Mail Questionnaire Survey	Random Sample, 412 High-Innovativeness Projects, 375 Low-Innovativeness Projects from Japanese Manufacturing Companies	Senior Managers (81%)
Song and Montoya-Weiss (2001)	MFit→MAProf (+), TFit→TAProf (+), CrosFI→MAProf (+), CrosFI→TAProf (+), TFit→NPQS (HTU:+, LTU:NS), MAProf→NPQS (HTU:NS, LTU:+), TAProf→NPQS (+), TFit→NP Financial Performance (+), CrosF→NP Financial Performance (+), TAProf→NP Financial Performance (NS), NPQS→NP Financial Performance (+)	Employees Number, R&D Spending % of Sales, Total Assets	Covariance-Based SEM (LISREL)	RBV Theory	Mail Questionnaire Survey	Random Sample, 553 NPD Projects from Japanese High-Tech Firms in Computer Related Products, Electronics, Electric Equipment and Household Appliances, Machinery, Telecommunications Equipment, Instruments and Related Products, Air Conditioning, Chemicals and Related Products, Transportation Equipment, and Pharmaceuticals, Drugs, and Medicines Industries	Senior Managers (55%)

Table 2.3. Previous research's models that just focus on the direct effects *(Continued)*

Study	Key Investigated Variables' Relationships (Findings)	Control Variables	Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
	Direct Effects						
Millson and Wilemon (2002)	CrosFI→NP Development and Launch Proficiency (NS), CrosFI→NP Profits (+), CrosFI→NP Sales (NS), PEProf→NP Profits (+), PEProf→NP Sales (+), PEProf→Creating NPs for Existing Markets (NS), PEProf→Open New Markets (+)	External Environmental Factors: Market Dynamism, Market Hostility, and Market Complexity; Internal Environmental Factors: Decision-Making, Management Philosophy, Market Aggressiveness, and Level of Technology	Spearman Rank Correlations, SAS Correlational Software Model		Mail Questionnaire Survey	Random Sample, 57 Most Successful and 61 Least Successful New Products of U.S. Firms in Medical Instruments, Electrical Equipment, and Heavy Construction Equipment Industries	Senior Managers (47.5%)

Table 2.3. Previous research's models that just focus on the direct effects *(Continued)*

Study	Key Investigated Variables' Relationships (Findings) — Direct Effects	Control Variables	Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
Millson and Wilemon (2006)	CrosFI→NP Development and Launch Proficiency (NS), CrosFI→NP Profits (NS), CrosFI→NP Sales (NS), PEProf→NP Profits (NS), PEProf→NP Sales (NS), PEProf→Creating NPs for Existing Markets (+), PEProf→Open New Markets (+)	External Environmental Factors: Market Dynamism, Market Hostility, and Market Complexity; Internal Environmental Factors: Decision-Making, Management Philosophy, Market Aggressiveness, and Level of Technology	Spearman Rank Correlations, SAS Correlational Software Model		Mail Questionnaire Survey	Random Sample, 33 Most Successful and 25 Least Successful New Products of 36 U.S. Firms in Electrical Equipment Manufacturing Industry	Senior Managers (54.7%)
Lee and Wong (2011)	MFit→MAProf (+), CrosFI→MAProf (+), TFit→TAProf (+), CrosFI→TAProf (+), MAProf→NP Performance (+), TAProf→NP Performance (+)	Firm Size, Industry Type	Hierarchical Moderated Regression Analysis, Covariance-Based SEM (LISREL)		Drop-and-Collect Questionnaire Survey	Random Sample, 232 NPD Projects from 232 South Korean Manufacturers	Senior Managers (52%)

Table 2.3. Previous research's models that just focus on the direct effects *(Continued)*

Study	Key Investigated Variables' Relationships (Findings): Direct Effects	Control Variables	Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
Song et al. (2011)	Internal R&D Resources→Product Launch Quality (+), Internal Marketing Resources→Product Launch Quality (+), Internal R&D Resources→First Product Performance (+), Internal Marketing Resources→First Product Performance (NS), Product Launch Quality→First Product Performance (+)	Founding Team's Characteristics, Industry Type	Heckman Sample Selection Models were Estimated in a Full Information Maximum Likelihood Procedure Using SAS QLIM Procedure, OLS Regression Models	Integrating the RBV Theory and Day and Wensley's (1988) Framework of Sources of Advantage, Positional Advantage, and Performance (SPP)	Questionnaire Survey	Convenience Sample, 496 Launched New Products and 215 Killed New Products from 711 U.S. New Ventures in Telephone and Wireless Communication Equipment, Consumer Electronics, Games and Toys, Computer and Software Products, and Household Related Products Industries	New Ventures' Founders (43%)
Calantone and di Benedetto (2012)	CrosFI→Quality of Marketing Effort (+), CrosFI→Lean Launch Execution (+), Quality of Marketing Effort→NP Performance (+), Lean Launch Execution→NP Performance (+), Launch Timing→NP Performance (NS)		Covariance-Based SEM (EQS 6.1B), Variance-Based PLS-SEM (SmartPLS 2)		Mail Questionnaire Survey	Convenience Sample, 183 New Products from 183 U.S. Consumer Goods and Business-to-Business Goods and Services Firms	Senior Managers (18.2%)

Note: NS, Insignificant Relationship; –, Negative and Significant Relationship; +, Positive and Significant Relationship; CrosFI, Internal Cross-Functional Integration; HTU, High Technological Uncertainty; LTU, Low Technological Uncertainty; MAProf, Marketing-Activities-Execution Proficiency; MFit, New-Product Fit-to-Firm's Marketing Skills and Resources; NP, New Product; NPD, New-Product Development; NPQS, New-Product's Quality Superiority; OLS, Ordinary Least Squares; PEProf, Process-Execution Proficiency; PLS, Partial Least Squares; QLIM, Qualitative and Limited Dependent Variable Model; R&D, Research and Development; RBV, Resource-Based View; SAS, Statistical Analysis System; SEM, Structural Equation Modelling; TAProf, Technical-Activities-Execution Proficiency; TFit, New-Product Fit-to-Firm's Technical Skills and Resources; TMS, Top-Management Support.

2.3.1.1. Calantone and di Benedetto's (1988) Model

Calantone and di Benedetto's (1988) model investigated the following causal effects: (1) technical resources and skills on the proficiency of technical activities; (2) marketing resources and skills on the proficiency of marketing activities besides the competitive and market intelligence; (3) competitive and market intelligence on the proficiency of marketing, technical, and launch activities, as well as product quality; (4) the proficiency of technical activities on product quality; (5) marketing activities proficiency on launch activities proficiency; and (6) the proficiency of marketing, technical, and launch activities, as well as product quality on NP performance.

The authors empirically tested their model utilising a mail questionnaire survey for a convenience sample of 61 NPD projects from the South-Eastern U.S. firms in the electronic equipment, communications equipment manufacturing, power equipment, boat construction, aircraft construction, NASA suppliers, and nuclear power suppliers industries. Their respondents were senior managers with a response rate of 63%. They based their data analysis on a system of six equations and a Three-Stage Least Squares (3SLS) analysis.

They found that: (1) both technical resources and skills have a significant positive effect on technical activities proficiency; (2) both marketing resources and skills have a considerable positive influence on marketing activities proficiency; (3) technical activities proficiency has a strong positive impact on product quality; and (4) the proficiencies of both marketing and technical activities, as well as product quality, have profound positive effects on NP performance; however, the proficiency in executing launch activities has a trivial weight.

2.3.1.2. Calantone *et al.*'s (1996) Model

Calantone *et al.* (1996) developed a model that examined the influences of: (1) technical resources and skills on the proficiency of technical activities; (2) marketing resources and skills on the proficiency of marketing activities besides the competitive and market intelligence; (3) competitive and market intelligence on the proficiencies of both marketing and technical activities, as well as product quality; (4) the proficiency of technical activities on product quality; and (5) the proficiencies of both marketing and technical activities, as well as product quality on NP performance.

They empirically tested their model using a mail questionnaire survey for a random sample of 142 (/470) NPD projects from 142 U.S. (/248 Chinese) firms operating in the manufacturing and consumer goods industries. Their respondents were senior managers with a response rate of 41% for U.S. sample and 85.8% for the Chinese sample. For conducting their data analysis, they employed a covariance-based SEM (EQS 3).

They reported that: (1) technical resources and skills have a substantial positive effect on the proficiency of technical activities; (2) marketing resources and skills have a crucial positive influence on the proficiency of marketing activities; (3) the proficiency of technical activities has an immaterial weight on product quality; (4) the proficiencies of both marketing and technical activities have key positive impacts on NP performance; and (5) although *product quality* has a significant positive effect on NP performance in the Chinese sample, *it* has a negligible weight in U.S. sample.

2.3.1.3. Song and Parry's (1997a) Model

Song and Parry (1997a) developed their model from Day and Wensley's (1988) framework of the Sources of advantage, Positional advantage, and Performance (SPP). They studied the impacts of: (1) marketing skills and resources, internal commitment, and cross-functional integration on the proficiency of idea development and screening, business and market-opportunity analysis, product testing, and product commercialisation; (2) technical skills and resources, internal commitment, and cross-functional integration on technical development proficiency; and (3) the proficiency of idea development and screening, business and market-opportunity analysis, product testing, product commercialisation, and technical development on product differentiation. Additionally, they explored the extent to which the internal commitment, market potential, competitive intensity, and marketing skills and resources moderate the effects of product differentiation on NP's profitability, sales, and market share.

They empirically examined their model employing a mail questionnaire survey for a random sample of 788 (/612) NPD projects from 404 Japanese (/312 U.S.) high-tech manufacturing firms. Their respondents were senior managers with a response rate of 81% for Japanese sample and 62.4% for U.S. sample. They based their data analysis on an Ordinary Least Squares (OLS) regression analysis.

Regarding the main effects, they established that marketing skills and resources, internal commitment, and cross-functional integration have significant positive influences on the proficiency of idea development and screening, business and market-opportunity analysis, product testing, and product commercialisation; however, internal commitment has an insignificant weight on the proficiency of product testing in U.S. sample.

Additionally, technical skills and resources, internal commitment, and cross-functional integration have profound positive impacts on the proficiency of technical development. Furthermore, the proficiency of business and market-opportunity analysis, product testing, and technical development have vital positive effects on product differentiation. Moreover, although *the proficiency of idea development and screening* has a critical negative influence on product differentiation in U.S. sample, *it* has a trivial weight in the Japanese sample. Finally, *the proficiency of product commercialisation* has a significant positive effect on product differentiation in U.S. sample, *yet* it has a negligible weight in the Japanese sample.

In relation to the moderating effects, while *product differentiation* has crucial positive leverages on NP's profitability, sales, and market share in case of high internal commitment, market potential, and marketing skills and resources, *it* has critical diminishing impacts in case of high competitive intensity.

2.3.1.4. Song and Parry's (1999) Model

Song and Parry's (1999) model investigated the following causal effects: (1) marketing synergy on marketing proficiency; (2) technical synergy on technical proficiency; (3) the proficiencies of both marketing and technical activities on product competitive advantage; (4) the extent to which product innovativeness moderates the three aforesaid relationships; (5) technical proficiency on marketing proficiency; and (6) product competitive advantage on relative product performance.

They empirically tested their model via a mail questionnaire survey for a random sample of 412 high-innovativeness and 375 low-innovativeness projects from the Japanese manufacturing companies. Their respondents were senior managers with a response rate of 81%. For executing their data analysis, they used a covariance-based SEM (LISREL).

They substantiated that: (1) marketing synergy significantly enhances marketing proficiency; (2) technical synergy greatly improves technical proficiency; (3) the proficiencies of both marketing and technical activities have significant positive effects on product competitive advantage; and (4) product competitive advantage has a crucial positive leverage on relative product performance.

2.3.1.5. Song and Montoya-Weiss's (2001) Model

Song and Montoya-Weiss (2001) developed their model based on the Resource-Based View (RBV) of the firm theory, and controlled for the influences of employees number, R&D spending's percentage of sales, and total assets. They probed the next causal impacts: (1) marketing synergy on the proficiency of marketing activities besides the competitive and market intelligence; (2) technical synergy on technical proficiency, competitive and market intelligence, product competitive advantage, and NP's financial performance; (3) cross-functional integration on the proficiencies of both marketing and technical activities, competitive and market intelligence, and NP's financial performance; (4) marketing proficiency on product competitive advantage; (5) technical proficiency on marketing proficiency, product competitive advantage, and NP's financial performance; (6) competitive and market intelligence on the proficiencies of both marketing and technical activities, as well as NP's financial performance; (7) product competitive advantage on NP's financial performance; and (8) the extent to which perceived technological uncertainty moderates the aforesaid relationships.

They empirically tested their model by a mail questionnaire survey for a random sample of 553 NPD projects from the Japanese high-tech firms across various manufacturing industries (e.g., electronics, machinery, telecommunication and transportation equipment, chemicals, and pharmaceuticals). Their respondents were senior managers (55% response rate). They based their data analysis on a covariance-based SEM (LISREL).

They confirmed that: (1) marketing synergy considerably improves marketing proficiency; (2) technical synergy substantially enhances technical proficiency and NP's financial performance; (3) although *technical synergy* has a significant positive effect on product competitive advantage in a high-perceived technological uncertainty, *it* has an immaterial weight in a low-perceived technological uncertainty; (4) cross-functional integration has crucial positive leverages on the executions proficiencies of both marketing and technical activities, as well as NP's financial performance; (5) while *marketing proficiency* has a significant positive impact on product competitive advantage in a low-perceived technological uncertainty, *it* has a trivial weight in a high-perceived technological uncertainty; (6) *technical proficiency* has a significant positive influence on product competitive advantage; however, *it* has a negligible weight on NP's financial performance; and (7) product competitive advantage greatly boosts NP's financial performance.

2.3.1.6. Millson and Wilemon's (2002) Model

After controlling for the influences of both external (i.e., market dynamism, market hostility, and market complexity) and internal (i.e., decision-making, management philosophy, market aggressiveness, and level of technology) environmental factors, Millson and Wilemon's (2002) model scrutinised the effects of: (1) organisational integration (i.e., overall, external, and internal) on both the proficiency in executing NPD activities (i.e., overall, predevelopment, development and launch, and post launch) and NP's market success (i.e., profits, sales, entering existing markets, and entering new markets); as well as (2) the proficiency in executing NPD activities on NP's market success.

They empirically examined their model utilising a mail questionnaire survey for a random sample of 57 most successful and 61 least successful new products of U.S. firms across three industries (i.e., medical instruments, electrical equipment, and heavy construction equipment). Their respondents were senior managers with a response rate of 47.5%. For performing their data analysis, they employed the Spearman rank correlations and SAS correlational software model.

They verified that *internal organisational integration* has a significant positive effect on NP profits; however, *it* has negligible weights on both the proficiencies in executing development and launch activities and NP sales. Additionally, although *the proficiency in executing the overall NPD activities* has a trivial weight on entering existing markets, *it* has crucial positive leverages on NP's sales, profits, and entering new markets.

2.3.1.7. Millson and Wilemon's (2006) Model

Millson and Wilemon's (2006) model is a relatively recent, yet a small-scale, replication of their aforementioned 2002's model. They empirically tested their 2006's model using a mail questionnaire survey for a random sample of 33 most successful and 25 least successful new products of 36 U.S. firms in the electrical equipment manufacturing industry. Their respondents were senior managers (54.7% response rate). They based their data analysis on the Spearman rank correlations and SAS correlational software model.

They proved that internal organisational integration has negligible weights on the proficiencies in executing the development and launch activities, NP's profits and sales. Additionally, while *the proficiency in executing the overall NPD activities* has no effects on either NP's profits or sales, *it* leads to vital positive gains regarding entering both the existing and new markets.

2.3.1.8. Lee and Wong's (2011) Model

After controlling for the influences of both firm size and industry type, Lee and Wong's (2011) model examined the impacts of: (1) both functional-specific sources of advantage (i.e., marketing and technology synergies) and project-specific sources of advantage (i.e., cross-functional integration) on organisational implementation capabilities (i.e., proficiencies in executing both marketing and technical activities); as well as (2) organisational implementation capabilities on NP performance. Additionally, it explores the extent to which the external environments (i.e., both competitive intensity and technology change) moderate the aforementioned relationships.

They empirically scrutinised their model employing a drop-and-collect questionnaire survey for a random sample of 232 NPD projects from 232 South Korean manufacturers. Their respondents were senior managers with a response rate of 52%. For implementing their data analysis, they utilised a covariance-based SEM (LISREL) and a hierarchical moderated regression analysis.

They concluded that: (1) marketing synergy considerably enhances the proficiency in executing marketing activities; (2) technology synergy substantially improves the proficiency in executing technical activities; (3) cross-functional integration has crucial positive leverages on the proficiencies in executing both marketing and technical activities; (4) the proficiencies in executing both marketing and technical activities have significant positive effects on NP performance; (5) technology change negatively moderates the impact of cross-functional integration on the proficiency in executing technical activities; and (6) competitive intensity negatively moderates the effects of: (a) marketing synergy on the proficiency in executing marketing activities, and (b) the proficiency in executing marketing activities on NP performance.

2.3.1.9. Song *et al.*'s (2011) Model

To develop their model, Song *et al.* (2011) integrated the Resource-Based View (RBV) of the firm theory with Day and Wensley's (1988) framework of the Sources of advantage, Positional advantage, and Performance (SPP). After controlling for the influences of both founding team's characteristics and industry type, Song *et al.*'s (2011) model specified how the internal (i.e., R&D and marketing) and external (i.e., supplier's specific investment) resources can be deployed to create positional advantages (i.e., product innovativeness, supplier involvement in production, and NP's launch quality), which can then be exploited by a new venture to increase its first NP's sales and profits margins. Additionally, it explored the extent to which market potential moderates the effects of positional advantages on the first NP performance.

They empirically examined their model via a questionnaire survey for a convenience sample of 496 launched and 215 killed new products from 711 new ventures across various U.S. industries (i.e., telephone and wireless communication equipment, consumer electronics, games and toys, computer and software products, and household related products). Their respondents were new ventures founders (43% response rate). They based their data analysis on the full information maximum likelihood sample selection corrected estimates (Heckman sample selection models) and the Ordinary Least Squares (OLS) regression models.

They found that: (1) market potential positively moderates the effect of product launch quality on the first NP performance; (2) both internal R&D and marketing resources facilitate the execution of a high quality launch; (3) internal R&D resources have a significant positive impact on the first NP performance; however, internal marketing resources have a trivial weight; (4) referring to the first NP performance, the execution of a high quality launch is more important than developing a highly innovative product; and (5) out of the three aforementioned positional advantages, the execution of a high quality launch has the largest positive effect on the first NP performance.

2.3.1.10. Calantone and di Benedetto's (2012) Model

Calantone and di Benedetto's (2012) model specified the lean launch, launch timing, and quality of marketing effort as precursors to NP performance. Additionally, it investigated the impacts of both market orientation and cross-functional integration on the quality of marketing effort and lean launch. Furthermore, it examined the direct effect of launch timing on NP performance, and the extent to which the former moderates the influence of lean launch on the latter.

They empirically tested their model through a mail questionnaire survey for a convenience sample of 183 new products from U.S. firms operating in the consumer and business-to-business goods and services. Their respondents were senior managers with a response rate of 18.2%. For doing their data analysis, they utilised a covariance-based SEM (EQS 6.1B) and a variance-based PLS-SEM (SmartPLS 2).

They reported that: (1) the execution of high quality marketing effort and lean launch considerably enhance NP performance; (2) while *achieving a correct launch timing* has no direct effect on NP performance, *it* positively moderates the influence of lean launch on NP performance; and (3) cross-functional integration facilitates the execution of high quality marketing effort and lean launch and consequently the NP performance.

2.3.2. Previous Research Models that Focus on both the Direct and Indirect (Mediated) Relationships

As outlined in Table 2.4, and explained in the following paragraphs, this section introduces the extant literature models that empirically investigate both the direct and indirect (mediated) interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes.

Table 2.4. Previous research's models that focus on both the direct and indirect (mediated) effects

Study	Key Investigated Variables' Relationships (Findings)		Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
	Direct Effects	Indirect (Mediated) Effects					
Song and Parry (1997b)	MFit→MAProf (+), TFit→TAProf (+), CrosFI→MAProf (+), CrosFI→TAProf (+), TFit→NPQS (+), MAProf→NPQS (+), TAProf→NPQS (+), CrosFI→NP Performance (+), TAProf→NP Performance (+), NPQS→NP Performance (+)	The Total Indirect Effects of: MFit→NP Performance (+), TFit→NP Performance (+), CrosFI→NP Performance (+), MAProf→NP Performance (+), TAProf→NP Performance (+) The specific mediating role(s) of the intervening variable(s) is not clear.	Covariance -Based SEM (LISREL 8)		Mail Questionnaire Survey	Random Sample, 788 NPD Projects from 404 Japanese High-Tech Manufacturing Firms	Senior Managers (81%)
Song et al. (1997a)	Marketing and Technical Skills Fit→MAProf (+), Marketing and Technical Skills Fit→TAProf (NS), TMS→MAProf (+), Marketing and Technical Skills Fit→NPQS (+), MAProf→NPQS (+), TAProf→NPQS (NS), NPQS→NP Performance (+)	Regarding the mediating factors namely, marketing proficiency, technical proficiency, and product quality, there is no clear distinction in testing and reporting the direct, indirect (mediated), and total effects. The specific mediating role(s) of the intervening variable(s) is not clear.	Covariance -Based SEM (LISREL 8)		Mail Questionnaire Survey	Convenience Sample, 34 Successful and 31 Failed NPD Projects from 17 Large, Multi-Divisional Japanese Firms in Fabricated Materials, Telecommunications Products, Computers and Related Equipment, Electronics Equipment, Industrial and Medical Instruments, Pharmaceuticals, and Transportation Equipment Industries	Senior Managers (100%)

Table 2.4. Previous research's models that focus on both the direct and indirect (mediated) effects *(Continued)*

Study	Key Investigated Variables' Relationships (Findings)		Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
	Direct Effects	Indirect (Mediated) Effects					
Song et al. (1997c)	Marketing Resources Fit→MAProf (Korea:NS, Taiwan:+), Marketing Skills Fit→MAProf (Korea:NS, Taiwan:+), Marketing Resources Fit→NP Profitability (Korea:–, Taiwan:NS), Marketing Skills Fit→NP Profitability (Korea:+, Taiwan:+), MAProf→NP Profitability (Korea:+, Taiwan:+)	Marketing Resources Fit→MAProf→NP Profitability (Korea:NS, Taiwan:+ FM), Marketing Skills Fit→MAProf→NP Profitability (Korea:NS, Taiwan:+ PM)	Three-Stage Least Squares (3SLS) Regression Analysis		Case-Study Interviews, Mail Questionnaire Survey	Random Sample, 372 New Products from South Korean Firms and 306 New Products from Taiwanese Firms in Physical (Non-Service) Products Industries	Senior Managers (Not Mentioned)
Thieme et al. (2003)	CrosFI→PEProf (+), CrosFI→NP Survival (Japan: NS; Korea: +), PEProf→NP Survival (+)	CrosFI→PEProf→NP Survival (Japan: + FM; Korea: + PM)	Covariance -Based SEM (LISREL)	A Modified Version of Ruekert and Walker's (1987) Framework of Situational Dimensions, Structural/ Process Dimensions, and Outcome Dimensions	Face-to-Face Questionnaire Survey	Convenience Sample, 64 New Products from Japanese Firms and 128 New Products from Korean Firms in Semiconductors, Electronics Components, Computers, Instruments, Audio-Visual Products, and Communications Products Industries	Senior Managers (Not Mentioned)

Table 2.4. Previous research's models that focus on both the direct and indirect (mediated) effects *(Continued)*

Study	Key Investigated Variables' Relationships (Findings)		Data Analysis Method (Software)	Theory/ Framework	Data Collection Method	Sample	Respondents (Response Rate)
	Direct Effects	Indirect (Mediated) Effects					
Kleinschmidt et al. (2007)	Resources Dedication→PreAProf (+), Resources Dedication→Launch Proficiency (+), TMI→PreAProf (NS), TMI→Launch Proficiency (+), Resources Dedication→NP Financial Performance (+), TMI→NP Financial Performance (–), PreAProf→NP Financial Performance (NS), PreAProf→Opened Windows of Opportunity (+), Launch Proficiency→NP Financial Performance (+), Launch Proficiency→Opened Windows of Opportunity (NS)	Resources Dedication→PreAProf→NP Financial Performance (NS), TMI→PreAProf→NP Financial Performance (NS), Resources Dedication→Launch Proficiency→NP Financial Performance (+ PM), TMI→Launch Proficiency→NP Financial Performance (+ PM)	Covariance -Based SEM (LISREL 8.54)	A Capabilities view of Resource-Based Theory (CRBT)	Mail Questionnaire Survey	Convenience Sample, 387 Global (North American and European, Business-to-Business) NPD Programs for Manufacturing and Service Firms Active in International Markets	Senior Managers (39.5%)
Lee and Wong (2010)	CrosFI→NPDT (NS If Model include Mediator, + If Not), MFit→NPDT (+), TFit→NPDT (NS), MAProf→NPDT (+), TAProf→NPDT (NS), CrosFI→MAProf (+), MFit→MAProf (+), CrosFI→TAProf (NS), TFit→TAProf (+)	CrosFI→MAProf→NPDT (+ FM), MFit→MAProf→NPDT (+ PM), CrosFI→TAProf→NPDT (NS), TFit→TAProf→NPDT (NS)	Covariance -Based SEM (LISREL)		Drop-and-Collect Questionnaire Survey	Random Sample, 232 NPD Projects from 232 South Korean Manufacturers	Senior Managers (52%)

Note: NS, Insignificant Relationship; –, Negative and Significant Relationship; +, Positive and Significant Relationship; CRBT, Capabilities Resource-Based View Theory; CrosFI, Internal Cross-Functional Integration; FM, Full Mediation; MAProf, Marketing-Activities-Execution Proficiency; MFit, New-Product Fit-to-Firm's Marketing Skills and Resources; NP, New Product; NPD, New-Product Development; NPDT, New-Product Development Timelines; NPQS, New-Product's Quality Superiority; PEProf, Process-Execution Proficiency; PM, Partial Mediation; PreAProf, Predevelopment-Activities-Execution Proficiency; RBV, Resource-Based View; SEM, Structural Equation Modelling; TAProf, Technical-Activities-Execution Proficiency; TFit, New-Product Fit-to-Firm's Technical Skills and Resources; TMI, Top-Management Involvement.

2.3.2.1. Song and Parry's (1997b) Model

Song and Parry's (1997b) model investigated the following direct effects: (1) marketing synergy on marketing proficiency besides competitive and market intelligence; (2) technical synergy on technical proficiency, competitive and market intelligence, and product competitive advantage; (3) competition on competitive and market intelligence, product competitive advantage, and NP performance; (4) cross-functional integration on the proficiencies of both marketing and technical activities, competitive and market intelligence, and NP performance; (5) marketing proficiency on product competitive advantage; (6) technical proficiency on marketing proficiency, product competitive advantage, and NP performance; (7) competitive and market intelligence on technical proficiency and NP performance; and (8) product competitive advantage on NP performance. Additionally, it considers the indirect impacts of the marketing synergy, technical synergy, cross-functional integration, marketing proficiency, and technical proficiency on the relative NP success.

They empirically tested their model utilising a mail questionnaire survey for a random sample of 788 NPD projects from 404 Japanese high-tech manufacturing firms. Their respondents were senior managers with a response rate of 81%. For conducting their data analysis, they used a covariance-based SEM (LISREL 8).

Regarding the direct effects, they found that: (1) marketing synergy considerably improves marketing proficiency; (2) technical synergy substantially enhances technical proficiency and product competitive advantage; (3) cross-functional integration has significant positive influences on the proficiencies of both marketing and technical activities, as well as NP performance; (4) both marketing and technical proficiencies greatly boost product competitive advantage; and (5) technical proficiency and product competitive advantage have crucial positive leverages on NP performance.

Moving to the mediated impacts, they reported in their study the total indirect effects of the cross-functional integration, both marketing and technical synergies, as well as proficiencies of both marketing and technical activities on the relative NP success; however, such reported results leave ambiguity, given the lack of clarity in testing and specifically reporting each indirect effect with its related paths and variables (i.e., the specific mediating roles of the intervening variables are not clear). Unfortunately, when such results are not precisely and/or fully reported, fellow researchers and managers are left to the risk of guessing by themselves the importance of these factors in determining NPD performance outcomes.

2.3.2.2. Song *et al.*'s (1997a) Model

Song *et al.* (1997a) developed a model that examined the direct influences of: (1) both process and project management skills, as well as skills/needs alignment on marketing proficiency; (2) skills/needs alignment, team skills, and design sensitivity on technical proficiency; (3) skills/needs alignment, and the proficiencies of both marketing and technical activities on product quality; and (4) product quality on NP performance. Additionally, it explored the potential mediating roles for the proficiencies of both marketing and technical activities, as well as product quality.

They empirically scrutinised their model employing a mail questionnaire survey for a convenience sample of 34 successful and 31 failed NPD projects from 17 large, multi-divisional Japanese firms operating in various manufacturing industries (i.e., fabricated materials, telecommunications products, computers and related equipment, electronics equipment, industrial and medical instruments, pharmaceuticals, and transportation equipment). Their respondents were senior managers (100% response rate). They based their data analysis on a covariance-based SEM (LISREL 8).

In relation to the direct effects, they established that: (1) while *skills/needs alignment* strongly fosters both product quality and marketing proficiency, *it* has a negligible weight on technical proficiency; (2) project management skills have a crucial positive leverage on marketing proficiency; (3) marketing proficiency considerably raises product quality; however, technical proficiency has an immaterial weight; and (4) product quality significantly promotes NP performance.

Respecting the mediated impacts, they indicated that their model includes three mediating variables (i.e., marketing proficiency, technical proficiency, and product quality); however, their results about these mediators leave ambiguity, given the lack of distinctness in testing and reporting the direct, indirect (mediated), and total effects (i.e., the specific mediating roles of the intervening variables are not clear). Unfortunately, when such results are not precisely and/or fully reported, fellow researchers and managers are left to the risk of guessing by themselves the importance of these factors in determining NPD performance outcomes.

2.3.2.3. Song *et al.*'s (1997c) Model

Song *et al.*'s (1997c) model scrutinised the direct relationships among marketing resources synergy, marketing skills synergy, marketing activities proficiency, and NP profitability. Additionally, it explored the extent to which the proficiency in executing marketing activities mediates the effects of the synergies of both marketing skills and resources on NP profitability.

They empirically examined their model through case-study interviews and a mail questionnaire survey for a random sample of 372 (/306) new products from the South Korean (/Taiwanese) firms operating in the physical (non-service) products industries. Their respondents were senior managers (without stating the response rate). For executing their data analysis, they utilised a Three-Stage Least Squares (3SLS) regression analysis.

With reference to the direct effects, they confirmed that: (1) while *the synergies of both marketing skills and resources* greatly increase the proficiency in executing marketing activities in the Taiwanese sample, *they* have trivial weights in the South Korean sample; (2) both marketing skills synergy and marketing activities proficiency have crucial positive impacts on NP profitability; and (3) *marketing resources synergy* diminishes NP profitability in the South Korean sample; however, *it* has a negligible weight in the Taiwanese sample. Regarding the mediated impacts, they proved that *the proficiency in executing marketing activities* fully (/partially) mediates the effect of the synergy of marketing resources (/skills) on NP profitability in the Taiwanese sample, though, *it* has no mediating roles in the South Korean sample.

2.3.2.4. Thieme *et al.*'s (2003) Model

Thieme *et al.* (2003) based their model on a modified version of Ruekert and Walker's (1987) framework of the situational (project management dimensions), structural/process, and outcome dimensions. Specifically, they studied the direct effects of: (1) the project management's dimensions (i.e., project-manager style, project-manager skills, and senior-management support) on the structural/process dimensions (i.e., cross-functional integration and planning proficiency); as well as (2) the structural/process dimensions on the outcome dimensions (i.e., process proficiency and NP survival). Additionally, they explored the extent to which the process proficiency mediates the influences of both cross-functional integration and planning proficiency on NP survival.

They empirically tested their model via a face-to-face questionnaire survey for a convenience sample of 64 (/128) new products from the Japanese (/Korean) firms across various manufacturing industries (i.e., semiconductors, electronics components, computers, instruments, audio-visual products, and communications products). Their respondents were senior managers (without declaring the response rate). They based their data analysis on a covariance-based SEM (LISREL).

Respecting the direct effects, they concluded that: (1) cross-functional integration considerably facilitates process proficiency; (2) process proficiency substantially enriches NP survival; and (3) while *cross-functional integration* has a crucial positive leverage on NP survival in the Korean sample, *it* has an immaterial weight in the Japanese sample. In relation to the mediated impacts, they verified that the process proficiency fully (/partially) mediates the influence of cross-functional integration on NP survival in the Japanese (/Korean) sample.

2.3.2.5. Kleinschmidt *et al.*'s (2007) Model

Kleinschmidt *et al.* (2007) adopted a Capabilities view of the Resource-Based Theory (CRBT) to develop their model. Their model explored the extent to which the global NPD-process capabilities/routines (i.e., global knowledge's integration, homework activities, and launch preparation) mediate the influences of the organisational resources (i.e., global innovation culture, top-management involvement, resource commitment, and NPD process formality) on the global NPD-programme's performance (i.e., opening windows of market opportunities for a firm and financial performance). Additionally, it tested the effect of opening windows of market opportunities for a firm on the financial performance.

They empirically scrutinised their model using a mail questionnaire survey for a convenience sample of 387 global (North American and European, business-to-business) NPD programs from the manufacturing and service firms active in the international markets. Their respondents were senior managers with a response rate of 39.5%. For performing their data analysis, they employed a covariance-based SEM (LISREL 8.54).

Concerning the direct effects, they substantiated that: (1) while *top-management involvement* has a significant positive (/negative) influence on launch preparation (/financial performance), *it* has a negligible weight on homework activities; (2) resource commitment considerably improves homework activities, launch preparation, and financial performance; (3) *homework activities* have an immaterial weight on financial performance; however, *it* greatly facilitate opening windows of market opportunities for a firm; and (4) while *launch preparation* crucially boosts financial performance, *it* has a trivial weight on opening windows of market opportunities for a firm.

Turning to the mediated impacts, they stated that homework activities have no mediating roles for either the effect of top-management involvement or resource commitment on the financial performance. In contrast, they indicated that launch preparation partially mediates the positive effects of both top-management involvement and resource commitment on the financial performance.

2.3.2.6. Lee and Wong's (2010) Model

Lee and Wong's (2010) model investigated the extent to which the proficiency in executing marketing (/technical) activities mediate the impacts of: (1) marketing (/technical) synergy and cross-functional integration on the NPD timelines; and (2) effective coordination of headquarters-subsidiary/agents activities on the international NPD timelines.

They empirically examined their model utilising a drop-and-collect questionnaire survey for a random sample of 232 NPD projects from 232 South Korean manufacturers. Their respondents were senior managers (52% response rate). They based their data analysis on a covariance-based SEM (LISREL).

In relation to the direct effects, they found that: (1) marketing synergy greatly facilitates both the proficiency in executing marketing activities and NPD timelines; (2) while *technical synergy* considerably improves the proficiency in executing technical activities, *it* undermines the NPD timelines; (3) *cross-functional integration* substantially enhances the proficiency in executing marketing activities; however, *it* has immaterial weights on both the proficiency in executing technical activities and NPD timelines; and (4) the proficiency in executing marketing (/technical) activities significantly boosts (/has a trivial weight on) the NPD timelines.

Regarding the mediated impacts, they reported that the proficiency in executing marketing activities partially (/fully) mediates the positive effect of marketing synergy (/cross-functional integration) on the NPD timelines. Additionally, they indicated that the proficiency in executing technical activities has no mediating roles for either the influence of technical synergy or cross-functional integration on the NPD timelines.

2.3.3. A Synthesis and an Evaluation of the Previous Research Models that Empirically Investigate the Direct and/or Indirect (Mediated) Interrelationships among the Product Innovation's Critical Firm-Based Enablers, Process Execution Proficiency, and Performance Outcomes

This section synthesises the contents and identifies the research gaps and shortcomings of the extant literature models that empirically investigate the direct and/or indirect (mediated) interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes. The relevant previous research contents are analysed based on their (1) main research variables definitions and operationalisation, (2) investigated relationships, key research findings, and models explanatory/predictive power (3) employed theories/frameworks, and (4) utilised research methodology; including (a) data collection method(s), (b) sample and respondents, and (c) data analysis method(s) and software.

2.3.3.1. Main Research Variables Definitions and Operationalisation

This section introduces the definitions and operationalisation of the main research variables for the current study based on the general product innovation literature and the relevant previous research models that empirically investigate the interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes.

2.3.3.1.1. Product Innovation's Critical Firm-based Enablers (CFEs: PFit, CrosFI, and TMS)

Over the last four decades, several studies have examined and identified numerous Critical Success Factors (CSFs) for product innovation performance. These CSFs could be broadly classified into an internal (firm-based) and external (outside the firm; e.g., competitors-, customers-, or suppliers-based) ones.

In this respect, according to Montoya-Weiss and Calantone's (1994) comprehensive, influential, and meta-analytic literature-review on product innovation CSFs, the most consistently reported significant CSFs are the firm-based ones, such as the strategic factors (marketing and technological synergies; NP advantage), and the development process factors (top-management support/skill; proficiencies of predevelopment, technological, and marketing activities). Drawing on these findings, regarding product innovation CSFs, and in line with the RBV of the firm theory, the focus of the current study is on the firm-based ones. Specifically, based on his recent and thorough reviewing of the relevant literature on product innovation firm-based CSFs, the author of the current study has noticed that: (1) new-product fit-to-firm's skills and resources (PFit), (2) internal cross-functional integration (CrosFI), and (3) top-management support (TMS), are the most commonly investigated ones. For the sake of comparability with previous studies, the focus of this study, *vis-à-vis* investigating product innovation CFEs, is on these three factors (i.e., PFit, CrosFI, and TMS).

A) New-Product Fit-to-Firm's Skills and Resources (PFit)

In product innovation literature, there is no agreement on defining and/or measuring PFit. Terms such as *new project's/product's* "*fit*", "*synergy*", "*familiarity*", "*alignment*", and "*compatibility*" are often utilised synonymously. Additionally, as shown in Appendix 1, the operational definitions of PFit range from a unidimensional construct of either the technical/technological's or marketing skills/resources, to a multidimensional construct of PFit in terms of both technical (R&D and production) and marketing skills/resources.

Owing to inclusivity, the current study adopts a multidimensional construct of PFit. Specifically, PFit refers to the extent to which the suggested new-product's innovation requirements fit-well-with the available firm's technical (R&D and production) and marketing (marketing research, sales force, advertising and promotion) skills/resources (Cooper & Kleinschmidt, 1994, 1995b; Harmancioglu *et al.*, 2009; Parry & Song, 1994; Souder & Jenssen, 1999).

B) Internal Cross-Functional Integration (CrosFI)

There is a dearth of consistent definition and/or measurement of CrosFI within the product innovation works. Terms such as *cross-functional's/inter-departmental's "integration*", "*collaboration*", "*cooperation*", "*involvement*", and "*team*" are frequently used interchangeably. Additionally, as presented in Appendix 2, the operational definitions of CrosFI range from a unidimensional construct of the interactions between two or more departments to a multidimensional construct of CrosFI in terms of the joint goals achievement, open and frequent communications, as well as sharing ideas, information, and resources among the internal firm's functions/departments (R&D, production, and marketing). Furthermore, CrosFI's measurements vary across the project/product, programme, and firm levels. Moreover, CrosFI refers to the internal (within the firm's functions/departments), external (with suppliers and/or customers), or overall (internal and external) integrations.

Because of precision, and in line with the Resource-Based View (RBV) of the firm theory, the current study adopts an internal multidimensional construct of CrosFI. Precisely, CrosFI denotes the magnitude of joint goals achievement, open and frequent communications, as well as sharing ideas, information, and resources among the internal firm's functions/departments (R&D, production, and marketing) to develop and introduce a new-product into the marketplace (Brettel *et al.*, 2011; Kahn, 1996; Olson *et al.*, 2001; Song & Montoya-Weiss, 2001; Troy *et al.*, 2008).

C) Top-Management Support (TMS)

According to Felekoglu and Moultrie (2014, p. 159), *top-management* refers to "a group of managers who occupy formally defined positions of authority and have decision-making responsibilities over NPD-related activities". Product innovation studies have no consensus among their authors on how to define and/or measure TMS.

Terms such as *top/senior-management's "support*", "*commitment*", "*involvement*", "*skills/competencies*", and "*leadership*" are repeatedly employed analogously. Additionally, as displayed in Appendix 3, the operational definitions of TMS range from a unidimensional construct of either top-management's resources dedication, commitment, or involvement to a multidimensional construct of TMS in terms of top-management's resources dedication, commitment, and involvement. Furthermore, TMSs measurements vary across the project/product, programme, and firm levels.

Towards inclusivity, the current study adopts a multidimensional construct of TMS. Explicitly, TMS means the level of support provided by top-management – to develop and introduce a new-product into the marketplace – through top-management's resources dedication, commitment, and involvement (Akgün *et al.*, 2007; de Brentani & Kleinschmidt, 2004; Gomes *et al.*, 2001; Rodríguez *et al.*, 2008; Swink, 2000).

2.3.3.1.2. Product Innovation Process Execution Proficiency (PEProf)

It is evident within product innovation literature that researchers lack a consistency in defining and operationalising PEProf. Terms such as "*execution proficiency*", "*execution quality*", "*execution excellence*", and "*implementation quality*" are often utilised synonymously in relation to product innovation's process activities. Additionally, as revealed in Appendix 4, the operational definitions of PEProf range from a unidimensional construct of the proficiency in executing either the marketing activities (MAProf or its dimensions), or the technical/technological activities (TAProf or its dimensions), to a multidimensional construct of PEProf comprises both MAProf and TAProf.

Due to inclusivity, the current study adopts a multidimensional construct of PEProf. Clearly, PEProf implies how well or adequately the overall product innovation process is carried out – to develop and introduce a new-product into the marketplace – in terms of ***marketing activities (MAProf**: searching for and generating new-product ideas; conducting a detailed study of market potential, customer preferences, purchase process, etc.; testing the new-product under real-life conditions; and introducing the new-product into the marketplace including advertising, promotion, selling, etc.), as well as ***technical activities (TAProf**: developing and producing the new-product's exemplar/prototype; testing and revising the new-product's exemplar/prototype according to the desired and feasible features; and executing new-product's production start-up) (Barczak, 1995; Campbell & Cooper, 1999; Chryssochoidis & Wong, 1998; Cooper & Kleinschmidt, 1995a; Durmuşoğlu *et al.*, 2013; Millson & Wilemon, 2002, 2006; Mishra *et al.*, 1996; Parry & Song, 1994; Song & Noh, 2006; Song & Parry, 1997a; Thieme *et al.*, 2003).

2.3.3.1.3. Product Innovation Performance (OperLP, ProdLP, and FirmLP)

Product innovation studies have no consensus among their authors on how to define, classify, or measure product innovation performance. Terms such as *NPD's*/*product innovation's "success*", "*success vs. failure"*, "*outcomes*", "*performance*" and *"survival"* are frequently used interchangeably. Additionally, as shown in Appendix 5, researchers measure *product innovation performance dimensions* either objectively (Calantone & di Benedetto, 2012; Hart, 1993; Song & Montoya-Weiss, 2001; Song *et al.*, 2011) or subjectively (Calantone *et al.*, 1996; Song & Parry, 1997a, b; Song *et al.*, 1997a, c), as well as along three different levels namely, project/product level (Calantone & di Benedetto, 1988; Lee & Wong, 2011; Song & Parry, 1999, Thieme *et al.*, 2003), programme level (Atuahene-Gima *et al.*, 2005; Cooper & Kleinschmidt, 1995a; Kleinschmidt *et al.*, 2007), or firm level (Calantone *et al.*, 2002; Hooley *et al.*, 2005; Hult *et al.*, 2004; Sandvik & Sandvik, 2003).

Furthermore, as displayed in Appendix 5, authors diversely measure product innovation performance along: (1) *one dimension*, either financial, market, customer, time, quality, or technical performance; (2) *two dimensions*, such as financial and nonfinancial performance (Hart, 1993), commercial (market share and financial objectives including profits, sales, payback period, and costs) and technical performance (Montoya-Weiss & Calantone, 1994), NP and organisational performance (Langerak *et al.*, 2004b), efficiency (development time/speed, cost, and the overall efficiency) and efficacy (market performance) (Alegre *et al.*, 2006), internal (NP quality/advantage, met time-goals, and met cost-goals) and external/market (NP's customer satisfaction, sales, profits, and market share) success/performance (García *et al.*, 2008; Tatikonda & Montoya-Weiss, 2001; Valle & Avella, 2003), or short-term and long-term performance in terms of market-based, customer-based, and financial-based performance (Molina-Castillo & Munuera-Alemán, 2009); (3) *three dimensions*, such as NP advantage, NP performance, and organisational performance (Healy *et al.*, 2014; Langerak *et al.*, 2004a), customer, market, and financial performance (Hooley *et al.*, 2005), or NPD speed, NPD cost, and market performance (Kong *et al.*, 2014); (4) *four dimensions*, such as financial, technical, objective customer acceptance, and subjective customer acceptance performance (Huang *et al.*, 2004), or firm, product, financial, and customer-based performance (Griffin & Page, 1993, 1996); or (5) *seven dimensions*, such as success rate, profitability, technical success, domestic market-share, impact on the firm, time efficiency, and on-schedule project (Cooper & Kleinschmidt, 1995c).

Considering the precision, inclusivity, and chronological order of the components of product innovation performance, and drawing on the previous studies aforesaid dimensions, this study adopts three sequential (interrelated, yet distinctive) multidimensional constructs of product innovation performance. Specifically, product innovation performance signifies the extent of achieving the desired interrelated, yet distinctive, outcomes – for developing and launching a new-product – along the following three sequential dimensions: (1) ***Operational-Level Performance*** (***OperLP***: NPQS, New-Product's Quality Superiority; NPDTS, New-Product Development and launching Time Superiority; and NPDCS, New-Product Development and launching Cost Superiority); (2) ***Product-Level Performance*** (***ProdLP***: NP's customer satisfaction, sales, and profits); and (3) ***Firm-Level Performance*** (***FirmLP***: NP's contributions to enhance the firm's overall sales, profits, and market share).

Regarding *OperLP's dimensions*, *NPQS* refers to the extent to which the new-product: (1) is superior to competitors' products by offering some unique features or attributes to customers, and (2) has a higher quality than competing products. *NPDTS* denotes the degree to which the new-product is developed and launched: (1) on or ahead of the original schedule, and (2) faster than the similar competitors' products. *NPDCS* means the level to which the cost of developing and launching the new-product is: (1) equal to or below the estimated budget, and (2) below the cost of similar products the firm has previously developed and launched.

2.3.3.2. Investigated Relationships, Key Research Findings, and Models Explanatory/Predictive Power

This section synthesises and evaluates the investigated relationships, key research findings, and models explanatory/predictive power, and identifies the research gaps/shortcomings, of the extant empirical models investigating direct and/or indirect (mediated) interrelationships among product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes.

2.3.3.2.1. The Interrelationships among the Components of Product Innovation Performance (OperLP, ProdLP, and FirmLP)

Generally, the conducted review of the relevant previous research models reveals that while several studies have investigated the relationship between NPQS and ProdLP, there is merely one study that has examined the effect of NPQS on market share (one of the FirmLP's dimensions), besides another study that has scrutinised the influence of launch timing (one of the OperLP's dimensions) on ProdLP. However, there is no conclusive evidence on the relationships between NPQS (one of the OperLP's dimensions) and both ProdLP and FirmLP. Additionally, no study has considered the following causal impacts: (1) the overall OperLP (i.e., comprising NPQS, NPDTS, and NPDCS) on ProdLP and FirmLP; (2) ProdLP on FirmLP; and (3) the extent to which ProdLP mediates the influence of the overall OperLP on FirmLP.

Regarding *the relationship between NPQS and ProdLP*, several studies found that NPQS considerably improves ProdLP (e.g., Calantone & di Benedetto, 1988; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Song & Parry, 1999; Song *et al.*, 1997a). Additionally, Calantone *et al.* (1996) reported that *product quality* substantially enhances NP performance in the Chinese firms; though, *it* has a trivial weight in U.S. firms. Furthermore, Song and Parry (1997a) established that *product differentiation* reduces both NP's profits and sales in case of high competitive intensity; conversely, *it* has crucial positive impacts with high internal commitment, market potential, and marketing skills/resources.

Moving to *the effect of NPQS on FirmLP*, Song and Parry (1997a) indicated that *product differentiation* has a critical adverse influence on market share in case of high competitive intensity; on the other hand, *it* has significant positive impacts given high internal commitment, market potential, as well as marketing skills and resources. Respecting *the association between NPDTS and ProdLP*, Calantone and di Benedetto (2012) confirmed that while *a correct launch timing* has no direct impact on NP performance, *it* positively moderates the influence of lean launch on NP performance.

2.3.3.2.2. The Relationships between PEProf and the Components of Product Innovation Performance (OperLP, ProdLP, and FirmLP)

<u>A) The effect of PEProf on OperLP:</u>

Based on surveying the relevant previous research models, it is evident that while few studies have tested the associations between (PEProf, MAProf, or TAProf) and NPQS, only single study has probed the impact of PEProf on NPDT. However, researchers have reported mixed findings on these investigated relationships. Additionally, no study has examined the influence of the overall PEProf on the overall OperLP (i.e., including NPQS, NPDTS, and NPDCS).

With reference to *the link between PEProf and NPQS*, Song and Parry (1997b) and Song and Parry (1999) proved that the proficiencies in executing both marketing and technical activities significantly boost NPQS. Specifically, Song and Parry (1997a) established that: (1) the proficiencies in executing the business and market-opportunity analysis, technical development, and product testing activities have crucial positive leverages on NPQS; (2) while *the proficiency in executing the idea development and screening activities* has a critical detrimental influence on NPQS in U.S. firms, *it* has a negligible weight in the Japanese firms; and (3) *the proficiency in executing the product commercialisation's activities* considerably improves NPQS in U.S. firms; however, *it* has an immaterial weight in the Japanese firms.

Concerning *the impact of MAProf on NPQS*, Song *et al.* (1997a) confirmed that the proficiency in executing marketing activities greatly enhances the NPQS. Additionally, Song and Montoya-Weiss (2001) proved that while *the proficiency in executing marketing activities* substantially boosts the NPQS in a low-perceived technological uncertainty, *it* has an insignificant weight in a high-perceived technological uncertainty.

Turning to *the relationship between TAProf and NPQS*, on one hand, Calantone and di Benedetto (1988) and Song and Montoya-Weiss (2001) concluded that the proficiency in executing technical activities considerably improves the NPQS. On the other hand, Calantone *et al.* (1996) and Song *et al.* (1997a) verified that the proficiency in executing technical activities has a trivial weight on the NPQS.

In connection with *the influence of PEProf on NPDT*, Lee and Wong (2010) substantiated that the proficiency in executing marketing activities has a significant positive effect on the NPD timelines; nevertheless, the proficiency in executing technical activities has a negligible weight.

B) The association between PEProf and ProdLP:

Reviewing the relevant previous research models discloses that although several studies have examined the relationship between PEProf and ProdLP, few studies have researched the impacts of PreAProf, TAProf, MAProf, and product launch proficiency on ProdLP, besides a single study that has explored the total indirect effects of both MAProf and TAProf on the NP's financial performance.

However, most of these tested relationships have varied results. Additionally, no study has scrutinised the extent to which the overall OperLP (i.e., encompassing NPQS, NPDTS, and NPDCS) mediates the influence of the overall PEProf on ProdLP.

Referring to *the association between PEProf and ProdLP*, while Millson and Wilemon (2006) indicated that *the proficiency in executing the overall NPD activities* has immaterial weights on both the NP's sales and profits, several studies found that *it* greatly enhances NP performance (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2011), both NP's sales and profits (Millson & Wilemon, 2002), and NP survival (Thieme *et al.*, 2003). Additionally, Song and Parry (1997b) stated that the total indirect effects of the proficiencies in executing both marketing and technical activities on the NP's financial performance are positive and significant.

Regarding *the relationship between PreAProf and ProdLP*, Kleinschmidt *et al.* (2007) established that the proficiency in executing predevelopment activities has a trivial weight on the NP's financial performance. Moving to *the effect of TAProf on ProdLP*, Song and Parry (1997b) proved that *the proficiency in executing technical activities* substantially improves NP performance; however, Song and Montoya-Weiss (2001) verified that *it* has a negligible weight on the NP's financial performance. Respecting *the association between MAProf and ProdLP*, Song *et al.* (1997c) and Calantone and di Benedetto (2012) confirmed that the proficiency in executing marketing activities considerably boosts NP performance.

With reference to *the link between product launch proficiency and ProdLP*, Calantone and di Benedetto (1988) indicated that *the proficiency in executing launch activities* has an insignificant weight on NP performance; though, Kleinschmidt *et al.* (2007) stated that *it* strongly promotes the NP's financial performance. Additionally, Song *et al.* (2011) confirmed that, besides *being* more important than developing a highly innovative product, *the execution of high quality launch* has the largest positive effect on the first NP performance. Furthermore, Calantone and di Benedetto (2012) concluded that the lean launch execution plays a key role in elevating NP performance.

<u>C) The impact of PEProf on FirmLP:</u>

Building upon analysing the relevant previous research models, it is clear that while few studies have considered the influences of PEProf on entering both the existing and new markets by a firm, only one study has probed the effects of both PreAProf and product launch proficiency on opening windows of market opportunities for a firm.

However, there is little consistency among authors on the relationship between PEProf and FirmLP. Additionally, no study has investigated the effect of the overall PEProf on the overall FirmLP (i.e., involving firm's sales, profits, and market share). Furthermore, no study has explored the extent to which the overall OperLP (i.e., containing NPQS, NPDTS, and NPDCS) and/or ProdLP mediate(s) the influence of the overall PEProf on FirmLP.

Concerning *the impacts of PEProf on entering both the existing and new markets by a firm*, Millson and Wilemon (2002) verified that *the proficiency in executing the overall NPD activities* serves as a vital enabler for a firm to enter new markets; though, *it* has an irrelevant weight on entering existing markets. In a more recent study, Millson and Wilemon (2006) established that the proficiency in executing the overall NPD activities greatly increases the firm's opportunities to enter both the existing and new markets.

Turning to *the relationship between (PreAProf and product launch proficiency) and opening windows of market opportunities for a firm*, Kleinschmidt *et al.* (2007) proved that while the proficiency in executing predevelopment activities strongly allows for opening windows of market opportunities for a firm, the proficiency in executing product launch's activities has no effect.

2.3.3.2.3. The Relationships between the Critical Firm-based Enablers (PFit, CrosFI, and TMS) and PEProf

<u>A) The effect of PFit on PEProf:</u>

Examining the relevant previous research models demonstrates that while several studies have examined the associations between MFit (/TFit) and MAProf (/TAProf), there is merely a single study for each one of the following causal impacts: (1) the skills/needs alignment on both MAProf and TAProf; (2) the synergies of both marketing resources and skills on MAProf; and (3) the internal resources of both R&D and marketing on product launch proficiency. However, there is no consensus on the relationship between PFit and PEProf. Additionally, no study has scrutinised the influence of the overall PFit on the overall PEProf.

Initially, Song *et al.* (1997a) stated that while *the skills/needs alignment* considerably improves the proficiency in executing marketing activities, *it* has a trivial weight on the proficiency in executing technical activities. Additionally, Song *et al.* (1997c) indicated that *the synergies of both marketing resources and skills* substantially enhance the proficiency in executing marketing activities in the Taiwanese firms; however, *they* have no effects in the South Korean firms.

Furthermore, several studies provide an empirical evidence that the fit of marketing (/technical) resources and skills greatly boosts the proficiency in executing marketing (/technical) activities (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2010; Lee & Wong, 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Song & Parry, 1999). Specifically, Song and Parry (1997a) confirmed that the fit of marketing resources and skills significantly elevates the proficiencies in executing the idea development and screening, business and market-opportunity analysis, product testing, and product commercialisation’s activities. Moreover, Song *et al.* (2011) proved that the internal resources of both R&D and marketing crucially promote the proficiency in executing product launch’s activities.

B) The association between CrosFI and PEProf:

From surveying the relevant previous research models, it is noticeable that several studies have investigated the effect of CrosFI on the overall PEProf (/PEProf's dimensions). However, there is no conclusive evidence on this relationship. On one hand, few studies have established that the cross-functional integration has negligible weights on the proficiencies in executing the development, launch (Millson & Wilemon, 2002; Millson & Wilemon, 2006), and technical (Lee & Wong, 2010) activities.

On the other hand, several studies have found that the cross-functional integration strongly improves the proficiencies in executing the overall NPD activities (Lee & Wong 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Thieme *et al.*, 2003), marketing activities (Calantone & di Benedetto, 2012; Lee & Wong, 2010), and lean launch (Calantone & di Benedetto, 2012). Specifically, Song and Parry (1997a) proved that the cross-functional integration crucially enhances the proficiencies in executing the idea development and screening, business and market-opportunity analysis, technical development, product testing, and product commercialisation's activities.

C) The impact of TMS on PEProf:

Reviewing the relevant previous research models shows that there is just a single study for each one of the following causal effects: (1) internal commitment (embracing TMS) on PEProf; (2) both top-management's involvement and resources dedication on both PreAProf and product launch proficiency; and (3) project management's skills (including TMS) on MAProf. However, researchers have reported mixed findings on the association between TMS and PEProf. Additionally, no study has scrutinised the influence of the overall TMS (i.e., comprising top-management's resources dedication, commitment, and involvement) on the overall PEProf.

Firstly, Song and Parry (1997a) confirmed that the internal commitment (enclosing TMS) greatly boosts the proficiencies in executing the idea development and screening, business and market-opportunity analysis, technical development, and product commercialisation's activities. Additionally, they stated that while *the internal commitment* substantially elevates the proficiency in executing product-testing activities in the Japanese firms, *it* has an immaterial weight in U.S. firms. *Secondly*, Kleinschmidt *et al.* (2007) indicated that *the top-management involvement* crucially promotes the proficiency in executing product launch's activities; however, *it* has a trivial weight on the proficiency in executing predevelopment activities. Additionally, they proved that the resources dedication considerably improves the proficiencies in executing both the predevelopment and product launch's activities. *Thirdly*, Song *et al.* (1997a) concluded that the project management's skills (involving TMS) strongly enhance the proficiency in executing marketing activities.

2.3.3.2.4. The Relationships between the Critical Firm-based Enablers (PFit, CrosFI, and TMS) and the Product Innovation Performance

A) The effects of PFit, CrosFI, and TMS on OperLP:

Banking on analysing the relevant previous research models, it is obvious that while two studies have considered the link between TFit and NPQS, there is merely a single study for each one of the following causal impacts: (1) skills/needs alignment on NPQS; (2) both MFit and TFit on NPDT; (3) CrosFI on NPDT; and (4) the extent to which MAProf (/TAProf) mediates the influences of MFit (/TFit) and CrosFI on NPDT.

However, the investigated relationships between the PFit's measures and the OperLP's dimensions have varied results. Additionally, no study has examined: (1) the concurrent effects of the overall PFit, CrosFI, and TMS on the overall OperLP (i.e., incorporating NPQS, NPDTS, and NPDCS); or (2) the extent to which the overall PEProf mediates the simultaneous influences of the overall PFit, CrosFI, and TMS on the overall OperLP.

Initially, while Song and Montoya-Weiss (2001) stated that the technical synergy has a trivial weight on the NPQS in a low-perceived technological uncertainty, several works indicated that the NPQS is crucially enhanced by the skills/needs alignment (Song *et al.*, 1997a), technical synergy (Song & Parry, 1997b), and technical synergy in a high-perceived technological uncertainty (Song & Montoya-Weiss, 2001). Additionally, Lee and Wong (2010) found that: (1) the marketing (/technical) synergy substantially improves (/diminishes) the NPD timelines; though, the cross-functional integration has no weight; and (2) the proficiency in executing marketing activities partially (/fully) mediates the significant positive impact of the marketing synergy (/cross-functional integration) on the NPD timelines; however, the proficiency in executing technical activities has not mediated the influence of either the technical synergy or cross-functional integration on the NPD timelines.

B) The associations between (PFit, CrosFI, and TMS) and ProdLP:

In relation to the effects of PFit, CrosFI, and TMS on ProdLP, the conducted review of the relevant previous research models reveals the following. Firstly, regarding *the relationship between PFit and ProdLP*, there is just a single study for each one of the following causal impacts: (1) the internal resources of both R&D and marketing on the first NP performance; (2) the synergies of both marketing skills and resources on the NP profitability; (3) TFit on the NP's financial performance; (4) the total indirect effects of both MFit and TFit on the NP's financial performance; and (5) the extent to which the proficiency in executing marketing activities mediates the influences of the synergies of both marketing skills and resources on the NP profitability.

Secondly, as for *the impact of CrosFI on ProdLP*, while two studies have considered the links between CrosFI and the NP's financial performance, sales, and profits, there is merely a single study for each one of the following causal effects: (1) CrosFI on the NP survival; (2) the total indirect effect of CrosFI on the NP's financial performance; and (3) the extent to which PEProf mediates the influence of CrosFI on the NP survival.

Thirdly, in connection with *the link between TMS and ProdLP*, there is just one study that has examined: (1) the effects of both the resources dedication and top-management involvement on the NP's financial performance; and (2) the extent to which both the PreAProf and product launch proficiency mediate the influences of both the resources dedication and top-management involvement on the NP's financial performance.

However, there is little consistency among authors on the impacts of the overall PFit, CrosFI, and TMS on the ProdLP. Additionally, no study has investigated: (1) the concurrent effects of the overall PFit, CrosFI, and TMS on the overall ProdLP (i.e., including NP's customer satisfaction, sales, and profits); or (2) the extent to which the overall PEProf and/or OperLP (i.e., covering NPQS, NPDTS, and NPDCS) mediate(s) the simultaneous influences of the overall PFit, CrosFI, and TMS on the overall ProdLP.

Firstly, regarding *the influence of PFit on ProdLP*, on one hand, Song and Montoya-Weiss (2001) found that the technical synergy considerably improves the NP's financial performance. Additionally, Song *et al.* (2011) reported that the internal R&D resources substantially enhance the first NP performance. Furthermore, Song *et al.* (1997c) established that the marketing skills synergy crucially boosts the NP profitability. Moreover, Song and Parry (1997b) confirmed that the total indirect effects of both marketing and technical synergies on the NP's financial performance are positive and significant. On the other hand, Song *et al.* (2011) proved that the internal marketing resources have a trivial weight on the first NP performance. Additionally, Song *et al.* (1997c) indicated that while *the marketing resources synergy* critically diminishes the NP profitability in the South Korean firms, *it* has a negligible weight in the Taiwanese firms.

Moving to *the mediated effects*, Song *et al.* (1997c) demonstrated that *the proficiency in executing marketing activities* fully (/partially) mediates the significant positive impact of the marketing resources (/skills) synergy on the NP profitability in the Taiwanese firms; however, *it* has no mediating roles in the South Korean firms.

Secondly, respecting *the association between CrosFI and ProdLP*, on one hand, there is evidence that the cross-functional integration greatly promotes the NP's financial performance (Song & Montoya-Weiss, 2001; Song & Parry, 1997b). Additionally, Song and Parry (1997b) concluded that the total indirect influence of the cross-functional integration on the NP's financial performance is positive and significant. On the other hand, Millson and Wilemon (2002) stated that while *the internal organisational integration* strongly elevates the NP profits, *it* has an immaterial weight on the NP sales. In a more recent study, Millson and Wilemon (2006) verified that the internal organisational integration has insignificant weights on both the NP's sales and profits. Additionally, Thieme *et al.* (2003) revealed that *the cross-functional integration* pivotally fosters the NP survival in the Korean firms; however, *it* has no weight in the Japanese firms. Turning to *the mediated impacts*, Thieme *et al.* (2003) substantiated that the NPD process execution proficiency partially (/fully) mediates the significant positive influence of the cross-functional integration on the NP survival in the Korean (/Japanese) firms.

Thirdly, concerning *the effect of TMS on ProdLP*, Kleinschmidt *et al.* (2007) found that the resources dedication (/top-management involvement) considerably improves (/diminishes) the NP's financial performance. Referring to *the mediated influences*, Kleinschmidt *et al.* (2007) reported that the proficiency in executing the product launch's (/predevelopment's) activities has a partial (/no) mediating role for the significant positive impacts of both the resources dedication and top-management involvement on the NP's financial performance.

2.3.3.2.5. Models Explanatory/Predictive Power

Respecting the models explanatory/predictive power, while half of the previous relevant empirical studies has not reported the percentages of the variance's explanations for their models (Calantone *et al.*, 1996; Lee & Wong, 2010; Millson & Wilemon, 2002, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1999; Song *et al.*, 1997a; Thieme *et al.*, 2003), the other half has reported limited percentages (as detailed next), which consequently reveals the need for more recent-studies models that have both broader scope and superior explanatory/predictive power.

Specifically, *Calantone and di Benedetto's (1988) model* explains 40%, 43%, and 46% of the variation of the execution proficiency of the technical, marketing, and launch activities, respectively, 12% of the variation of the NP quality, and 40% of the variation of the NP success/failure. *Song and Parry's (1997a) model* explains 20-49% of the variation of the execution proficiency of the innovation process individual stages (idea's development and screening, market-opportunity analysis, technical development, product testing, and commercialisation), 18-23% of the variation of the NP differentiation, and 37-44% of the variation of the individual components of the NP performance (profitability, sales, and market share).

Song and Parry's (1997b) model explains 48.3% of the variation of the relative NP success. *Song et al.'s (1997c) model* explains 46% and 83% of the variation of the NP performance in the Taiwanese and South Korean firms, respectively. *Kleinschmidt et al.'s (2007) model* explains 38-56% of the variation of the individual components of the global NPD process capabilities (homework activities and launch preparation), and 25-32% of the variation of the individual components of the global NPD programme performance (windows of opportunity and financial performance). *Lee and Wong's (2011) model* explains 39-43% and 43-49% of the variation of the execution proficiency of the marketing and technical activities, respectively, and 33-37% of the variation of the NP's launch success.

Song et al.'s (2011) model explains 48-50% of the variation of the individual components of the first NP performance (gross margin and sales growth). Finally, *Calantone and di Benedetto's (2012) model* explains 17%, 39%, and 74% of the variation of the quality of marketing effort, lean launch, and NP performance, respectively.

2.3.3.3. Employed Theories/Frameworks

This section introduces the employed theories/frameworks within the previous research models that empirically investigate the relationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes.

Concerning the theory/framework utilisation, within all the 16 extant relevant studies, the theory/framework usage was evident in only five works (i.e., Kleinschmidt *et al.*, 2007; Song & Montoya-Weiss, 2001; Song & Parry, 1997a; Song *et al.*, 2011; Thieme *et al.*, 2003). Additionally, except for Kleinschmidt *et al.* (2007) and Song *et al.* (2011), no study has attempted to develop and empirically test its research model based on integrating two or more seminal theories/frameworks, which consequently reveals the need for more recent-studies to do so.

The employed theories/frameworks within these relevant studies comprised: (1) the Resource-Based View (RBV) of the firm theory (Song & Montoya-Weiss, 2001); (2) a Capabilities view of the Resource-Based Theory (CRBT; Kleinschmidt *et al.*, 2007); (3) Day and Wensley's (1988) framework of the Sources of advantage, Positional advantage, and Performance (SPP; Song & Parry, 1997a); (4) integrating the RBV of the firm theory with Day and Wensley's (1988) framework of the Sources of advantage, Positional advantage, and Performance (SPP; Song *et al.*, 2011); and (5) a modified version of Ruekert and Walker's (1987) framework of the situational (project management dimensions), structural/process, and outcome dimensions (Thieme *et al.*, 2003), as exemplified next.

Firstly, Thieme *et al.* (2003) based their model on a modified version of Ruekert and Walker's (1987) framework of the situational (project management dimensions), structural/process, and outcome dimensions. Specifically, they studied the direct effects of: (1) the project management's dimensions (i.e., project-manager style, project-manager skills, and senior-management support) on the structural/process dimensions (i.e., cross-functional integration and planning proficiency); as well as (2) the structural/process dimensions on the outcome dimensions (i.e., process proficiency and NP survival).

Secondly, Kleinschmidt *et al.* (2007) adopted a Capabilities view of the Resource-Based Theory (CRBT) to develop their model. Explicitly, they explored the extent to which the global NPD-process capabilities/routines (i.e., global knowledge's integration, homework activities, and launch preparation) mediate the effects of the organisational resources (i.e., global innovation culture, top-management involvement, resource commitment, and NPD process formality) on the global NPD-programme's performance (i.e., opening windows of market opportunities for a firm and financial performance).

Thirdly, to develop their model, Song *et al.* (2011) integrated the Resource-Based View (RBV) of the firm theory with Day and Wensley's (1988) framework of the Sources of advantage, Positional advantage, and Performance (SPP). Their model specifies how the internal (i.e., R&D and marketing) and external (i.e., supplier's specific investment) resources can be deployed to create positional advantages (i.e., product innovativeness, supplier involvement in production, and NP's launch quality), which can then be exploited by a new venture to increase its first NP's sales and profits margins.

2.3.3.4. Utilised Research Methodology

This section presents the utilised research methodology (i.e., data collection method, sample and respondents, and data analysis method/software) within the previous research models that empirically examine the relationships among the product innovation's CFEs, PEProf, and performance outcomes.

Concerning *data collection method*, the questionnaire survey utilisation was evident in all the 16 reviewed relevant studies (i.e., Calantone & di Benedetto, 1988, 2012; Calantone *et al.*, 1996; Kleinschmidt *et al.*, 2007; Lee & Wong, 2010, 2011; Millson & Wilemon, 2002, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1997a, b, 1999; Song *et al.*, 1997a, c, 2011; Thieme *et al.*, 2003). Such a questionnaire survey utilisation was based on mail in all of these studies except Lee and Wong (2010, 2011) who used a drop-and-collect questionnaire survey, and Thieme *et al.* (2003) who employed a face-to-face questionnaire survey. All these studies have based their data collection on one method (i.e., questionnaire survey) except Song *et al.* (1997c) who conducted case-study interviews besides a mail questionnaire survey.

Regarding *sample and respondents*, within the reviewed studies, the focus of the *investigated countries* was mainly on U.S.A. (Calantone & di Benedetto, 1988, 2012; Calantone *et al.*, 1996; Kleinschmidt *et al.*, 2007; Millson & Wilemon, 2002, 2006; Song & Parry, 1997a; Song *et al.*, 2011), followed by Japan (Song & Montoya-Weiss, 2001; Song & Parry, 1997a, b, 1999; Song *et al.*, 1997a; Thieme *et al.*, 2003), then South Korea (Lee & Wong, 2010, 2011; Song *et al.*, 1997c; Thieme *et al.*, 2003), and finally within Europe (Kleinschmidt *et al.*, 2007), China (Calantone *et al.*, 1996), and Taiwan (Song *et al.*, 1997c). Additionally, most of the reviewed studies have investigated only one country, while others have investigated two countries, such as U.S.A. and China (Calantone *et al.*, 1996), U.S.A. and Japan (Song & Parry, 1997a), South Korea and Taiwan (Song *et al.*, 1997c), South Korea and Japan (Thieme *et al.*, 2003), and within North America and Europe (Kleinschmidt *et al.*, 2007).

Concerning the *investigated industries*, all the reviewed relevant studies were purely based on the manufacturing firms except: (1) Calantone *et al.* (1996; manufacturing and consumer goods firms); (2) Kleinschmidt *et al.* (2007; manufacturing and service firms); and (3) Calantone and di Benedetto (2012; consumer and business-to-business goods and services firms). Additionally, with the exception of Millson and Wilemon (2006), who focused on a single-industry (electrical equipment manufacturing industry), it is evident that all the reviewed relevant studies were multiple-industry studies.

The investigated manufacturing industries in these multiple-industry studies covered various manufacturing industries, such as: physical products, fabricated materials, telecommunications products, electronics equipment, industrial and medical instruments, pharmaceuticals, transportation equipment, heavy construction equipment, semiconductors, audio-visual products industries, games and toys, computer and software products, household related products, boat construction, aircraft construction, NASA suppliers, chemicals and related products, and nuclear power suppliers industries.

The current study's observation of the multiple-industry studies confirms the same observation of Barczak (1995). Specifically, Barczak (1995) noticed that previous works on product innovation are mainly multiple-industry studies. However, such studies average the results across industries and make conclusions that may not be true for any industry. She also noticed that the nature of firms NPD practices, as well as the interrelationships among these practices and performance outcomes, might be dependent on the unique characteristics of the industry in which a firm competes. Although *multiple-industry* studies can be appreciated in findings generalisation, *these* studies may deny the possible unique characteristics of a particular industry. Thus, Barczak (1995) recommended researchers to, exclusively, focus on firms in a single-industry as this may help to eliminate inter-industry effects and yield findings that are more accurate and useful for product innovation researchers and managers.

Such a reasoning is also consistent with numerous studies within product innovation literature (e.g., Abrunhosa & Sá, 2008; Alegre & Chiva, 2008; Alegre *et al.*, 2006, 2013; Alegre-Vidal *et al.*, 2004; Bhaskaran, 2006; Cardinal, 2001; Dess *et al.*, 1990; Fredrickson & Mitchell, 1984; Macher *et al.*, 2007; Parthasarthy & Hammond, 2002; Pla-Barber & Alegre, 2007; Stock *et al.*, 2002; Wu & Shanley, 2009). The aforementioned reasoning reveals the need for more recent single-industry studies that pay more attention to firms within the service industry, such as restaurants.

The *sample type* within the reviewed studies was either a random sample (e.g., Calantone *et al.*, 1996; Lee & Wong, 2010, 2011; Millson & Wilemon, 2002, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1997a, b, 1999; Song *et al.*, 1997c), or a convenience sample (e.g., Calantone & di Benedetto, 1988, 2012; Kleinschmidt *et al.*, 2007; Song *et al.*, 1997a, 2011; Thieme *et al.*, 2003).

Additionally, within the reviewed studies, the smallest *sample size* was composed of 33 most successful and 25 least successful new products of 36 U.S. firms in the electrical equipment manufacturing industry (Millson & Wilemon, 2006), while the largest sample size comprised 788 NPD projects from 404 Japanese and 612 NPD projects from 312 U.S. high-tech manufacturing firms (Song & Parry, 1997a).

As knowledgeable key informants, the *respondents*, within all the reviewed studies, were senior managers (including project/product, NPD, R&D, and marketing managers). Beside the two studies that have not reported their *response rate* (Song *et al.*, 1997c; Thieme *et al.*, 2003), the response rate within the reviewed studies ranged from 18.2% (Calantone & di Benedetto, 2012) to 100% (Song *et al.*, 1997a).

Various *data analysis methods* were utilised to validate the measurements model and/or to test the hypothesised relationships within the reviewed studies (e.g., correlations, multivariate regression, and SEM; structural equations modelling), as detailed below:

(1) Spearman rank correlations and SAS correlational software model (Millson & Wilemon, 2002, 2006);

(2) an Ordinary Least Squares (OLS) regression analysis (Song & Parry, 1997a);

(3) full information maximum likelihood sample selection corrected estimates (Heckman sample selection models) and OLS regression models (Song *et al.*, 2011);

(4) a Three-Stage Least Squares (3SLS) regression analysis (Song *et al.*, 1997c);

(5) a system of six equations and a 3SLS regression analysis (Calantone & di Benedetto, 1988);

(6) a covariance-based SEM (LISREL) and a hierarchical moderated regression analysis (Lee & Wong, 2011);

(7) a covariance-based SEM (LISREL 8; Kleinschmidt *et al.*, 2007; Lee & Wong, 2010; Song & Montoya-Weiss, 2001; Song & Parry, 1997b, 1999; Song *et al.*, 1997a; Thieme *et al.*, 2003);

(8) a covariance-based SEM (EQS 3; Calantone *et al.*, 1996); and

(9) a covariance-based SEM (EQS 6.1B) and a variance-based PLS-SEM (SmartPLS 2; Calantone & di Benedetto, 2012).

2.4. Previous Research Gaps and Shortcomings

Firstly, based on reviewing the extant relevant studies on *product innovation within the restaurants context* (i.e., Feltenstein, 1986; Gubman & Russell, 2006; Jones & Wan, 1992; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b), it is evident that despite the great efforts and valuable insights provided by these prior works, regarding the nature of product innovation practices and the characteristics (i.e., stages and activities) of the adopted product innovation process in restaurants, these prior studies still have some research gaps and shortcomings, as explained next.

Over the past three decades, only eight studies have investigated product innovation within the restaurants context. Additionally, to date, since Ottenbacher and Harrington's (2009b) study, there have been no more studies on product innovation in restaurants. Furthermore, these prior studies are mainly:

(1) considered exploratory and qualitative studies, with a lack of theory-informed, theory-development, and/or theory-testing quantitative studies utilising advanced statistical analysis techniques, such as structural equation modelling (SEM);

(2) considered small-sample and narrow-coverage studies regarding both the numbers and types of the investigated restaurants; and

(3) focused on just investigating the nature and the characteristics (stages and activities) of the adopted product innovation process in restaurants, with a lack of an empirical investigation of the simultaneous direct and indirect/mediated interrelationships among:

(a) the product innovation *process* (e.g., process execution proficiency);

(b) *its* antecedents (e.g., product innovation's critical firm-based enablers); and

(c) consequences (e.g., product innovation performance outcomes).

Secondly, based on reviewing the extant relevant studies on *product innovation in general*, it is evident that numerous studies have examined and identified the Critical Success Factors (CSFs) for product innovation performance (e.g., Adams-Bigelow, 2006; Barczak & Kahn, 2012; Barczak *et al.*, 2009; Belassi & Tukel, 1996; Cheng & Shiu, 2008; Cooper, 1979, 1998; Cooper & Kleinschmidt, 1987, 1995a, b, c, 2000; Cooper *et al.*, 2004a, b, c; Ernst, 2002; Griffin, 1997; Griffin & Page, 1996; Johne & Snelson, 1988; Kahn *et al.*, 2006, 2012; Lester, 1998; Montoya-Weiss & Calantone, 1994; Nicholas *et al.*, 2011; Rubenstein *et al.*, 1976; Shum & Lin, 2007; Song & Noh, 2006; Song & Parry, 1994, 1996, 1997b; Sun & Wing, 2005; Van der Panne *et al.*, 2003). Such CSFs could be broadly classified into internal (firm-based) and external (outside the firm; e.g., competitors-, customers-, or suppliers-based) ones.

However, until very recently, fewer empirical studies, which were mostly focused on the manufacturing firms, have tried to empirically investigate the simultaneous direct (i.e., Calantone & di Benedetto, 1988, 2012; Calantone *et al.*, 1996; Lee & Wong, 2011; Millson & Wilemon, 2002, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1997a, 1999; Song *et al.*, 2011) and indirect/mediated (i.e., Kleinschmidt *et al.*, 2007; Lee & Wong, 2010; Song & Parry, 1997b; Song *et al.*, 1997a, c; Thieme *et al.*, 2003) relationships among some measurements/dimensions of the product innovation's critical firm-based enablers, process execution proficiency, and performance outcomes.

Based on reviewing these relevant empirical studies, it is evident that despite the great efforts and valuable insights provided by such prior works, they still have some research gaps and shortcomings, as detailed next.

Concerning the *investigated variables definitions and operationalisation* (i.e., PFit, CrosFI, TMS, PEProf, and product innovation performance dimensions), it is evident that there is little consistency in the operationalisation of these variables. For example, NPD timeliness, as one of the OperLP's dimensions, appears as a main construct in one study, while a sub-construct or an indicator/item in another study. Likewise, some studies have used only few indicators to measure PEProf, while others have employed a long list of indicators.

Additionally, CrosFI sometimes refers to an internal (i.e., within the firm's functions/departments), external (e.g., with suppliers and/or customers), or overall (i.e., internal and external) integration. Furthermore, respecting the operationalisation of product innovation performance, while a set of indicators forms a single factor in one study, similar indicators form multiple factors in another. Moreover, regarding the level of analysis, previous studies have based their variables operationalisation on various levels (i.e., project/product, program, or firm level).

Respecting the *investigated relationships and key research findings*, it is evident that the focus of the reviewed relevant empirical studies was mainly on the direct impacts, with less focus on the indirect (mediated) effects.

Initially, regarding the interrelationships among the components of product innovation performance (i.e., OperLP, ProdLP, and FirmLP), there is no conclusive evidence on the associations between NPQS (one of the OperLP's dimensions) and both ProdLP and FirmLP. Additionally, no study has considered the following causal impacts: (1) the overall OperLP (i.e., comprising NPQS, NPDTS, and NPDCS) on the overall ProdLP (i.e., embracing NP's customer satisfaction, sales, and profits) and FirmLP (i.e., involving firm's sales, profits, and market share); (2) ProdLP on FirmLP; and (3) the extent to which ProdLP mediates the influence of the overall OperLP on FirmLP.

With reference to the links between PEProf and the components of product innovation performance, authors have reported mixed findings. Additionally, no study has examined: (1) the effect of the overall PEProf on the overall OperLP and FirmLP; (2) the extent to which the overall OperLP mediates the impact of the overall PEProf on ProdLP; or (3) the extent to which the overall OperLP and/or ProdLP mediate(s) the influence of the overall PEProf on FirmLP.

Referring to the impacts of the critical firm-based enablers (i.e., PFit, CrosFI, and TMS) on PEProf, researchers have found various results. Additionally, no study has scrutinised the effects of the overall PFit and TMS (i.e., covering top-management's resources dedication, commitment, and involvement) on the overall PEProf. Furthermore, there is no consensus among scholars on the relationships between the product innovation's critical firm-based enablers and the different outcomes of product innovation performance.

Moreover, no study has investigated: (1) the concurrent effects of the overall PFit, CrosFI, and TMS on the overall OperLP and ProdLP; (2) the extent to which the overall PEProf mediates the simultaneous influences of the overall PFit, CrosFI, and TMS on the overall OperLP; or (3) the extent to which the overall PEProf and/or OperLP mediate(s) the parallel impacts of the overall PFit, CrosFI, and TMS on ProdLP.

Regarding the *models explanatory/predictive power*, while half of the previous relevant empirical studies have not reported the percentages of the variance's explanations for their models (Calantone *et al.*, 1996; Lee & Wong, 2010; Millson & Wilemon, 2002, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1999; Song *et al.*, 1997a; Thieme *et al.*, 2003), the other half have reported limited percentages, which consequently reveals the need for more recent-studies models that have both broader scope and superior explanatory/predictive power.

Concerning *theory/framework utilisation*, within all the 16 extant relevant studies, the theory/framework usage was evident in only five works (i.e., Kleinschmidt *et al.*, 2007; Song & Montoya-Weiss, 2001; Song & Parry, 1997a; Song *et al.*, 2011; Thieme *et al.*, 2003). Additionally, except for Kleinschmidt *et al.* (2007) and Song *et al.* (2011), no study has attempted to develop and empirically test its research model based on integrating two or more seminal theories/frameworks, which consequently reveals the need for more recent-studies to do so.

Moving to the *investigated industries*, the focus of the reviewed relevant studies was mainly on manufacturing firms, with less focus on service ones (e.g., restaurants). Additionally, these reviewed studies were mainly multiple-industry studies, with a less focus on single-industry studies. In this respect, the nature of firms NPD practices, as well as the interrelationships among these practices and performance outcomes, might be dependent on the unique characteristics of the industry in which a firm competes.

However, such multiple-industry studies average the results across industries and make conclusions that may not be true for any industry. Although *multiple-industry* studies are appreciated in findings generalisation, *these* studies may deny the possible unique characteristics of a particular industry. Focusing exclusively on firms in a single-industry may help to eliminate inter-industry effects and yield findings that are more accurate and useful for product innovation researchers and managers (Barczak, 1995). This reasoning is also consistent with numerous studies within product innovation literature (e.g., Abrunhosa & Sá, 2008; Alegre & Chiva, 2008; Alegre *et al.*, 2006, 2013; Bhaskaran, 2006; Cardinal, 2001; Macher *et al.*, 2007; Pla-Barber & Alegre, 2007; Stock *et al.*, 2002; Wu & Shanley, 2009).

Based on the conducted review of the relevant extant literature, and to the best of the author knowledge, no study, either generally or specifically within U.S. restaurants context, has developed and empirically tested an integrated, theory-informed model comprehensively: (1) explicating the simultaneous direct and indirect/mediated interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP); as well as (2) explaining/predicting the variation of the PEProf, OperLP, ProdLP, and FirmLP.

2.5. Research Questions

Based on the aforementioned research gaps and shortcomings in the relevant previous studies, the author has raised the following main research question:

What are the simultaneous direct and indirect/mediated interrelationships among the *product innovation's Critical Firm-based Enablers (CFEs: PFit, CrosFI, and TMS), Process Execution Proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP), and to what extent can a model, incorporating the aforesaid relationships, explain/predict the variation of the PEProf, OperLP, ProdLP, and FirmLP?*

For the sake of achievability, the author has disentangled the aforementioned main research question into the following research sub-questions:

RQ1. What are the direct and indirect (mediated) interrelationships among the components of product innovation performance (OperLP, ProdLP, and FirmLP)?

RQ2. What is the effect of PEProf on ProdLP, and is it mediated by OperLP?

RQ3. What is the effect of PEProf on FirmLP, and is it mediated by OperLP and ProdLP?

RQ4. What are the effects of PFit, CrosFI, and TMS on OperLP, and are these effects mediated by PEProf?

RQ5. What are the effects of PFit, CrosFI, and TMS on ProdLP, and are these effects mediated by PEProf and OperLP?

RQ6. To what extent can a model, incorporating the aforesaid relationships, explain/predict the variation of the PEProf, OperLP, ProdLP, and FirmLP?

2.6. Research Aim and Objectives

To address the aforesaid main research question, the primary aim of this study is to develop and empirically test, within a U.S. restaurants context, an integrated, theory-informed model comprehensively:

(1) explicating the simultaneous direct and indirect/mediated interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP); as well as

(2) explaining/predicting the variation of the PEProf, OperLP, ProdLP, and FirmLP.

In order to achieve the aforementioned main research aim, the current study specifically seeks to achieve the following research objectives:

RO1. To clarify the direct and indirect (mediated) interrelationships among the components of product innovation performance (OperLP, ProdLP, and FirmLP).

RO2. To illuminate the effect of PEProf on ProdLP, and the extent to which OperLP mediates this effect.

RO3. To explicate the effect of PEProf on FirmLP, and the extent to which OperLP and ProdLP mediate this effect.

RO4. To clarify the effects of PFit, CrosFI, and TMS on OperLP, and the extent to which PEProf mediates these effects.

RO5. To explicate the effects of PFit, CrosFI, and TMS on ProdLP, and the extent to which PEProf and OperLP mediate these effects.

RO6. To illuminate the extent to which a model, incorporating the aforesaid relationships, could explain/predict the variation of the PEProf, OperLP, ProdLP, and FirmLP.

2.7. Summary

This chapter has critically reviewed two streams of the extant literature that underpin this study. The first part of this chapter has introduced the current literature on product innovation in restaurants (the first literature stream), synthesised its contents, and identified its research gaps and shortcomings. As a complementation to the first literature stream, the second part of this chapter has introduced, synthesised the contents, as well as identified the research gaps and shortcomings of, the current literature models that empirically investigate the direct and/or indirect (mediated) interrelationships among the product innovation's CFEs, PEProf, and performance outcomes (the second literature stream). Drawing on the conducted critical literature review, this chapter has outlined the main research gaps and shortcomings in the previous studies along both literature streams. Finally, based on these identified research gaps and shortcomings, this chapter has concluded by providing the research questions, aim, and objectives for the current study.

The next chapter introduces the current study's theoretical underpinnings, conceptual framework (Critical Firm-based Enablers-Mediators-Outcomes: CFEMOs model, section 3.2.10), investigated variables, hypotheses development, and control variables. Besides the significant relationships identified from the relevant empirical studies (section 3.3), the hypothesised direct and indirect/mediated relationships of the CFEMOs model are based on integrating the complementary theoretical perspectives of the Critical Success Factors (CSFs) approach; the Resource-Based View (RBV) of the firm theory; and the Input-Process-Output (IPO) model, together, under the system(s) approach's umbrella (section 3.2).

Chapter 3: Research Theoretical Underpinnings, Conceptual Framework, and Hypotheses Development

3.1. Introduction

This chapter introduces the current study's theoretical underpinnings, conceptual framework (Critical Firm-based Enablers-Mediators-Outcomes: CFEMOs model, section 3.2.10), investigated variables, hypotheses development, and control variables. There is a consensus among scholars that product innovation is a disciplined problem-solving process, and inherently a multifaceted phenomenon that comprises complex and simultaneous direct and indirect interrelationships among its enablers, process, and performance outcomes. However, the extant relevant empirical studies (section 2.3.3) have examined product innovation variables by focusing mainly on the direct effects and some different measurements/dimensions of product innovation's CFEs, PEProf, and performance outcomes. Consequently, it is challenging to have a holistic understanding of the simultaneous interrelationships among these variables in light of the fragmented findings, varied focus and level of analysis for most of these studies. Thus, there is a crucial need for an integrative model based on a system(s) approach that can provide product innovation researchers and managers with a holistic view for better and comprehensive understanding, and, eventually, management of these complex and simultaneous interrelationships.

To this end, the researcher proposes and develops, in this chapter, a theoretical model of those critical, managerially controllable factors that have high potential for achieving the majority of the significant improvements in the desired (intermediate and ultimate) NPD efforts outcome(s). After accounting for the control variables effects (firm size, firm age, and NP innovativeness, section 3.4), the CFEMOs model integrates, on an individual NP level, the simultaneous direct and indirect/mediated interrelationships among the product innovation's critical firm-based enablers (PFit, CrosFI, and TMS), PEProf, and performance outcomes (OperLP, ProdLP, and FirmLP).

Besides the significant relationships identified from the relevant empirical studies (section 3.3), the hypothesised direct and indirect/mediated relationships of the CFEMOs model are based on integrating the complementary theoretical perspectives of the Critical Success Factors (CSFs) approach; the Resource-Based View (RBV) of the firm theory; and the Input-Process-Output (IPO) model, together, under the system(s) approach's umbrella (section 3.2).

3.2. Research Theoretical Underpinnings and Conceptual Framework

This section introduces the research variables, and proposes a theoretical model (CFEMOs), as shown in Fig. 3.1, of those critical, managerially controllable factors that have high potential for achieving the majority of the significant improvements in the desired (intermediate and ultimate) NPD efforts outcome(s). Underlying the depicted relationships, are the integration of the complementary theoretical perspectives of the Critical Success Factors (CSFs) approach (Bullen & Rockart, 1981; Daniel, 1961; Rockart, 1979), the Resource-Based View (RBV) of the firm theory (Barney, 1991; Grant, 1991; Peteraf, 1993; Wernerfelt, 1984), and the Input-Process-Output (IPO) model (Hackman & Morris, 1975; McGrath, 1984), together, under the system(s) approach's umbrella (Ackoff, 1964, 1971).

3.2.1. Product Innovation Performance (OperLP, ProdLP, and FirmLP)

Performance rests at the heart of the product innovation literature (García *et al.*, 2008). The primary focus for product innovation researchers and managers is mainly on the identification of the critical success factors and their relative effects on the different outcomes of product innovation efforts. However, achieving this aim necessitates, first, an understanding of what constitutes a successful product innovation, as diverse meanings and classifications of a successful product innovation can yield diverse findings (Craig & Hart, 1992; Huang *et al.*, 2004). Thus, product innovation researchers and managers alike need a comprehensive conceptualisation of product innovation performance (Montoya-Weiss & Calantone, 1994).

Without measurable product innovation success, the zeal for developing and launching new products will diminish from both NPD team and top-management (O'Dell & Grayson, 1999). Measuring the outcomes of NPD efforts is vital to understand, explain, predict, and manage the organisational behaviours and resources allocation associated with firms product innovation efforts. NPD team and top-management will be motivated to perform the necessary NPD activities well and will be more willing to allocate the needed resources for developing and launching their new products if they believe and expect that doing so will lead to desired outcomes (Huang *et al.*, 2004). In this respect, special consideration needs to be devoted to the measurement of product innovation performance outcomes (Alegre *et al.*, 2006).

In an endeavour to simultaneously account for the various viewpoints of different stakeholders (e.g., operational, marketing, and financial), and drawing on the relevant literature on product innovation performance (e.g., Alegre *et al.*, 2006; Cooper & Kleinschmidt, 1995c; García *et al.*, 2008; Griffin & Page, 1993, 1996; Hooley *et al.*, 2005; Kessler & Bierly, 2002; Kim & Atuahene-Gima, 2010; Kong *et al.*, 2014; Langerak *et al.*, 2004a, b; Mishra & Shah, 2009; Olson *et al.*, 2001; Stanko *et al.*, 2012; Tatikonda & Montoya-Weiss, 2001; Tatikonda & Rosenthal, 2000; Valle & Avella, 2003; Yang, 2012), this study adopts three sequential multidimensional constructs of product innovation performance.

In this study, product innovation performance refers to the extent of achieving the desired outcomes – for developing and introducing a new-product into the marketplace – along three sequential dimensions: (1) *operational-level performance* (OperLP: NPQS, new-product's quality superiority; NPDTS, new-product development and launching time superiority; and NPDCS, new-product development and launching cost superiority), then (2) *product-level performance* (ProdLP: NP's customer satisfaction, sales, and profits), and finally (3) *firm-level performance* (FirmLP: NP's contributions to enhance the firm's overall sales, profits, and market share).

Within this study, and drawing from Tatikonda and Rosenthal (2000) and Tatikonda and Montoya-Weiss (2001), OperLP (with reference to NPQS, NPDTS, and NPDCS) is viewed as a two-sided coin; with one side related to project execution outcomes (operational perspective), and the other side related to key product-intrinsic characteristics that have potential market performance outcomes (marketing perspective). In other words, OperLP is concurrently an outcome for PEProf, and an enabler to ProdLP and FirmLP in terms of customer satisfaction, sales, profits, and market share. The reasons behind this study's adoption of these three sequential multidimensional constructs of product innovation performance, as detailed below.

Firstly, a well-established finding by previous studies is that rather than depending only on their current product offerings, firms that pursue the continuous development and launching of successful new products are rewarded with significant improvements in their overall firm performance with reference to sales, profitability, and market share (e.g., Baker & Sinkula, 2005; Chang *et al.*, 2014; Griffin, 1997; Griffin & Page, 1996; Gunday *et al.*, 2011; Kim *et al.*, 2014; Langerak & Hultink, 2005; Langerak *et al.*, 2004a, b; Thoumrungroje & Racela, 2013). *Secondly*, under varying conditions of technological, market, and environmental uncertainties (Tatikonda & Montoya-Weiss, 2001), achieving a superior operational performance (in terms of NP quality, NPD's time and cost) enhances the NP's market performance, e.g., NP's customer satisfaction, sales, profitability, and commercial success (García *et al.*, 2008; Gunday *et al.*, 2011; Mishra & Shah, 2009; Tatikonda & Montoya-Weiss, 2001; Yang, 2012). *Thirdly*, developing new products characterised by competitive advantages increases the firm's market performance, overall financial performance, and long-term viability (Kim *et al.*, 2014). Achieving a superior operational performance (in terms of NP quality, NPD's time and cost) improves the overall firm performance with reference to the customer loyalty, market share, overall profitability, break-even time, and return on investment (García *et al.*, 2008; Jayaram & Narasimhan, 2007; Mishra & Shah, 2009; Yang, 2012).

Thus, it is evident that there is an interrelationship among these three sequential multidimensional constructs of product innovation performance. Specifically, the achievement of an enhanced overall firm performance (FirmLP as an ultimate outcome) is based on the continuous development and launching of successful new products (ProdLP as a second intermediate outcome), which in turn depends on the attainment of a superior operational performance (OperLP as a first intermediate outcome). In other words, neither OperLP nor ProdLP are ends in themselves; instead, they are sequential precursors to the ultimate outcome (FirmLP). Additionally, adopting only one of these dimensions or their sub-dimensions, or combining all of them together in one factor can yield incomplete, irrelevant, or even misleading conclusions that would lead managers to take the wrong decisions and suffer from the subsequent disheartening consequences.

Hence, by adopting these three sequential multidimensional constructs of product innovation performance, this study can provide product innovation researchers and managers with a more precise, comprehensive, and better conceptualisation of the simultaneous relative effects of the different product innovation practices and processes – for developing and launching a specific product within a firm – on the different intermediate and ultimate outcomes of product innovation performance, as well as the interactions among these product innovation performance outcomes.

3.2.2. The Critical Success Factors (CSFs) Approach

The CSFs approach (Bullen & Rockart, 1981; Daniel, 1961; Rockart, 1979) can be employed to explain the direct effects of those critical critical factors that their utilisation throughout developing and launching new products can lead to significant improvements in the firms pursued NPD efforts outcomes. Besides its merits, CSFs approach has some key limitations, which suggests complementing it by integrating it with the other theoretical frameworks, such as the RBV theory, IPO model, and system(s) approach.

The CSFs approach originates from Daniel's (1961) concept of "success factors", which Rockart and his colleague (Bullen & Rockart, 1981; Rockart, 1979) expanded to develop the CSFs approach. It is still very influential today and is applicable to various challenges facing firms (Caralli *et al.*, 2004). A CSF is a skill or resource, determining major differences in the perceived values and/or relative costs. The core of the CSFs approach is that not every factor will be of equal importance to a firm, accordingly, the constant focus of firm resources, management attention and efforts should be on those relatively limited number of actionable and measurable factors that can yield the highest competitive advantage. For a factor to be 'critical' and given a very high priority, it should have the highest importance in achieving a firm's competitive success, and represent significant consequences, either of a positive or negative nature. It is these CSFs and the level of their achievements, which will eventually determine the firm success or failure (Brotherton & Shaw, 1996; Bullen & Rockart, 1981; Leidecker & Bruno, 1984; Rockart, 1979). The CSFs approach utilisation can improve any firm's effort, decision, process, or initiative (Caralli *et al.*, 2004).

Specifically, CSFs act as goals enablers through priorities setting and resources allocation for superior management decision-making (Bullen & Rockart, 1981). Gaining a better understanding of the CSFs role is vital for firms to achieve competitive advantage by devoting their attention, time and resources to areas that are established as contributors to an enhanced performance outcome, which is particularly important, as managers have limited resources at their disposal (Ram *et al.*, 2014). The CSFs approach helps managers to affect an effort's outcome through proactively taking the essential actions in areas that have a crucial impact on the desired outcome (Boynton & Zmud, 1984). Additionally, it assures a systematic method of detecting the crucial areas that necessitate the continuous and watchful management care to attain performance goals (Ram & Corkindale, 2014).

Although the achievement of the ultimate outcome (FirmLP) is based on the continuous development and launching of successful new products (ProdLP), firms typically face high costs, complexity, risks, and failures throughout developing and launching their new products (e.g., Cooper, 2001; Feltenstein, 1986; Fuller, 1994; Gubman & Russell, 2006; Harrington *et al.*, 2009; Hsu & Powers, 2002; Johnson *et al.*, 2005; Jones & Wan, 1992; Kotler & Armstrong, 2012; Ottenbacher & Harrington, 2007, 2009a, b). In an endeavour to mitigate these high costs, complexity, risks, and failures, over the last four decades, many studies focused on identifying numerous CSFs for NPD efforts outcomes (e.g., Adams-Bigelow, 2006; Barczak & Kahn, 2012; Barczak *et al.*, 2009; Belassi & Tukel, 1996; Cheng & Shiu, 2008; Cooper, 1979, 1998; Cooper & Kleinschmidt, 1987, 1995a, b, c, 2000; Cooper *et al.*, 2004a, b, c; Ernst, 2002; Griffin, 1997; Griffin & Page, 1996; Johne & Snelson, 1988; Kahn *et al.*, 2006, 2012; Lester, 1998; Montoya-Weiss & Calantone, 1994; Nicholas *et al.*, 2011; Rubenstein *et al.*, 1976; Shum & Lin, 2007; Song & Noh, 2006; Song & Parry, 1994, 1996, 1997b; Sun & Wing, 2005; Van der Panne *et al.*, 2003).

Besides its merits, the CSFs approach has some key limitations. *Firstly*, with reference to the aforementioned numerous CSFs for the outcomes of NPD efforts that have been identified by many studies over the last four decades, Brown and Eisenhardt (1995, p. 353) emphasised that “it is often difficult to observe the "new product development" forest amid myriad "results" trees. The findings of many studies read like a "fishing expedition"—too many variables and too much factor analysis. It is not uncommon for a study to report 10 to 20 to even 40 or 50 important findings”. Thus, with these numerous critical success factors, there is at least a great challenge, if it is possible, for a firm with its limited resources to apply all of them. Accordingly, in order for these CSFs to be applicable and achievable, there is a desperate need for narrowing their focus down.

Secondly, these CSFs are explicit (Caralli *et al.*, 2004) and easy to be copied by competitors, which can lead a firm to lose its sustained competitive advantage based on these imitated CSFs. *Thirdly*, the CSFs approach provides no detailed information on the dimensions of performance outcomes or the possible interactions among these performance outcomes. *Fourthly*, the focus of the CSFs approach can be conceived of as the direct effects of CSFs on a firm performance, while neglecting the possible interactions among these CSFs and the possible indirect (mediated) effects or the mechanisms by which these CSFs can lead to different performance outcomes. CSFs approach suggests a direct link between accomplishments or acceptable results in identified, narrow areas of activity and the attainment of sought after performance outcomes (Rockart, 1979). However, CSFs are not expected to be transformed automatically into performance outcomes. CSFs are means to an end; they are not ends in themselves. Accordingly, rather than to be considered as business goals or objectives, CSFs are better conceived of as a collection of activities and processes designed to support the achievement of desired outcomes identified by the firm's goals or objectives (Brotherton & Shaw, 1996).

Finally, from the CSFs perspective, both firm-based CSFs and external CSFs have the same level of importance. However, it is expected that they have not the same level of importance or have the same magnitude of effect on the different performance outcomes. CSFs are drawn from, or depend greatly on, features of both a firm's internal and external environments, and might arise from varied conditions of activities, events, circumstances, which necessitate a special attention from a firm's management (Dickinson *et al.*, 1984). CSFs could be broadly classified into internal ones (firm-based) and external ones (outside the firm; e.g., competitors-, customers-, or suppliers-based). Internal CSFs are within managers areas of direct control, while managers have a slight, if any, control over external CSFs (Brotherton & Shaw, 1996; Bullen & Rockart, 1981; Caralli *et al.*, 2004; Dickinson *et al.*, 1984; Khanna *et al.*, 2011).

CSFs are the ‘must achieve’ factors both within a company and within its external environment. If drawn from a firm’s ‘internal’ environment, CSFs are expected to be actionable, measurable, controllable, and arise from particular characteristics of its employees, structures, processes, and products. These CSFs are typically mirroring a firm’s specific situation, with reference to its competencies and core capabilities that are crucial for achieving its competitive advantage. In case of firm’s ‘external’ environment, this could be at two levels: (1) at a meso-level—CSFs faced by a specific firm are derived from the nature of the industrial and market structures/dynamics within which it operates; or (2) at a macro-level—CSFs are derived from the broader conditions and trends evident in the wider business environment. These ‘external’ CSFs are typically faced by all firms operating in a given external environment and are less controllable than the internal CSFs (Brotherton & Shaw, 1996). Thus, it seems more rational and highly recommended for firms with its limited resources to give the priority to and mainly focus their attention, efforts, and resources on the firm-based CSFs rather than the external ones.

3.2.3. The Resource-Based View (RBV) of the Firm Theory

The RBV of the firm theory (Barney, 1991; Grant, 1991; Peteraf, 1993; Wernerfelt, 1984) can be employed to explain the direct effects of product innovation’s firm-based enablers on the performance outcomes. Besides its merits, the RBV theory has some key limitations, which suggests complementing (integrating) it with the other theoretical frameworks, such as the CSFs approach, IPO model, and system(s) approach.

The RBV theory argues that the heterogeneous market positions of close competitors originate from each firm’s unique bundle of resources and capabilities (Barney, 1991; Wernerfelt, 1984). The RBV theory focuses on investigating the link between a firm’s internal characteristics and its performance. Firm resources can be tangible or intangible and include “all assets, capabilities, organisational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness" (Barney, 1991, p. 101). To be useful in generating a sustained competitive advantage for a firm, these firm resources must have four characteristics: valuable, rare, imperfectly imitable, and non-substitutable (Barney, 1991; Peteraf, 1993).

The RBV theory is considered one of the most influential and cited theories in the management theorising history. Thanks for its straightforwardness, the RBV's core message is appealing, easily grasped, and easily taught (Kraaijenbrink *et al.*, 2010). Firm-based resources are more controllable than those resources located outside the firm. The firm's internal resources and capabilities are the main source of its profitability (Grant, 1991). Valuable and rare firm's resources can help a firm to improve its efficiency and effectiveness. Additionally, inimitable and non-substitutable firm's resources can help a firm to attain a sustainable competitive advantage (Barney, 1991). Besides its merits, the RBV theory has some key limitations, as detailed next.

Firstly, it provides no distinction between resources and capabilities; however, they are not the same. Firm's resources are like the inputs into the production process, such as employees skills, capital, finance, equipment, and brand names. A firm's capability is the capacity of a collection of resources to perform specific tasks or activities. The available firm's resources in terms of their types, qualities, and quantities play a crucial role on what a firm can do, because they place constraints upon the range and the performance standard of the conducted organisational routines. Firm's capabilities are largely immobile and inimitable in comparison to the individual resources. A capability is not just a matter of assembling a group of resources; rather it incorporates complex patterns of coordination between employees plus the other resources. Therefore, a resource can be considered a source of a firm's capability, while a capability is the source of a firm's competitive advantage (Grant, 1991).

Secondly, from the RBV perspective, all firm resources (that are valuable, rare, imperfectly imitable, and non-substitutable) have the same level of importance. However, not all firm's resources are expected to have the same level of importance or have the same magnitude of effect on the different performance outcomes (Hooley *et al.*, 2005). *Thirdly*, the RBV provides no detailed information on the dimensions of performance outcomes or the possible interactions among these performance outcomes. *Finally*, the RBV focus can be conceived of as the direct effects of firm resources on its performance, while neglecting the possible interactions among these resources and the possible indirect (mediated) effects or the mechanisms by which these resources can lead to different performance outcomes. From the RBV perspective, all firm resources (that are valuable, rare, imperfectly imitable, and non-substitutable) generate a sustained competitive advantage for a firm. However, firm resources are not expected to be transformed automatically into performance outcomes. Firm resources are not ends in themselves; what counts is how they are utilised to achieve the desired NPD efforts outcomes (Song *et al.*, 1997c).

In this respect, a firm attainment of a sustained competitive advantage is not based on just possessing resources, rather it is based on its ability to deploy those resources (Makadok, 2001). A severe shortcoming of any direct effects model is that it leaves ambiguity regarding the intervening processes through which firm's resources affect the outcomes of product innovation performance (Atuahene-Gima, 2003; Brown & Eisenhardt, 1995). As emphasised by Grant (1991, p. 133) "the key to a resource-based approach to strategy formulation is understanding the relationships between resources, capabilities, competitive advantage, and profitability—in particular, an understanding of the mechanisms through which competitive advantage can be sustained over time".

Rather than investigating the impacts of the firm's external environments (market-related factors) which are far from direct management control, the relevant literature on product innovation (e.g., Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Montoya-Weiss & Calantone, 1994; Cooper, 1979; Ernst, 2002; Johne & Snelson, 1988; Thieme *et al.*, 2003) have emphasised the importance of giving the priority to investigating the managerially controllable factors of success (i.e., variables related to the organisation, the NPD process, and the product itself) and their effects on the outcomes of NPD efforts. In other words, focusing mainly, within the firm, on those factors that are more and directly amenable to managerial actions.

In this sense, Cooper (1979) emphasised that the majority of the variables that discriminate between innovation success and failure are within the firm control. The associated risks with NPD efforts can be controlled, at least to some extent, by management-directed actions (Calantone & di Benedetto, 1988). The factors over which product innovation directors exercise some level of control offer a paramount chance for enhancing NPD efforts outcomes (Calantone *et al.*, 1996). After conducting their influential and comprehensive meta-analytic literature review on product innovation's Critical Success Factors (CSFs), Montoya-Weiss and Calantone (1994) concluded that managerially controllable factors are most strongly related to successful NPD outcomes. They emphasised that the most consistently reported significant CSFs are the firm-based ones, such as strategic factors (marketing and technological synergies; NP advantage), as well as development process factors (top-management support/skill; proficiency of predevelopment, technological, and marketing activities). This recommendation in favour for managerially controllable factors within the firm is based on the following two main reasons.

Firstly, a substantial number of previous studies have indicated their importance as drivers for successful NPD efforts outcomes; while the external environment – in which a firm competes – is not under direct managerial control. In this regard, several studies found that the proficiency in executing the overall NPD activities has a significant positive effect on NP performance (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2011; Song & Noh, 2006), both NP's sales and profits (Millson & Wilemon, 2002; Song & Parry, 1996), and NP survival (Thieme *et al.*, 2003).

Specifically, achieving a significant improvement in NP performance (in terms of NP's customer satisfaction, sales, and profitability) depends on the proficiencies in executing the: (1) predevelopment (e.g., strategic-planning and idea-generation; Cooper & Kleinschmidt, 1995c; Langerak *et al.*, 2004b); (2) technical (Harmancioglu *et al.*, 2009; Song & Parry, 1997b); (3) marketing (Calantone & di Benedetto, 2012; Cooper & Kleinschmidt, 1995c; Harmancioglu *et al.*, 2009; Song *et al.*, 1997c); and (4) product launch's (Kleinschmidt *et al.*, 2007; Langerak *et al.*, 2004a; O'Dwyer & Ledwith, 2009) activities.

Additionally, NP's market and financial performance are enhanced significantly by the synergies of both marketing and technical skills/resources, cross-functional interface, and top-management support (Atuahene-Gima, 1996a; Rese & Baier, 2011; Song & Noh, 2006). Furthermore, the synergies of both marketing and technology, as well as project organisation (cross-functional team and top-management support), are associated significantly and positively with NPD efficiency in terms of NPD's time and cost (Rese & Baier, 2011).

Secondly, identifying these firm-based variables and their relative importance would guide managers to take the achievable corrective actions to improve the way by which their firms develop and launch new products; which is not achievable in case of the firms external environment variables.

Thus, in addition to the aforementioned three sequential dimensions of product innovation performance outcomes, and drawing from both CSFs approach and the RBV theory, the current study investigates the most consistently reported product innovation's critical firm-based enablers (CFEs), including: the new-product fit-to-firm's skills and resources (PFit), internal cross-functional integration (CrosFI), and top-management support (TMS), as well as the product innovation process execution proficiency (PEProf),.

3.2.4. Product Innovation Process Execution Proficiency (PEProf)

PEProf refers to how well or adequately the overall product innovation process is carried out – to develop and introduce a new-product into the marketplace – in terms of *marketing activities (MAProf)*; (1) searching for and generating new-product ideas, (2) conducting a detailed study of market potential, customer preferences, purchase process, etc., (3) testing the new-product under real-life conditions, and (4) introducing the new-product into the marketplace; advertising, promotion, selling, etc., as well as *technical activities (TAProf)*; (1) developing and producing the new-product's exemplar/prototype, (2) testing and revising the new-product's exemplar/prototype according to the desired and feasible features, and (3) executing new-product's production start-up (Barczak, 1995; Campbell & Cooper, 1999; Chryssochoidis & Wong, 1998; Cooper & Kleinschmidt, 1995a; Durmuşoğlu *et al.*, 2013; Millson & Wilemon, 2002, 2006; Mishra *et al.*, 1996; Parry & Song, 1994; Song & Noh, 2006; Song & Parry, 1997a; Thieme *et al.*, 2003).

Product innovation literature stresses the vigorous contribution of achieving high PEProf in enhancing the NPD's performance outcomes. The proficiencies in executing both the predevelopment and marketing activities have significant positive effects on the NPD's performance outcomes in terms of the NP's technical performance, speed-to-market, success rate, profitability, as well as the NP's contributions to enhance the firms overall sales, profits, and market share (Cooper & Kleinschmidt, 1995c).

Specifically, the achievements of high proficiencies in executing the strategic-planning, idea-generation (Langerak *et al.*, 2004b), and product-launch activities, as well as NP advantage, are related positively and significantly to NP performance, which in turn is related positively and significantly to firm performance (Langerak *et al.*, 2004a).

In this respect, firms that have higher levels of NPD process execution proficiency are in a better position to develop new-products that have advantages over competing products. Consequently, achieving a superior NP advantage leads to an improved NP performance (e.g., customer satisfaction), which in turn enhances the overall firm performance (e.g., profitability). Customers typically purchase new products that offer superior value, are unique, and provide an advantage relative to competing products. Therefore, it is possible for customers who perceive a superior NP advantage to be satisfied with it, which in turn can lead to frequent purchasing of that new product at a premium price accompanied by purchasing of other products and offerings of the firm.

Thus, firms that enjoy high proficiency in developing and launching a superior new product that appeals to target markets are rewarded with significant improvements in their NP performance and consequently their overall firm performance, such as sales growth and profitability (Anderson *et al.*, 1994; Langerak *et al.*, 2004a, b; Narver & Slater, 1990; Sandvik & Sandvik, 2003; Sandvik *et al.*, 2011).

3.2.5. New-Product Fit-to-Firm's Skills and Resources (PFit)

PFit refers to the extent to which the suggested new-product's innovation requirements fit-well-with the available firm's technical (R&D and production) and marketing (marketing research, sales force, advertising and promotion) skills and resources (Cooper & Kleinschmidt, 1994, 1995b; Harmancioglu *et al.*, 2009; Parry & Song, 1994; Souder & Jenssen, 1999).

Product innovation literature emphasises the vital importance of ensuring PFit for improving NPD efforts outcomes. NP-firm compatibility boosts NP success (Mishra *et al.*, 1996). An increase in NP's fit to firms technical/marketing resources/skills leads to significant enhancements in the NP' market and financial performance (Cooper & Kleinschmidt, 1987; Song & Parry, 1996; Zhao *et al.*, 2015). Harmancioglu *et al.* (2009) stated that marketing fit has significant positive effect on NP success (i.e., NP's customer satisfaction and profitability). Similarly, technical synergy has a significant positive effect on the NP's financial performance (Song & Montoya-Weiss, 2001).

Additionally, both marketing and technological synergies are associated significantly and positively with NP advantage concerning superior NP's quality and cost efficiency relative to competing products (Song & Parry, 1996), as well as achieving a superior NPD timelines (Chryssochoidis & Wong, 1998; Lee & Wong, 2010; Zhao *et al.*, 2015). Previous studies show that NP advantage is affected positively and significantly by skills/needs alignment (Song *et al.*, 1997a), technical fit (Harmancioglu *et al.*, 2009; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Zhao *et al.*, 2015), and marketing fit (Harmancioglu *et al.*, 2009). Furthermore, several studies provide an empirical evidence that the fit of marketing resources and skills has a significant positive effect on the proficiency in executing marketing activities, and that the fit of technical resources and skills has a significant positive effect on the proficiency in executing technical activities (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2010, 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997b, 1999).

3.2.6. Internal Cross-Functional Integration (CrosFI)

CrosFI refers to the extent of joint goals achievement, open and frequent communications, as well as sharing ideas, information, and resources among the internal firm's functions/departments (e.g., R&D, production, and marketing) to develop and introduce a new-product into the marketplace (Brettel *et al.*, 2011; Kahn, 1996; Olson *et al.*, 2001; Song & Montoya-Weiss, 2001; Troy *et al.*, 2008). The crucial importance of adopting CrosFI for enhancing NPD efforts outcomes is evident within product innovation literature.

Firms adopting cross-functional teams are rewarded with enhanced NPD performance outcomes (Barczak, 1995; Ittner & Larcker, 1997; Mishra & Shah, 2009; Song *et al.*, 1997b), such as greater: percentage of new products that are successful in the market (Valle & Avella, 2003); NP's financial performance (Song & Montoya-Weiss, 2001; Song & Parry, 1997b); NP profitability (Langerak & Hultink, 2005; Millson & Wilemon, 2002); NP's market performance (Kong *et al.*, 2014); NP survival (Thieme *et al.*, 2003); operational performance and its dimensions in terms of NP quality, NPD's time and cost (García *et al.*, 2008; Mishra & Shah, 2009; Valle & Avella, 2003); NP's technical performance (Cooper & Kleinschmidt, 1995c); NPD speed (Chryssochoidis & Wong, 1998; Langerak & Hultink, 2005; Lee & Wong, 2012); and NPD cost efficiency (Kong *et al.*, 2014).

Additionally, several studies found that utilising cross-functional integration has significant positive effects on the proficiency in executing the overall NPD activities (Lee & Wong 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Thieme *et al.*, 2003), marketing activities (Calantone & di Benedetto, 2012; Lee & Wong, 2010), lean launch (Calantone & di Benedetto, 2012), idea development and screening, business and market-opportunity analysis, technical development, product testing, and product commercialisation's activities (Song & Parry, 1997a).

3.2.7. Top-Management Support (TMS)

TMS refers to the extent of support provided by top-management – to develop and introduce a new-product into the marketplace – through top-management's resources dedication, commitment, and involvement (Akgün *et al.*, 2007; de Brentani & Kleinschmidt, 2004; Gomes *et al.*, 2001; Rodríguez *et al.*, 2008; Swink, 2000). The critical significance of providing TMS for boosting NPD efforts outcomes is supported by product innovation literature.

There is an empirical evidence that providing top-management support is associated significantly and positively with NPD's performance outcomes (Song *et al.*, 1997b), such as NP's sales and profitability (Cooper & Kleinschmidt, 1987; Song & Parry, 1996), NP's customer satisfaction (Valle & Avella, 2003), NP advantage (Song & Parry, 1996), as well as NPD timelines (Valle & Avella, 2003). Additionally, top-management involvement has a significant positive effect on the proficiency in executing product launch, while resources dedication leads to significant improvements in NP's financial performance, as well as the proficiencies in executing both the predevelopment and product launch's activities (Kleinschmidt *et al.*, 2007).

Furthermore, Song and Parry (1997a) reported that internal commitment (including TMS) has significant positive effects on the proficiencies in executing the idea development and screening, business and market-opportunity analysis, technical development, and product commercialisation's activities. They also established that internal commitment has a significant positive effect on the proficiency in executing product-testing activities in the Japanese firms. Similarly, Song *et al.* (1997a) indicated that project management's skills (including TMS) have a significant positive effect on the proficiency in executing marketing activities.

3.2.8. The Input-Process-Output (IPO) Model

The IPO model (Hackman & Morris, 1975; McGrath, 1984) can be employed to explain the mechanism (indirect or mediated effect) by which product innovation enablers can lead to performance outcomes. Besides its merits, the IPO model has some key limitations, which suggests complementing it by integrating it with the other theoretical frameworks, such as the CSFs approach, RBV theory, and system(s) approach.

The IPO model (Hackman & Morris, 1975; McGrath, 1984) is a universal and overarching conceptual framework in business and management context. It has a widespread utilisation and a great influence on business and management research, much of which either implicitly or explicitly utilises the IPO model (Goodwin *et al.*, 2009; Hülsheger *et al.*, 2009; Ilgen *et al.*, 2005). From the IPO model perspective, there are three broad categories for variables: input, process, and output variables. It focuses on how resources (inputs) are converted (processed) into products (outputs). It assumes that the input factors affect output performances through certain kinds of interaction processes. Specifically, the effect of input variables on output variables is completely (mediated by) channelled through process variables. In other words, it assumes that an input leads to a process, which in turn leads to an output (Hackman & Morris, 1975; McGrath, 1984).

A fundamental notion inherent in the IPO model is that while establishing an input–output relationship is an essential first-step in any research endeavour, an articulation and understanding of the intervening mechanism (mediation) in this relationship is vital for a better, accurate, and comprehensive understanding, prediction, and, eventually, management of a phenomenon of interest (Anderson *et al.*, 2006; Van der Vegt *et al.*, 2010). Identifying mediators is crucial for product innovation researchers and managers to enhance their understanding of how resources are converted into NPD performance outcomes and provides guidance for managers on how best to allocate their scarce resources (Zhao *et al.*, 2015).

Without controlling for the roles of the intervening variables (mediators; such as PEProf), the effect of a success factor on NPD performance outcomes is likely to be overestimated (Langerak *et al.*, 2004a, b). In this regard, within the current study, product innovation phenomenon could be conceptualised as a set of three distinct but interrelated components: product innovation's enablers, process, and performance outcomes. Product innovation enablers (e.g., PFit, CrosFI, and TMS) affect the outcomes of product innovation performance (e.g., OperLP, ProdLP, and FirmLP) through product innovation process execution proficiency (PEProf). In particular, PEProf can be either a dependent variable for product innovation enablers (e.g., PFit, CrosFI, and TMS), or an independent variable that form an antecedent for the outcomes of product innovation performance (e.g., OperLP, ProdLP, and FirmLP).

Besides its merits, the IPO model has some key limitations. *Firstly*, the focus of the IPO model can be conceived of as the indirect (mediated) effects of product innovation enablers (e.g., PFit, CrosFI, TMS) on product innovation performance outcomes (e.g., OperLP, ProdLP, and FirmLP) through product innovation process execution proficiency (PEProf), while neglecting the possible direct effects of product innovation enablers (e.g., PFit, CrosFI, TMS) on product innovation performance outcomes (e.g., OperLP, ProdLP, and FirmLP).

However, without accounting for these direct effects, a complete examination of the possible mediating effect and its type (full or partial mediation) is unachievable (e.g., Hair *et al.*, 2014a). The existence of both direct and indirect effects of product innovation enablers on performance outcomes must be considered in the product innovation decision-making process (Calantone & di Benedetto, 1988).

Secondly, within the IPO model "P" refers to the process that intervenes between an input and an output. However, a variable that intervene and conduct the influence of inputs to outcomes is not necessarily a *"process"* (Ilgen *et al.*, 2005; Van der Vegt *et al.*, 2010); instead, it is "the underlying logic that explains a causal relationship between independent and dependent variables" (Van de Ven & Poole, 1995, p. 512). Instead of *"process"*, using the term *"mediator(s)"* can accommodate for a wider range of variables that have important mediational roles in explaining/predicting the variability in the intermediate and/or ultimate outcome(s). A mediator can be a process (e.g., PEProf), an emergent state, or an intermediate outcome (e.g., OperLP, or ProdLP).

Thirdly, as the IPO model assumes that a variable can only be one of three categories (either input, process, or output), it does not accommodate for the possible multiple roles that a variable can simultaneously play (e.g., enabler, mediator, and outcome). For example, OperLP can concurrently be: (1) an independent variable (critical firm-based enabler) for ProdLP and FirmLP (outcomes); (2) a mediating variable (mediator) for the effects of PFit, CrosFI, TMS, and PEProf (critical firm-based enablers) on ProdLP and FirmLP (outcomes); and (3) a dependent variable (outcome) for PFit, CrosFI, TMS, and PEProf (critical firm-based enablers). *Finally*, the IPO model does not accommodate for: (1) the intermediate outcomes (e.g., OperLP and ProdLP) in addition to the ultimate outcome (e.g., FirmLP); (2) the interactions among the different outcomes dimensions (e.g., OperLP, ProdLP, and FirmLP) or their sequence in these interactions (e.g., OperLP→ProdLP→FirmLP); and (3) the sequential mediating effects that two variables can play together in mediating sequentially the enablers effects on the different performance outcomes. For example:

(1) PEProf→*OperLP→ProdLP*→FirmLP; or

(2) (PFit, CrosFI, and TMS)→*PEProf→OperLP*→ProdLP.

3.2.9. The System(s) Approach

The system(s) approach (Ackoff, 1964, 1971) can be employed to provide a foundation for a more holistic and simultaneous understanding of the multiple direct and indirect (mediated) interrelationships: (1) among product innovation's enablers, process execution proficiency, and performance outcomes; and (2) among the different dimensions of product innovation performance outcomes. Besides its merits, the system(s) approach has some key limitations, which suggests complementing it by integrating it with the other theoretical frameworks, such as the CSFs approach, RBV theory, and IPO model.

A system is "a complex collection of interactive elements and subsystems within a single product, jointly performing a wide range of independent functions to meet a specific operational mission or need. A system consists of many subsystems (and components), each performing its own function and serving the system's major mission" (Shenhar *et al.*, 2002, p. 117). The system(s) approach (Ackoff, 1964, 1971) has been closely connected with the development of operational research and management science. It is popular, pervasive and applicable to almost any domain or problem area because of its generality (Mingersa & White, 2010; Rubenstein-Montano *et al.*, 2001; Schiuma *et al.*, 2012). The systems approach is about viewing a situation holistically, and distinguishing a hierarchy of levels of systems and the consequent ideas of properties emerging at different levels, as well as the mutual causality both within and between levels (Mingersa & White, 2010). It is a conceptual framework for problem solving that considers problems in their entirety. It assumes that there are emergent properties of systems that do not occur when systems are disintegrated into smaller parts. Problem solving, in this way, involves pattern finding to enhance the understanding, management, and solution of a specific problem (Ackoff, 1971; Rubenstein-Montano *et al.*, 2001).

The systems approach is centred on the premise that the whole is often more than the summation of its parts and that it is impractical to get a truthful visualisation of a specific phenomenon without investigating the interrelationships between the whole and its separate components (Waldron *et al.*, 2010). Some characteristics of systems can only be understood and adequately managed from a holistic point of view. These characteristics derive from the relationships between parts of systems: how the parts interact and fit together (Ackoff, 1971). Thus, the systems approach can enable managers to comprehend the sophisticated nature of a specific project, capturing it as a 'whole', and, eventually, managing it adequately (Cleland & King, 1983).

In this regard, there is a wide agreement among researchers that product innovation is inherently a multifaceted phenomenon that encompasses complex and simultaneous direct and indirect interrelationships among product innovation's enablers, process, and performance outcomes (e.g., Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Campbell & Cooper, 1999; Cooper, 1979; Cooper & Kleinschmidt, 1995a; Chryssochoidis & Wong, 1998; García *et al.*, 2008; Healy *et al.*, 2014; Kong *et al.*, 2014; Langerak *et al.*, 2004a, b; Song & Parry, 1997a; Thieme *et al.*, 2003).

Additionally, product innovation is a disciplined problem-solving process (Atuahene-Gima, 2003; Brown & Eisenhardt, 1995), which in turn stimulates the need for an integrative model based on a system approach (Brown & Eisenhardt, 1995; Calantone & di Benedetto, 1988; Kessler & Chakrabarti, 1996; Song & Montoya-Weiss, 2001; Song & Noh, 2006; Song & Parry, 1997a; Tatikonda & Montoya-Weiss, 2001; Thieme *et al.*, 2003) that can provide product innovation researchers and managers with a holistic view for better and comprehensive understanding of these complex and simultaneous interrelationships.

However, the reviewed relevant empirical studies (for more details, see section 2.3.3) have examined product innovation variables by focusing mainly on the direct effect and some different measurements/dimensions of product innovation's critical firm-based enablers, process execution proficiency, and performance outcomes. Accordingly, it is challenging to have a holistic understanding of the simultaneous interrelationships among these variables in light of the fragmented findings, varied focus and level of analysis for most of these studies (Brown & Eisenhardt, 1995).

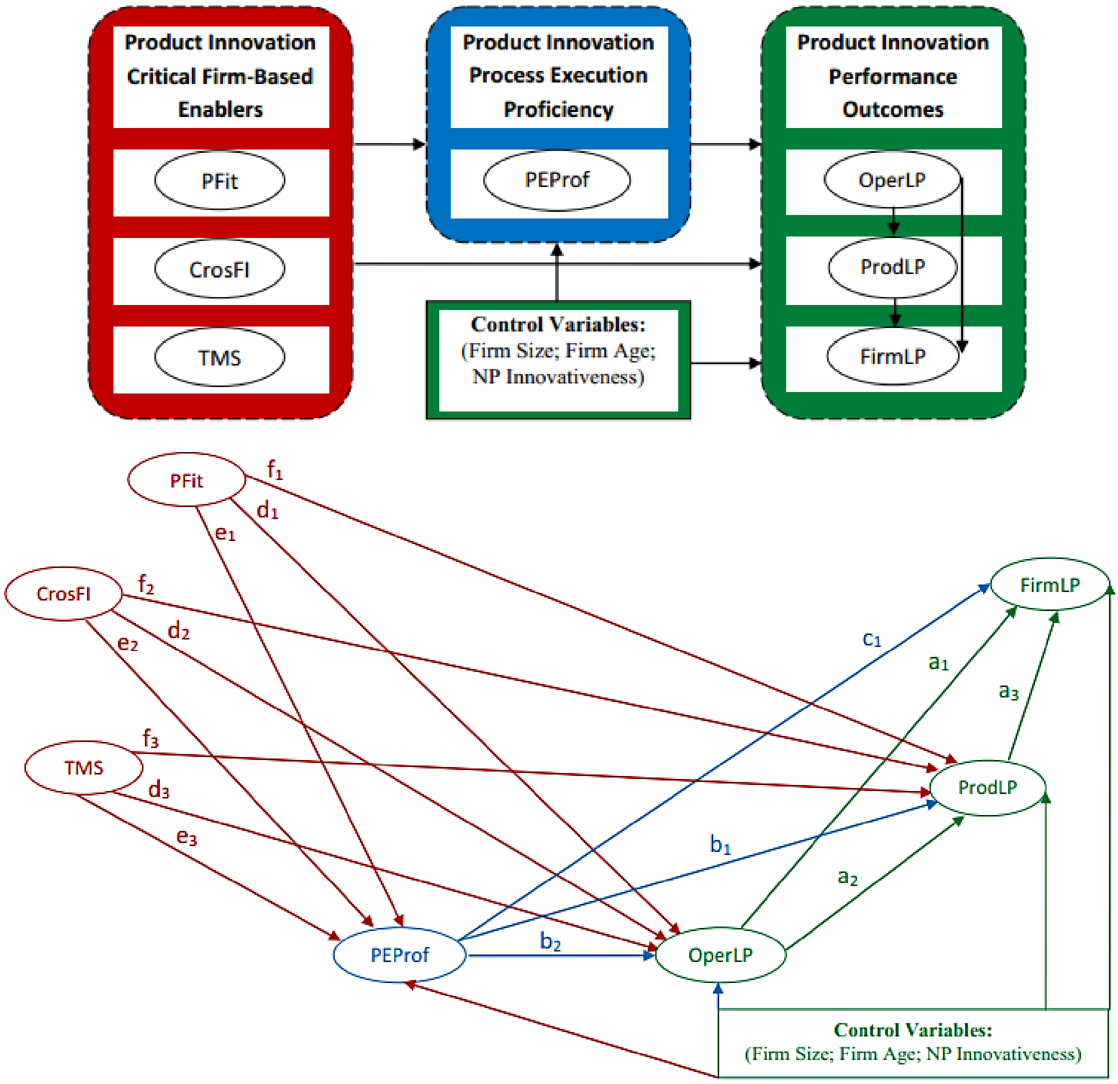
Additionally, previous studies have adopted various levels of analysis, such as individual project/product level, programme level, or firm level. However, adopting an individual project/product level for analysis is superior to the programme and firm levels (Calantone *et al.*, 1996), as it permits a study to capture the unique situational attributes that influence the processes and outcomes of a specific product/project (Kessler & Bierly, 2002). Contrarily, studies at the programme and firm levels tend to mix the results of a group of NPD products/projects for a firm, confusing each product/project's specific characteristics and their associated differential effects on the different performance outcomes (Chen *et al.*, 2005).

Besides its popularity, pervasiveness and applicability to almost any domain or problem area (Mingersa & White, 2010; Rubenstein-Montano *et al.*, 2001; Schiuma *et al.*, 2012), the system(s) approach is too general. It lacks specificity, provides no guidance, or concrete and detailed information on the specific factors to be investigated, their relative importance, effects, or sequence. In its broadest sense, everything is a system. Additionally, what makes something a system is dependent on how each person thinks about the system (Cabrera *et al.*, 2008). Furthermore, while the systems approach is applicable to almost any domain, Mingersa and White (2010) emphasised that the different individual disciplines have been developing in their own way to accommodate for its specific characteristics and needs.

3.2.10. The Theoretical Model: Critical Firm-based Enablers-Mediators-Outcomes (CFEMOs)

The previously mentioned merits and limitations lend support to the complementary nature of the reviewed theoretical perspectives and empirical studies, which in turn suggests integrating them together for a more holistic view. Based on the aforesaid arguments and discussions, the focus of the current study is on developing and empirically verifying a theory-informed model (CFEMOs), as shown in Fig. 3.1, of the managerially controllable factors (critical firm-based enablers) that have high potential for achieving the desired (intermediate and ultimate) NPD efforts outcome(s).

This theoretical model integrates, on an individual NP level, the simultaneous direct and indirect (mediated) interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP). Underlying the depicted relationships are the combined theoretical perspectives of the Critical Success Factors (CSFs) approach (Bullen & Rockart, 1981; Daniel, 1961; Rockart, 1979), the Resource-Based View (RBV) of the firm theory (Barney, 1991; Grant, 1991; Peteraf, 1993; Wernerfelt, 1984), and the Input-Process-Output (IPO) model (Hackman & Morris, 1975; McGrath, 1984), together, under the system(s) approach's umbrella (Ackoff, 1964, 1971).



Stage 1:

H1: OperLP→FirmLP; **H2:** OperLP→ProdLP→FirmLP;

Stage 2:

H3: PEProf→ProdLP; **H4:** PEProf→OperLP→ProdLP; **H5:** PEProf→FirmLP; **H6:**PEProf→OperLP→FirmLP; **H7:** PEProf→ProdLP→FirmLP; **H8:**PEProf→OperLP→ProdLP→FirmLP;

Stage 3:

H9a: PFit→OperLP; **H9b:** CrosFI→OperLP; **H9c:** TMS→OperLP; **H10a:**PFit→PEProf→OperLP; **H10b:** CrosFI→PEProf→OperLP; **H10c:** TMS→PEProf→OperLP; **H11a:** PFit→ProdLP; **H11b:**CrosFI→ProdLP; **H11c:** TMS→ProdLP; **H12a:** PFit→PEProf→ProdLP; **H12b:**CrosFI→PEProf→ProdLP; **H12c:** TMS→PEProf→ProdLP; **H13a:** PFit→OperLP→ProdLP; **H13b:** CrosFI→OperLP→ProdLP; **H13c:** TMS→OperLP→ProdLP; **H14a:**PFit→PEProf→OperLP→ProdLP; **H14b:** CrosFI→PEProf→OperLP→ProdLP; **H14c:**TMS→PEProf→OperLP→ProdLP.

Fig. 3.1. The theoretical model: Critical Firm-based Enablers-Mediators-Outcomes (CFEMOs)

Note: All relationships are hypothesised to be positive and significant. PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product.

For the purpose of the current study, *critical firm-based enablers* refer to the few (not all) firm-based (not outside the firm) variables that their utilisations in developing and launching a new product (and/or their achievements) are critical (lead to significant improvements) in achieving the desired product innovation intermediate and/or ultimate outcome(s). Additionally, a variable that intervenes and conducts the influence of inputs to outcomes is not necessarily a *"process"* (Ilgen *et al.*, 2005; Van der Vegt *et al.*, 2010); instead, it is "the underlying logic that explains a causal relationship between independent and dependent variables" (Van de Ven & Poole, 1995, p. 512). For the purpose of the current study, and drawing on Van de Ven and Poole (1995) and Ilgen *et al.* (2005), instead of *"process"*, the author adopts the term *"mediator(s)"* in order to accommodate for a wider range of variables that have important mediational roles in explaining/predicting the variability in the intermediate and/or ultimate outcome(s). A mediator can be a process (e.g., PEProf), an emergent state, or an intermediate outcome (e.g., OperLP, or ProdLP).

Thus, rather than following a manufacturing perspective in which a process takes raw materials as inputs, applies a manufacturing process, and produces manufactured goods as output; instead, the theoretical model for the current study (CFEMOs), as shown in Fig. 3.1, follows the following logic: Critical Firm-based Enabler(s)→ Mediator(s)→Outcome(s). In other words, the utilisation(s) of the critical firm-based enabler(s) lead(s) to enhancement(s) in the intermediate outcome(s)/mediator(s) indispensable for the achievement(s) of other intermediate outcome(s) and/or an ultimate outcome. Additionally, within this theoretical model, the author posits that a variable can: (1) only be a critical firm-based enabler (PFit, CrosFI, and TMS); (2) only be an ultimate outcome (FirmLP); or (3) concurrently play multiple roles, namely a critical firm-based enabler, a mediator, and an intermediate outcome (PEProf, OperLP, and ProdLP).

For example, PEProf is concurrently: (1) an independent variable (critical firm-based enabler) for OperLP, ProdLP, and FirmLP (outcomes); (2) a mediating variable (mediator) for the effects of PFit, CrosFI, and TMS (critical firm-based enablers) on OperLP, ProdLP, and FirmLP (outcomes); and (3) a dependent variable (outcome) for PFit, CrosFI, and TMS (critical firm-based enablers). In a similar vein, OperLP is concurrently: (1) an independent variable (critical firm-based enabler) for ProdLP and FirmLP (outcomes); (2) a mediating variable (mediator) for the effects of PFit, CrosFI, TMS, and PEProf (critical firm-based enablers) on ProdLP and FirmLP (outcomes); and (3) a dependent variable (outcome) for PFit, CrosFI, TMS, and PEProf (critical firm-based enablers). In the same way, ProdLP is concurrently: (1) an independent variable (critical firm-based enabler) for FirmLP (outcome); (2) a mediating variable (mediator) for the effects of PFit, CrosFI, TMS, PEProf, and OperLP (critical firm-based enablers) on FirmLP (outcome); and (3) a dependent variable (outcome) for PFit, CrosFI, TMS, PEProf, and OperLP (critical firm-based enablers). Furthermore, PEProf and OperLP together are sequential mediating variables (mediators) for the effects of PFit, CrosFI, and TMS (critical firm-based enablers) on ProdLP (outcome). Similarly, OperLP and ProdLP together are sequential mediating variables (mediators) for the effect of PEProf (critical firm-based enabler) on FirmLP (outcome).

Before proceeding to the research hypotheses development, it should be noted that, while this study provides a substantial progress toward clarifying the complex interrelationships among the product innovation’s critical firm-based enablers (PFit, CrosFI, and TMS), process execution proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP), limitations resulting from trade-off decisions required in all empirical research are present. The following three limitations offer promising avenues for future research.

First, only three specific critical firm-based enablers (i.e., PFit, CrosFI, and TMS) were examined as exogenous variables—ones that, based on the theoretical and empirical literature, warranted investigation. Therefore, additional understanding of this study's investigated relationships would be grasped by future empirical research that extends this study's integrated theoretical framework (CFEMOs model) by, for instance: (1) examining the effects of both PFit and TMS on CrosFI; (2) studying the potential roles of other firm-based enablers (e.g., innovation culture, process formality/flexibility, information technology); (3) comparing the roles of the critical firm-based enablers to the potential roles of the out-of-the-firm ones (e.g., external relations with customers, competitors, suppliers, and research institutes) based on the resource-advantage theory; and/or (4) exploring qualitatively (e.g., utilising personal interviews and focus groups) the drivers, facilitators, and barriers for the firms adoption of PFit, CrosFI, and TMS.

Second, besides considering the *overall OperLP*, disentangling *it*, using future research, into *its* three individual components (i.e., NP's quality, speed-to-market, and cost efficiency) would uncover more specific effects: (1) of their antecedents; as well as (2) on their consequences. *Third*, as the current study was primarily focused on the mediating effects, thus, to reveal further insights, the author call future research to extend this study by accounting for the potential moderators that might affect (strengthen or weaken) this study's investigated relationships (e.g., product innovativeness, order of market entry, market potential, competitive intensity, environmentally-caused disruption).

3.3. Research Hypotheses Development

Besides integrating the complementary theoretical perspectives of the Critical Success Factors (CSFs) approach; the Resource-Based View (RBV); and the Input-Process-Output (IPO) model, together, under the system(s) approach's umbrella, the hypothesised direct and indirect (mediated) relationships of the CFEMOs model were based on the significant relationships identified from the relevant empirical studies.

3.3.1. The Effect of OperLP on FirmLP, and the Role of ProdLP in Mediating this Effect

3.3.1.1. The Relationship between OperLP and FirmLP

Developing new products characterised by competitive advantages increases the firm's market performance, overall financial performance, and long-term viability (Kim *et al.*, 2014). Achieving a superior operational performance (in terms of NP quality, NPD's time and cost) improves the overall firm performance with reference to the customer loyalty, market share, overall profitability, break-even time, and return on investment (García *et al.*, 2008; Jayaram & Narasimhan, 2007; Mishra & Shah, 2009; Yang, 2012).

Firstly, NP advantage (i.e., a differentiated and superior product that delivers value-for-money, high relative quality, and meets customer needs better than competitors) enhances NPD performance outcomes (Cooper & Kleinschmidt, 1995c; Montoya-Weiss & Calantone, 1994; Rese & Baier, 2011). Specifically, NP advantage has significant positive effects on the NP's contributions to enhance the firms overall sales, profits, market share, and opening windows of market opportunities for a firm (Baker & Sinkula, 2005; Calantone & Knight, 2000; Cooper & Kleinschmidt, 1995c; Kim *et al.*, 2013; Song & Parry, 1996, 1997a; Terwiesch *et al.*, 1998), as well as long-term performance, such as customer loyalty and return on investment (Molina-Castillo *et al.*, 2011, 2013).

Secondly, regardless of the fundamental competitive strategy adopted (Davis *et al.*, 2002), and the level of market and technological turbulence (Calantone *et al.*, 2003), NPD time superiority improves NPD performance outcomes. Precisely, NPD time superiority has significant positive effects on the overall firm performance with regard to sales, profitability, return on investment, and market share (Baker & Sinkula, 2005; Calantone *et al.*, 2003; Chen *et al.*, 2005; Davis *et al.*, 2002; Langerak & Hultink, 2005; Sheng *et al.*, 2013).

Thirdly, high NP's development and launching costs can lead to NP's market failure, while achieving a superior NP's development and launching cost would enhance the firm's market performance (Tatikonda & Montoya-Weiss, 2001). As high NPD cost may limit a firm's ability to position a NP at a competitive price, it can lead to lower sales and a decrease in the firm's short- and long-term profitability (García *et al.*, 2008). Thus, it is posited that:

H1: OperLP has a positive and significant direct effect on FirmLP

(H1: OperLP→FirmLP = a_1*).*

3.3.1.2. The Mediating Role of ProdLP in the Relationship between OperLP and FirmLP

Besides the evidence provided by product innovation literature that a high level of OperLP improves FirmLP, the mechanism by which this effect is achieved is less researched. It is argued here that the effect of OperLP on FirmLP is achieved through ProdLP.

Firstly, accomplishing a high OperLP can enhance ProdLP. The three operational outcomes (product quality, time-to-market, and unit cost) represent key product development capabilities for a firm. The achievement of operational outcomes predicts the achievement of market outcomes. Under varying conditions of technological, market, and environmental uncertainties (Tatikonda & Montoya-Weiss, 2001), achieving a superior operational performance (in terms of NP quality, NPD's time and cost) enhances the NP's market performance, such as NP's customer satisfaction, sales, profitability, and commercial success (García *et al.*, 2008; Gunday *et al.*, 2011; Mishra & Shah, 2009; Tatikonda & Montoya-Weiss, 2001; Yang, 2012).

With regard to superior NP quality, several studies found that firms that develop and launch a differentiated NP, characterised by a superior quality in relation to the competing products, are rewarded with significant improvements in NP performance concerning NP's customer satisfaction, sales, and profits (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Cooper & Kleinschmidt, 1995c; Kim & Atuahene-Gima, 2010; Kim *et al.*, 2013; Langerak *et al.*, 2004a; Molina-Castillo *et al.*, 2011, 2013; Montoya-Weiss & Calantone, 1994; Rodríguez-Pinto *et al.*, 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997a, b, 1999; Song *et al.*, 1997a; Zhao *et al.*, 2015).

In relation to NPD time, prior works shows that, regardless of the technological uncertainty (Chen *et al.*, 2005), as well as the legal, technological, and competitive's environments (Chryssochoidis & Wong, 1998), achieving a superior NP development and launching time in terms of NPD timeliness and NP speed-to-market has a significant positive effect on the overall NP success with regard to NP's customer acceptance, sales, and profitability (Chen *et al.*, 2005; Chryssochoidis & Wong, 2000; Kessler & Bierly, 2002; Kim & Atuahene-Gima, 2010; Stanko *et al.*, 2012).

Regarding NPD cost, there is evidence that the NP development and launching cost efficiency has a significant positive effect on the NP performance (e.g., Kim & Atuahene-Gima, 2010). High NPD costs can lead to the NP's market failure, while realising superior NPD costs significantly enhances the NP's market performance (Tatikonda & Montoya-Weiss, 2001). Increasing NPD costs may limit a firm's ability to position a NP at a competitive price in the target markets, and thus can lead to lower NP's sales and profitability (García *et al.*, 2008).

Secondly, achieving a high ProdLP can boost FirmLP. A well-established finding by previous studies is that NP success contributes to improving the overall firm performance (e.g., Langerak *et al.*, 2004a, b). Griffin (1997) reported that best-practice firms achieve 49% of their sales and profits from launched new products within the last five years. In addition, Baker and Sinkula (2005) confirmed that the attainment of an enhanced market share for a firm is subject to its NP success. Furthermore, Langerak and Hultink's (2005) study provides an empirical evidence that NP profitability boosts the firm's financial performance. In order to meet their sales and profits objectives, firms cannot depend on their current product offerings only; instead, firms should pursue the continuous development and launching of successful new products (Langerak & Hultink, 2005; Langerak *et al.*, 2004a, b). Moreover, Hooley *et al.* (2005) and Gunday *et al.* (2011) indicated that achieving a superior NP's market performance leads to significant improvements in the firm's overall financial performance. In a recent study, Thoumrungroje and Racela (2013) reported a significant positive association between NP performance and firm performance. Chang *et al.* (2014) and Kim *et al.* (2014) confirmed these findings by asserting that NP performance has a strong significant positive effect on the overall firm performance in terms of sales, profitability, and market share.

Thirdly, a well-timed accomplishment of NP's development and launching permits firms to achieve substantial cost reduction, larger market segment coverage, more profits, and a leading position in the target markets (Lee & Wong, 2012). Although *realising a superior NP quality* might lead to a significant improvement in firm success, *it* is insufficient for achieving firm success (Calantone & Knight, 2000). Instead, the concurrent pursuit of the competitive capabilities (NP quality, NPD's time and cost) is the recommended way that leads to an enhancement in the ultimate firm performance (Jayaram & Narasimhan, 2007).

Therefore, achieving a superior overall operational performance constitutes the first step towards improving the overall firm performance (Mishra & Shah, 2009). The effect of NP speed-to-market on firm performance is not simple and direct (Ittner & Larcker, 1997). Additionally, both NP differentiation and NP development and launching cost have significant positive indirect effects on firm performance (Calantone & Knight, 2000). With this respect, Hooley *et al.* (2005) highlighted the importance of customer and market performance as routes to attain superior firm financial performance. Specifically, Anderson *et al.* (1994) and Langerak *et al.* (2004a) proved that achieving a superior NP advantage leads to an improved NP performance (e.g., customer satisfaction), which in turn enhances the overall firm performance (e.g., profitability). Customers typically purchase new products that offer superior value, are unique, and provide an advantage relative to competing products. Therefore, it is possible for customers who perceive a superior NP advantage to be satisfied with it, which in turn can lead to frequent purchasing of that new product at a premium price accompanied by purchasing of other products and offerings of the firm.

Thus, firms that develop and launch a superior new product that appeals to target markets are rewarded with significant improvements in their NP performance and consequently their overall firm performance, such as sales growth and profitability (Anderson *et al.*, 1994; Narver & Slater, 1990; Sandvik & Sandvik, 2003; Sandvik *et al.*, 2011). In a recent study, Gunday *et al.* (2011) indicated that the effect of operational performance (in terms of NP quality, NPD's time and cost) on firm's financial performance is channelled through market performance. Kim *et al.* (2014) confirmed these findings by asserting that developing differentiated products enhances market performance, which consequently improves the firm's overall financial performance. Accordingly, it is hypothesised that:

H2: ProdLP mediates the effect of OperLP on FirmLP

(H2: OperLP→ProdLP→FirmLP = $a_2 \times a_3$*).*

3.3.2. The Effect of PEProf on ProdLP, and the Role of OperLP in Mediating this Effect

3.3.2.1. The Relationship between PEProf and ProdLP

Several studies found that the proficiency in executing the overall NPD activities has a significant positive effect on NP performance (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2011; Song & Noh, 2006), both NP's sales and profits (Millson & Wilemon, 2002; Song & Parry, 1996), and NP survival (Thieme *et al.*, 2003).

Specifically, achieving a significant improvement in NP performance (in terms of NP's customer satisfaction, sales, and profitability) depends on the proficiencies in executing the: (1) predevelopment (e.g., strategic-planning and idea-generation) (Cooper & Kleinschmidt, 1995c; Langerak *et al.*, 2004b); (2) technical (Harmancioglu *et al.*, 2009; Song & Parry, 1997b); (3) marketing (Calantone & di Benedetto, 2012; Cooper & Kleinschmidt, 1995c; Harmancioglu *et al.*, 2009; Song *et al.*, 1997c); and (4) product launch's (Kleinschmidt *et al.*, 2007; Langerak *et al.*, 2004a; O'Dwyer & Ledwith, 2009) activities.

Additionally, Calantone and di Benedetto (2012) indicated that realising an increase in lean launch's execution enhances NP performance. Furthermore, Song *et al.* (2011) concluded that the execution of a high quality launch had the largest positive effect on the first NP performance, and it is much more important than developing a highly innovative product. Therefore, it is predicted that:

H3: PEProf has a positive and significant direct effect on ProdLP

(H3: PEProf→ProdLP = b_1*).*

3.3.2.2. The Mediating Role of OperLP in the Relationship between PEProf and ProdLP

Besides the evidence provided by product innovation literature that a high level of PEProf enhances ProdLP, the mechanism by which this effect is realised is less investigated. It is argued here that the effect of PEProf on ProdLP is realised through OperLP.

Firstly, accomplishing a high PEProf can enhance OperLP. Achieving high NPD process execution proficiency (predevelopment, marketing, and technological activities) is associated significantly and positively with NPD efficiency in terms of NP quality, NPD's time and cost (Rese & Baier, 2011). A superior NP development and launching time can be realised through NPD process execution proficiency (Chryssochoidis & Wong, 1998). Specifically, achieving high proficiencies in executing both marketing and technical activities boosts NPD timelines/speed-to-market (Harmancioglu *et al.*, 2009; Lee & Wong, 2010, 2012). Additionally, a proper execution of the overall NPD process is crucial in achieving NP advantage (Langerak *et al.*, 2004a; Sandvik *et al.*, 2011).

In this regard, the proficiencies in executing both marketing (Harmancioglu *et al.*, 2009; Song *et al.*, 1997a) and technical (Calantone & di Benedetto, 1988) activities have significant positive effects on achieving superior NP quality (Song & Montoya-Weiss, 2001; Song & Parry, 1997b, 1999). Particularly, the proficiencies in executing the predevelopment, concept development and evaluation, marketing research, product-testing, technical development, and product launch's activities, are associated significantly and positively with NP advantage concerning superior NP's quality and cost efficiency relative to competing products (Song & Parry, 1996, 1997a; Verworn, 2009; Verworn *et al.*, 2008).

Secondly, achieving a high OperLP can boost ProdLP. Under varying conditions of technological, market, and environmental uncertainties (Tatikonda & Montoya-Weiss, 2001), achieving a superior operational performance (in terms of NP quality, NPD's time and cost) enhances the NP's market performance, such as NP's customer satisfaction, sales, profitability, and commercial success (García *et al.*, 2008; Gunday *et al.*, 2011; Mishra & Shah, 2009; Tatikonda & Montoya-Weiss, 2001; Yang, 2012).

Thirdly, there is evidence that the total indirect effects of the proficiency in executing both marketing and technical activities on NP's financial performance are positive and significant (Song & Parry, 1997b). Additionally, both NP advantage and the proficiency in executing NPD launch tactics are related positively and significantly to NP performance (Langerak *et al.*, 2004a).

In this respect, firms that enjoy high NPD process execution proficiency are able to develop new-products that have advantages over competing products, which in turn yields an improved NP performance. Customers typically purchase new products that offer superior value, are unique, and provide an advantage relative to competing products. Therefore, it is possible for customers who perceive a superior NP advantage to be satisfied with it and buy it frequently at a premium price. Thus, firms that enjoy high proficiency in developing and launching a superior new product that appeals to target markets are rewarded with significant improvements in NP performance in terms of customer satisfaction, sales, and profits (Anderson *et al.*, 1994; Sandvik *et al.*, 2011). Accordingly, it is posited that:

H4: OperLP mediates the effect of PEProf on ProdLP

(H4: PEProf→OperLP→ProdLP = $b_2 \times a_2$*).*

3.3.3. The Effect of PEProf on FirmLP, and the Roles of OperLP and ProdLP in Mediating this Effect

3.3.3.1. The Relationship between PEProf and FirmLP

Project execution holds the key to the firm's market success with regard to market share, overall profitability, and return on investment (Mishra & Shah, 2009). The proficiencies in executing the predevelopment, technological, and marketing activities enhance NPD performance outcomes (Montoya-Weiss & Calantone, 1994). Specifically, Cooper and Kleinschmidt's (1995c) study provides an empirical evidence that the proficiencies in executing both predevelopment and marketing activities have significant positive effects on NP's contributions to enhance firms overall sales, profits, and market share. Additionally, Langerak *et al.* (2004a) and O'Dwyer and Ledwith (2009) reported a significant positive association between the proficiency in executing product launch's activities and firm performance.

Furthermore, Millson and Wilemon (2002) stated that the proficiency in executing the overall NPD activities enables firms to enter new markets. In a follow-up study, Millson and Wilemon (2006) found that the proficiency in executing the overall NPD activities has significant positive effects on entering both existing and new markets by the firm. Moreover, Kleinschmidt *et al.* (2007) indicated that the proficiency in executing predevelopment activities has a significant positive effect on opening windows of market opportunities for a firm. In a recent study, Kim *et al.* (2014) confirmed these finding by asserting that NPD-effort success improves both the firm's market performance and overall financial performance. Thus, it is suggested that:

H5: PEProf has a positive and significant direct effect on FirmLP

(H5: PEProf→FirmLP = c_1*).*

3.3.3.2. The Mediating Role of OperLP in the Relationship between PEProf and FirmLP

Besides the evidence provided by product innovation literature that a high level of PEProf improves FirmLP, the mechanism by which this effect is achieved is less researched. It is argued here that the effect of PEProf on FirmLP is achieved via OperLP.

Firstly, achieving a high PEProf can improve OperLP. Achieving high NPD process execution proficiency is associated significantly and positively with NPD efficiency in terms of NP quality, NPD's time and cost (Rese & Baier, 2011). Accomplishing high proficiencies in executing both marketing and technical activities boosts NPD timelines/speed-to-market (Harmancioglu *et al.*, 2009; Lee & Wong, 2010, 2012). Additionally, a proper execution of the overall NPD process is crucial in achieving NP advantage (Langerak *et al.*, 2004a; Sandvik *et al.*, 2011). Specifically, the proficiencies in executing the predevelopment, concept development and evaluation, marketing research, product-testing, technical development, and product launch's activities, are associated significantly and positively with NP advantage concerning superior NP's quality and cost efficiency relative to competing products (Song & Parry, 1996, 1997a).

Secondly, attaining a greater OperLP can enhance FirmLP. Developing new products characterised by competitive advantages increases the firm's market performance, overall financial performance, and long-term viability (Kim *et al.*, 2014). Achieving a superior operational performance (in terms of NP quality, NPD's time and cost) improves the overall firm performance with reference to customer loyalty, market share, overall profitability, break-even time, and return on investment (García *et al.*, 2008; Jayaram & Narasimhan, 2007; Mishra & Shah, 2009; Yang, 2012).

Thus, firms that ensure a high NPD process execution proficiency that enable them to develop and launch a superior new product (with reference to NP quality, NP development and launching time and cost) are consequently rewarded with an enhanced overall firm performance, such as sales, profitability, and market share. Accordingly, it is hypothesised that:

H6: OperLP mediates the effect of PEProf on FirmLP

(H6: PEProf→OperLP→FirmLP = $b_2 \times a_1$*).*

3.3.3.3. The Mediating Role of ProdLP in the Relationship between PEProf and FirmLP

Besides the evidence provided by product innovation literature that a high PEProf enhances FirmLP, the mechanism by which this effect is achieved is less investigated. It is argued here that the effect of PEProf on FirmLP is realised through ProdLP. *Firstly, accomplishing a high PEProf can boost ProdLP*. Several studies found that the proficiency in executing the overall NPD activities has a significant positive effect on NP performance (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2011; Song & Noh, 2006), both NP's sales and profits (Millson & Wilemon, 2002; Song & Parry, 1996), and NP survival (Thieme *et al.*, 2003).

Secondly, achieving a superior ProdLP can improve FirmLP. A well-established finding by previous studies is that NP success contributes to improving the overall firm performance (e.g., Langerak *et al.*, 2004a, b). Additionally, Langerak and Hultink's (2005) study provides an empirical evidence that NP profitability boosts the firm's financial performance. In order to meet their sales and profits objectives, firms cannot depend on their current product offerings only; instead, firms should pursue the continuous development and launching of successful new products (Langerak & Hultink, 2005; Langerak *et al.*, 2004a, b). Furthermore, Chang *et al.* (2014) and Kim *et al.* (2014) confirmed these findings by asserting that NP performance has a strong significant positive effect on the overall firm performance in terms of sales, profitability, and market share.

Thirdly, NPD effort success enhances NP's market performance and accordingly improves the firm's overall financial performance (Kim *et al.*, 2014). The achievements of high proficiencies in executing the strategic-planning, idea-generation (Langerak *et al.*, 2004b), and product-launch (Langerak *et al.*, 2004a) activities enhance NP performance, which in turn improves firm performance. Thus, firms that enjoy high NPD process execution proficiency are rewarded with significant improvements in their NP performance (e.g., high NP's customer satisfaction, sales, and profits), which in turn enhances their overall firm performance in terms of sales, profitability, and market share. Based on the above argument, it is posited that:

H7: ProdLP mediates the effect of PEProf on FirmLP

(H7: PEProf→ProdLP→FirmLP = $b_1 \times a_3$*).*

3.3.3.4. The Sequential Mediating Role of OperLP→ProdLP in the Relationship between PEProf and FirmLP

This study suggests a multiple mediating model in which OperLP and ProdLP sequentially mediate the effect of PEProf on FirmLP. As described above, OperLP and ProdLP are both implicated in mediating the relationship between PEProf and FirmLP. However, previous research has shown that OperLP precedes ProdLP.

In this respect, under varying conditions of technological, market, and environmental uncertainties (Tatikonda & Montoya-Weiss, 2001), achieving a superior operational performance (i.e., NP quality, NPD's time and cost) enhances the NP's market performance, such as NP's customer satisfaction, sales, profitability, and commercial success (García *et al.*, 2008; Gunday *et al.*, 2011; Mishra & Shah, 2009; Tatikonda & Montoya-Weiss, 2001; Yang, 2012).

Turning to the mediated impacts, generally, the proficiencies in executing both the predevelopment and marketing activities have significant positive effects on the product innovation performance outcomes in terms of the NP's technical performance, speed-to-market, success rate, profitability, as well as the NP's contributions to enhance the firms overall sales, profits, and market share (Cooper & Kleinschmidt, 1995c).

Specifically, the achievements of high proficiencies in executing the strategic-planning, idea-generation (Langerak *et al.*, 2004b), and product-launch activities, as well as NP advantage, are related positively and significantly to NP performance, which in turn is related positively and significantly to firm performance (Langerak *et al.*, 2004a).

In this regard, firms that have higher levels of NPD process execution proficiency are able to develop new-products that have advantages over competing products. Consequently, achieving a superior NP advantage leads to an improved NP performance (e.g., customer satisfaction), which in turn enhances the overall firm performance (e.g., profitability). Customers typically purchase new products that offer superior value, are unique, and provide an advantage relative to competing products. Therefore, it is possible for customers who perceive a superior NP advantage to be satisfied with it, which in turn can lead to frequent purchasing of that new product at a premium price accompanied by purchasing of other products and offerings of the firm. Thus, firms that enjoy high proficiency in developing and launching a superior new product that appeals to target markets are rewarded with significant improvements in their NP performance and consequently their overall firm performance, such as sales growth and profitability (Anderson *et al.*, 1994; Langerak *et al.*, 2004a, b; Narver & Slater, 1990; Sandvik & Sandvik, 2003; Sandvik *et al.*, 2011).

Integrating the mediation through OperLP with the mediation through ProdLP together yields a three-path mediated effect, as shown in Fig. 3.1 (Castro & Roldán, 2013; Hayes, 2009; Taylor *et al.*, 2008; Van Jaarsveld *et al.*, 2010). Based on the aforementioned theory and empirical evidence, it is hypothesised that PEProf is related to FirmLP through OperLP first and then ProdLP. In other words, it is posited that firms that have a high PEProf are able to achieve a superior OperLP, which in turn leads to significant improvement in their ProdLP and consequently boosts their FirmLP. Accordingly:

H8: OperLP and ProdLP sequentially mediate the effect of PEProf on FirmLP
(H8: PEProf→OperLP→ProdLP→FirmLP = $b_2 \times a_2 \times a_3$*).*

3.3.4. The Effects of PFit, CrosFI, and TMS on OperLP, and the Roles of PEProf in Mediating these Effects

3.3.4.1. The Relationships between (PFit, CrosFI, and TMS) and OperLP

Marketing and technological synergies, as well as top-management support, are strongly linked to NPD performance outcomes (Montoya-Weiss & Calantone, 1994). Specifically, marketing and technological synergies, as well as project organisation (cross-functional team and top-management support), are associated significantly and positively with NPD efficiency in terms of NP quality, NPD's time and cost (Rese & Baier, 2011). *Regarding the relationship between PFit and OperLP,* both marketing and technological synergies are associated significantly and positively with NP advantage concerning superior NP's quality and cost efficiency relative to competing products (Song & Parry, 1996). Additionally, achieving a superior NPD timelines is subject to the sufficiency in both marketing and technological resources (Chryssochoidis & Wong, 1998; Lee & Wong, 2010; Zhao *et al.*, 2015). Furthermore, previous studies show that NP advantage is affected positively and significantly by skills/needs alignment (Song *et al.*, 1997a), technical fit (Harmancioglu *et al.*, 2009; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Zhao *et al.*, 2015), and marketing fit (Harmancioglu *et al.*, 2009).

In relation to the effect of CrosFI on OperLP, Cooper and Kleinschmidt (1994, 1995b) reported that the top driver of NPD timeliness is project organisation with reference to cross-functional team and top-management support. Adopting cross-functional teams can lead to significant improvements in performance outcomes (Ittner & Larcker, 1997). Specifically, higher levels of cross-functional integration have significant positive effects on operational performance and its dimensions in terms of NP quality, NPD's time and cost (García *et al.*, 2008; Mishra & Shah, 2009; Valle & Avella, 2003). Stimulating inter-functional cooperation enhances NP technical performance (Cooper & Kleinschmidt, 1995c), leads to faster NPD speed (Chryssochoidis & Wong, 1998; Langerak & Hultink, 2005; Lee & Wong, 2012), and contributes to NPD cost efficiency (Kong *et al.*, 2014).

Concerning the relationship between TMS and OperLP, there is an empirical evidence that top-management support is associated significantly and positively with NP advantage regarding superior NP's quality compared to competing products (Song & Parry, 1996). Firms that utilise effective leaders throughout their NPD activities achieve superior NP's quality and NPD timelines (Valle & Avella, 2003). Thus, it is suggested that:

H9a–c: PFit, CrosFI, and TMS have positive and significant direct effects on OperLP (H9a: PFit→OperLP = d_1; H9b: CrosFI→OperLP = d_2; H9c: TMS→OperLP = d_3).

3.3.4.2. The Mediating Roles of PEProf in the Relationships between (PFit, CrosFI, and TMS) and OperLP

There is an evidence within product innovation literature that ensuring NP fit-to-firm's marketing and technical skills/resources (PFit), adopting internal cross-functional integration (CrosFI), and providing top-management support (TMS) can yield a superior OperLP; however, the mechanism by which these effects are achieved is less researched. It is argued here that PEProf mediates the effects of PFit, CrosFI, and TMS on OperLP. *Firstly, ensuring PFit, adopting CrosFI, and providing TMS can enhance PEProf.*

Regarding the relationship between PFit and PEProf, Song *et al.* (1997a) revealed that skills/needs alignment has a significant positive effect on the proficiency in executing marketing activities. Additionally, Song *et al.* (1997c) indicated that the synergies of both marketing skills and resources have significant positive effects on the proficiency in executing marketing activities in the Taiwanese firms. Furthermore, Song *et al.* (2011) stated that the internal resources of both R&D and marketing have significant positive effects on the proficiency in executing product launch's activities.

Moreover, several studies provide an empirical evidence that the fit of marketing resources and skills has a significant positive effect on the proficiency in executing marketing activities, and that the fit of technical resources and skills has a significant positive effect on the proficiency in executing technical activities (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2010, 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997b, 1999). Specifically, Song and Parry (1997a) reported that the fit of marketing resources and skills has significant positive effects on the proficiencies in executing the idea development and screening, business and market-opportunity analysis, product testing, and product commercialisation's activities.

In relation to the effect of CrosFI on PEProf, several works found that the cross-functional integration has significant positive effects on the proficiency in executing the overall NPD activities (Lee & Wong 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Thieme *et al.*, 2003), marketing activities (Calantone & di Benedetto, 2012; Lee & Wong, 2010), and lean launch (Calantone & di Benedetto, 2012). Specifically, Song and Parry (1997a) established that the cross-functional integration has significant positive effects on the proficiencies in executing the idea development and screening, business and market-opportunity analysis, technical development, product testing, and product commercialisation's activities.

Concerning the relationship between TMS and PEProf, top-management initiatives concerning the allocations of both resources and tasks, as well as the establishments of what constitutes an acceptable behaviour and evaluation criteria, can greatly be mirrored in shaping the NPD process execution with reference to the incentives, objectives, priorities, and procedures (Gopalakrishnan & Bierly, 2006).

In this respect, Song and Parry (1997a) verified that internal commitment (including TMS) has significant positive effects on the proficiencies in executing the idea development and screening, business and market-opportunity analysis, technical development, and product commercialisation's activities. They also proved that internal commitment has a significant positive effect on the proficiency in executing product-testing activities in the Japanese firms. Additionally, Song *et al.* (1997a) indicated that project management skills (including TMS) have a significant positive effect on the proficiency in executing marketing activities. Furthermore, Kleinschmidt *et al.* (2007) confirmed that top-management involvement has a significant positive effect on the proficiency in executing product launch. They also concluded that resources dedication has significant positive effects on the proficiencies in executing both predevelopment and product launch's activities.

Secondly, achieving a high PEProf can boost OperLP. Achieving high NPD process execution proficiency is associated significantly and positively with NPD efficiency in terms of NP quality, NPD's time and cost (Rese & Baier, 2011). Accomplishing high proficiencies in executing both marketing and technical activities boosts NPD timelines/speed-to-market (Harmancioglu *et al.*, 2009; Lee & Wong, 2010, 2012). Additionally, a proper execution of the overall NPD process is crucial in achieving NP advantage (Langerak *et al.*, 2004a; Sandvik *et al.*, 2011). Specifically, the proficiencies in executing the predevelopment, concept development and evaluation, marketing research, product-testing, technical development, and product launch's activities, are associated significantly and positively with NP advantage concerning superior NP's quality and cost efficiency relative to competing products (Song & Parry, 1996, 1997a).

Thirdly, the attainment of NP advantage, such as superior NP's quality and cost efficiency (Song & Parry, 1996, 1997a), as well as NPD timelines (Chryssochoidis & Wong, 1998; Lee & Wong, 2010), is subject to the proficient executions of the predevelopment, technical, marketing, and launching activities throughout the NPD process. In turn, the NPD process execution proficiency depends on the synergies of both marketing and technical skills/resources, top-management support, as well as cross-functional integration (Kleinschmidt *et al.*, 2007; Lee & Wong, 2010; Song & Parry, 1996, 1997a; Song *et al.*, 1997a).

Without adopting cross-functional teams throughout the NPD process, there might be a lack of knowledge exchange and sharing among the firm's different functions, which can lead to an escalation in the costs associated with the ineffective execution of the NP development and launching activities (Lee & Wong, 2012). On the other hand, in conjunction with the synergies of both marketing and technical skills/resources, as well as top-management support, it is believed that a closer integration among firm's functions (e.g., marketing, manufacturing, operations, and R&D) across the various stages of the NPD process, can lead to significant improvements in the NPD efficiency in terms of NP quality, NPD's time and cost (Kong *et al.*, 2014; Olson *et al.*, 2001; Rese & Baier, 2011; Song & Parry, 1996; Valle & Avella, 2003).

Thus, firms that ensure NP fit-to-firm's marketing and technical skills/resources, adopt cross-functional integration, and provide top-management support, are rewarded with high NPD process execution proficiency, which in turn boosts their NP's superiority with reference to NP quality, NP development and launching time and cost. Accordingly, it is posited that:

H10a–c: PEProf mediates the effects of PFit, CrosFI, and TMS on OperLP

(H10a: PFit→PEProf→OperLP = $e_1 \times b_2$*; H10b: CrosFI→PEProf→OperLP =* $e_2 \times b_2$*; H10c: TMS→PEProf→OperLP =* $e_3 \times b_2$*).*

3.3.5. The Effects of PFit, CrosFI, and TMS on ProdLP, and the Roles of PEProf and OperLP in Mediating these Effects

3.3.5.1. The Relationships between (PFit, CrosFI, and TMS) and ProdLP

Marketing and technological synergies, as well as top-management support, are strongly linked to NPD performance outcomes (Montoya-Weiss & Calantone, 1994). NP's market and financial performance are enhanced significantly by the synergies of both marketing and technical skills/resources, cross-functional interface, and top-management support (Atuahene-Gima, 1996a; Rese & Baier, 2011; Song & Noh, 2006).

Regarding the relationship between PFit and ProdLP, NPD performance is attributed to the fit between a firm's NPD strategy and its corporate goals and capabilities rather than on a specific strategy (Barczak, 1995). Mishra *et al.* (1996) confirmed this claim by indicating that ensuring NP-firm compatibility boosts NP success. The closer the fits of both technical and marketing resources, the higher the NP's market and financial performance (Cooper & Kleinschmidt, 1987; Song & Parry, 1996; Zhao *et al.*, 2015). Song *et al.* (1997c) found that marketing skills synergy has a significant positive effect on NP profitability. Harmancioglu *et al.* (2009) substantiated this finding by stating that marketing fit has significant positive effect on NP success with regard to both NP's customer satisfaction and profitability. Additionally, Song and Montoya-Weiss (2001) indicated that technical synergy has a significant positive effect on NP's financial performance. In a recent study, Song *et al.* (2011) supported this finding by asserting that internal R&D resources have a significant positive effect on the first NP performance.

In relation to the effect of CrosFI on ProdLP, adopting cross-functional teams enhances NPD performance outcomes (Barczak, 1995; Ittner & Larcker, 1997; Mishra & Shah, 2009; Song *et al.*, 1997b). Firms adopting cross-functional integration in their NPD activities are rewarded with a high percentage of new products that are successful in the market (Valle & Avella, 2003). There is an empirical evidence that stimulating cross-functional integration has a significant positive effect on NP's success rate and profitability (Cooper & Kleinschmidt, 1995c), NP's financial performance (Song & Montoya-Weiss, 2001; Song & Parry, 1997b), NP profitability (Langerak & Hultink, 2005; Millson & Wilemon, 2002), and NP survival (Thieme *et al.*, 2003). In a more recent study, Kong *et al.* (2014) confirmed these findings by indicating that a high level of marketing-manufacturing integration across NPD business/market's opportunity analysis and product-testing stages improves NP's market performance.

Concerning the relationship between TMS and ProdLP, there is an empirical evidence that top-management support is associated significantly and positively with NPD performance outcomes (Song *et al.*, 1997b), such as NP's sales and profitability (Cooper & Kleinschmidt, 1987; Song & Parry, 1996). Firms that utilise effective leaders throughout their NPD activities achieve a high level of NP's customer satisfaction (Valle & Avella, 2003). Additionally, Kleinschmidt *et al.* (2007) substantiated that resources dedication has a significant positive effect on NP's financial performance. Thus, it is predicted that:

H11a–c: PFit, CrosFI, and TMS have positive and significant direct effects on ProdLP (H11a: PFit→ProdLP = f_1; H11b: CrosFI→ProdLP = f_2; H11c: TMS→ProdLP = f_3).

3.3.5.2. The Mediating Roles of PEProf in the Relationships between (PFit, CrosFI, and TMS) and ProdLP

There is an evidence within product innovation literature that ensuring NP fit-to-firm's marketing and technical skills/resources (PFit), adopting internal cross-functional integration (CrosFI), and providing top-management support (TMS) can enhance ProdLP; however, the mechanism by which these effects are realised is less scrutinised. It is argued here that PEProf mediates the effects of PFit, CrosFI, and TMS on ProdLP.

Firstly, ensuring PFit, adopting CrosFI, and providing TMS can improve PEProf. Regarding the relationship between PFit and PEProf, several studies confirmed that the fit of marketing resources and skills has a significant positive effect on the proficiency in executing marketing activities, and that the fit of technical resources and skills has a significant positive effect on the proficiency in executing technical activities (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2010, 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997b, 1999). *In relation to the effect of CrosFI on PEProf,* several works proved that the cross-functional integration has significant positive effects on the proficiency in executing the overall NPD activities (Lee & Wong 2011; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Thieme *et al.*, 2003), marketing activities (Calantone & di Benedetto, 2012; Lee & Wong, 2010), and lean launch (Calantone & di Benedetto, 2012).

Concerning the relationship between TMS and PEProf, Song and Parry (1997a) revealed that internal commitment (including TMS) has significant positive effects on the proficiencies in executing the idea development and screening, business and market-opportunity analysis, technical development, and product commercialisation's activities. Additionally, Kleinschmidt *et al.* (2007) confirmed that top-management involvement has a significant positive effect on the proficiency in executing product launch, and that resources dedication has significant positive effects on the proficiencies in executing both the predevelopment and product launch's activities.

Secondly, accomplishing a high PEProf can improve ProdLP. Several studies found that the proficiency in executing the overall NPD activities has a significant positive effect on NP performance (Calantone & di Benedetto, 1988; Calantone *et al.*, 1996; Lee & Wong, 2011; Song & Noh, 2006), both NP's sales and profits (Millson & Wilemon, 2002; Song & Parry, 1996), and NP survival (Thieme *et al.*, 2003).

Thirdly, there is evidence that the total indirect effects of marketing synergy, technical synergy, and cross-functional integration on the NP's financial performance are positive and significant (Song & Parry, 1997b). Song *et al.* (1997c) verified that the proficiency in executing marketing activities: (1) fully mediates the significant positive effect of marketing resources synergy on NP profitability, and (2) partially mediates the significant positive effect of marketing skills synergy on NP profitability in the Taiwanese firms. Additionally, achieving high marketing-manufacturing's integrations across NPD business/market's opportunity analysis and product-testing's stages improve NP's market performance (Kong *et al.*, 2014). Thieme *et al.* (2003) indicated that while *the NPD process execution proficiency* partially mediates the significant positive effect of cross-functional integration on NP survival in the Korean firms, *it* fully mediates the same effect in the Japanese firms. Furthermore, Kleinschmidt *et al.* (2007) concluded that product launch proficiency partially mediates the significant positive effects of both resources dedication and top-management involvement on NP's financial performance. Thus, firms that ensure NP fit-to-firm's marketing and technical skills/resources, adopt cross-functional integration, and provide top-management support, enjoy a high NPD process execution proficiency, which in turn yields an improved NP performance (i.e., high NP's customer satisfaction, sales, and profits). Accordingly, it is posited that:

H12a–c: PEProf mediates the effects of PFit, CrosFI, and TMS on ProdLP

(H12a: PFit→PEProf→ProdLP = $e_1 \times b_1$; H12b: CrosFI→PEProf→ProdLP = $e_2 \times b_1$; H12c: TMS→PEProf→ProdLP = $e_3 \times b_1$).

3.3.5.3. The Mediating Roles of OperLP in the Relationships between (PFit, CrosFI, and TMS) and ProdLP

There is an evidence within product innovation literature that ensuring NP fit-to-firm's marketing and technical skills/resources (PFit), adopting internal cross-functional integration (CrosFI), and providing top-management support (TMS) can improve ProdLP; however, the mechanism by which these effects are realised is less examined. It is argued here that OperLP mediates the effects of PFit, CrosFI, and TMS on ProdLP.

Firstly, ensuring PFit, adopting CrosFI, and providing TMS can boost OperLP. Marketing and technological synergies, as well as project organisation (cross-functional team and top-management support), are associated significantly and positively with NPD efficiency in terms of NP quality, NPD's time and cost (Rese & Baier, 2011). Previous studies show that NP advantage is affected positively and significantly by skills/needs alignment (Song *et al.*, 1997a), technical fit (Harmancioglu *et al.*, 2009; Song & Montoya-Weiss, 2001; Song & Parry, 1997b; Zhao *et al.*, 2015), and marketing fit (Harmancioglu *et al.*, 2009). Additionally, adopting cross-functional integration has significant positive effects on the operational performance and its dimensions in terms of NP quality, NPD's time and cost (García *et al.*, 2008; Mishra & Shah, 2009; Valle & Avella, 2003). Furthermore, providing top-management support is associated significantly and positively with NP advantage regarding superior NP's quality and cost efficiency compared to competing products (Song & Parry, 1996), as well as achieving superior NP quality and NPD time (Valle & Avella, 2003).

Secondly, achieving a superior OperLP can increase ProdLP. Under varying conditions of technological, market, and environmental uncertainties (Tatikonda & Montoya-Weiss, 2001), achieving a superior operational performance (in terms of NP quality, NPD's time and cost) enhances the NP's market performance, such as NP's customer satisfaction, sales, profitability, and commercial success (García *et al.*, 2008; Gunday *et al.*, 2011; Mishra & Shah, 2009; Tatikonda & Montoya-Weiss, 2001; Yang, 2012).

Thirdly, there is evidence that the total indirect effects of the marketing synergy, technical synergy, and cross-functional integration on the NP's financial performance are positive and significant (Song & Parry, 1997b). A closer fit in the technical resources improves NP differentiation, which consequently enhances NP's market and financial performance (Zhao *et al.*, 2015). Firms that develop and launch new products that fit-will-with their existing marketing skills and resources tend to: (1) succeed in sustaining their NP's value perceptions and the consequent satisfaction levels of their customers (Harmancioglu *et al.*, 2009); and (2) achieve a timely NP's introduction and availability in their target markets, which in turn enhances their NP's market and financial performance (Zhao *et al.*, 2015).

Additionally, Langerak and Hultink (2005) stated that the effect of stimulating inter-functional cooperation on the financial performance is based on the NP's development speed. In a more recent study, Mishra and Shah (2009) confirmed this finding in more details by asserting that implementing cross-functional involvement has no direct effect on the market performance (the overall profitability, market share, and return on investment), but has a significant positive effect on the operational performance (e.g., NP quality, NPD's time and cost), which in turn has a significant positive impact on the market performance. In this respect, firms that fail to achieve the desired operational performance outcomes will also fail to achieve their market performance goals (Mishra & Shah, 2009). Therefore, firms that ensure integration among their functions, for developing and launching a new product, achieve a superior internal performance in terms of NP quality, NPD's time and cost. Such an internal success may consequently lead to an improved market success (García *et al.*, 2008; Kong *et al.*, 2014).

Furthermore, providing top-management support is related significantly and positively to NP advantage regarding superior NP's quality and cost efficiency compared to competing products (Song & Parry, 1996), as well as achieving superior NP quality and NPD time (Valle & Avella, 2003), which consequently leads to significant improvements in NP performance, such as NP's customer satisfaction, sales, and profits.

Thus, firms that ensure NP fit-to-firm's marketing and technical skills/resources, adopt cross-functional integration, and provide top-management support, are rewarded with a superior new product (e.g., NP quality, NP development and launching time and cost), which in turn yields an improved NP performance in terms of customer satisfaction, sales, and profitability. Accordingly, it is hypothesised that:

H13a–c: OperLP mediates the effects of PFit, CrosFI, and TMS on ProdLP

(H13a: PFit→OperLP→ProdLP = $d_1 \times a_2$*; H13b: CrosFI→OperLP→ProdLP =* $d_2 \times a_2$*; H13c: TMS→OperLP→ProdLP =* $d_3 \times a_2$*).*

3.3.5.4. The Sequential Mediating Roles of PEProf→OperLP in the Relationships between (PFit, CrosFI, and TMS) and ProdLP

This study suggests a multiple mediating model in which PEProf and OperLP sequentially mediate the effects of PFit, CrosFI, and TMS on ProdLP. As described above, PEProf and OperLP are both implicated in mediating the relationships between (PFit, CrosFI, and TMS) and ProdLP. However, previous research has shown that PEProf precedes OperLP.

In this respect, achieving high NPD process execution proficiency is associated significantly and positively with NPD efficiency in terms of NP quality, NPD's time and cost (Rese & Baier, 2011). The accomplishments of high proficiencies in executing both marketing and technical activities boost NPD timelines/speed-to-market (Harmancioglu *et al.*, 2009; Lee & Wong, 2010, 2012). Additionally, a proper execution of the overall NPD process is crucial in achieving NP advantage (Langerak *et al.*, 2004a; Sandvik *et al.*, 2011). Specifically, the proficiencies in executing the predevelopment, concept development and evaluation, marketing research, product-testing, technical development, and product launch's activities, are associated significantly and positively with NP advantage concerning superior NP's quality and cost efficiency relative to competing products (Song & Parry, 1996, 1997a).

Moving to the mediated impacts, there is evidence that the total indirect effects of marketing synergy, technical synergy, and cross-functional integration on NP's financial performance are positive and significant (Song & Parry, 1997b). Additionally, a closer integration between marketing and manufacturing functions throughout the NPD process leads to significant improvements in NPD speed, NPD cost and market performance (Kong *et al.*, 2014). Furthermore, firms adopting cross-functional integration in their NPD activities are rewarded with not only an improved operational performance (in terms of NP quality, NPD's time and cost), but also with a high percentage of new products that are successful in the market. In a similar vein, firms that utilise effective leaders throughout their NPD activities achieve superior NP quality and NPD time, as well as a high level of NP's customer satisfaction (Valle & Avella, 2003).

Thus, firms that ensure NP fit-to-firm's marketing and technical skills/resources, adopt cross-functional integration, and provide top-management support, can attain a high NPD process execution proficiency that enable them to develop and launch a superior new product (with reference to NP quality, NP development and launching time and cost), which in turn yields an improved NP performance in terms of customer satisfaction, sales, and profitability.

Integrating the mediation through PEProf with the mediation through OperLP together yields a three-path mediated effect, as shown in Fig. 3.1 (Castro & Roldán, 2013; Hayes, 2009; Taylor *et al.*, 2008; Van Jaarsveld *et al.*, 2010). Based on the aforementioned theory and empirical evidence, it is hypothesised that PFit, CrosFI, and TMS are related to ProdLP through PEProf first and then OperLP. In other words, it is posited that firms that ensure PFit, adopt CrosFI, and provide TMS, are rewarded with high PEProf that enable them to realise a superior OperLP, which in turn leads to significant improvement in their ProdLP with reference to customer satisfaction, sales, and profitability. Accordingly, the following hypotheses are proposed.

H14a–c: PEProf and OperLP sequentially mediate the effects of PFit, CrosFI, and TMS on ProdLP

(H14a: PFit→PEProf→OperLP→ProdLP = $e_1 \times b_2 \times a_2$*;*

H14b: CrosFI→PEProf→OperLP→ProdLP = $e_2 \times b_2 \times a_2$*;*

H14c: TMS→PEProf→OperLP→ProdLP = $e_3 \times b_2 \times a_2$*).*

3.4. Control Variables

In addition to the aforementioned hypotheses, previous studies argue that the NPD performance outcomes are affected by the firm size (e.g., Chandy & Tellis, 2000; Sheng *et al.*, 2013), firm age (e.g., Autio *et al.*, 2000; Gopalakrishnan & Bierly, 2006; Marion & Meyer, 2011), and NP innovativeness (e.g., Cheng *et al.*, 2013; Danneels & Kleinschmidt, 2001; Kleinschmidt & Cooper, 1991).

Firstly, compared to small firms, large firms incline to have more sufficient financial, marketing, and technical resources and capabilities to manage product innovation activities and are consequently more successful (Bonner & Walker, 2004; Chandy & Tellis, 2000; Li & Huang, 2012). *Secondly*, new firms may lack the experience needed for product innovation management (Sheng *et al.*, 2013), while old firms are more likely to have strong ties with customers and consequently to be more successful than new firms (Autio *et al.*, 2000; Bonner & Walker, 2004). *Thirdly*, compared to low-innovativeness products, high-innovativeness products tend to have higher levels of process execution proficiency, NP's competitive advantage, and NP performance (Song & Parry, 1999).

Thus, to account for the possible effects of both firm and product characteristics on the proposed relationships, the current study incorporates the firm size (employees number), firm age (operation's years) (Hsieh *et al.*, 2008; Li & Huang, 2012; Marion & Meyer, 2011; Sheng *et al.*, 2013; Wei & Morgan, 2004), and NP innovativeness (Song & Montoya-Weiss, 1998; Song & Parry, 1999) as control variables.

It is noteworthy that although they are included in the statistical analysis, the specific direct links from each of these control variables (i.e., firm size, firm age, and NP innovativeness) towards each dependent variable (i.e., PEProf, OperLP, ProdLP, and FirmLP) are replaced with one link in the theoretical model figure for sake of brevity, as depicted in Fig. 3.1.

3.5. Summary

This chapter has provided the current study's theoretical underpinnings, conceptual framework (CFEMOs model), investigated variables, hypotheses development, and control variables. The first part of this chapter has introduced the research variables, and the proposed theoretical model (CFEMOs model), of those critical, managerially controllable factors that have high potential for achieving the majority of the significant improvements in the desired (intermediate and ultimate) NPD efforts outcome(s). Underlying the relationships of the CFEMOs model are the integration of the complementary theoretical perspectives of the Critical Success Factors (CSFs) approach, the Resource-Based View (RBV) of the firm theory, and the Input-Process-Output (IPO) model, together, under the system(s) approach's umbrella. The second part of this chapter has provided the significant relationships identified from the relevant empirical studies that justify the hypothesised direct and indirect (mediated) relationships of the CFEMOs model. Finally, this chapter has concluded by providing the control variables incorporated within the CFEMOs model.

The next chapter introduces and justifies the adopted research: philosophical worldview (post-positivism); approach (deductive); design (quantitative); strategy (survey); and method (self-completed, web-based via email, questionnaire survey). Additionally, it explains and rationalises the utilised research: population (U.S. commercial restaurants); unit/level of analysis (restaurants new menu-items); level of respondents seniority (restaurants owners/senior executives); and ethical considerations.

Furthermore, it describes and substantiates the questionnaire's design, measures, validation (pre-testing and piloting), and the final questionnaire's content. Moreover, it explains the access to target respondents and final questionnaire's deployment and data collection. Finally, it ends by detailing the utilised data analysis technique (multivariate: SEM), SEM type (PLS-SEM); and PLS-SEM software program (WarpPLS v. 4).

Chapter 4: Research Methodology

4.1. Introduction

This chapter introduces and justifies the adopted research: philosophical worldview (post-positivism); approach (deductive); design (quantitative); strategy (survey); and method (self-completed, web-based via email, questionnaire survey). Additionally, it explains and rationalises the utilised research: population (U.S. commercial restaurants); unit/level of analysis (restaurants new menu-items); level of respondents seniority (restaurants owners/senior executives); and ethical considerations. Furthermore, it describes and substantiates the questionnaire's design, measures, validation (pre-testing and piloting), and the final questionnaire's content. Moreover, it explains the access to target respondents and final questionnaire's deployment and data collection. Finally, it ends by detailing the utilised data analysis technique (multivariate: Structural Equation Modelling, SEM), SEM type (Partial Least Squares PLS-SEM), and PLS-SEM software program (WarpPLS v. 4).

4.2. Research Philosophical Worldview: Post-Positivism

Drawing from the methodological literature within the context of business and management research (e.g., Bryman, 2012; Collis & Hussey, 2014; Creswell, 2014; Howell, 2013; Lincoln *et al.*, 2011; Mertens, 2015; Neuman, 2014; Saunders *et al.*, 2012), a research worldview or paradigm can be conceived as a philosophical assumption, perspective, or orientation for a researcher towards what constitutes a best inquiry of a specific social phenomenon and its knowledge's nature, investigation, and development. Additionally, adopting a proper research philosophy is so crucial in informing, guiding, and shaping a researcher's whole inquiry process concerning a specific social phenomenon, with reference to the research question, aim, objectives, approach, design, strategy, data type, collection, analysis, and interpretation method, etc.

Furthermore, there is an agreement within the aforesaid literature on that: (1) there is no clear-cut boundaries among the research paradigms; (2) there is no an absolute superiority for one paradigm over another; (3) one paradigm may only be more appropriate than another for answering a specific question or solving a particular problem; and (4) researchers have to adopt a worldview that best closely approximates their own.

Nevertheless, the differences among the research paradigms are reasonably observable along three main dimensions: ontology, epistemology, and axiology. Each dimension encompasses key different options along continua, which influence the way in which a researcher think about the research inquiry for a specific social phenomenon. *Ontology* is a branch of philosophy, which is concerned with the nature of reality along the *external reality* vs. socially constructed reality continuum, and the *objective reality* vs. subjective reality continuum. *Epistemology* is another branch of philosophy that focuses on: (1) what denotes an acceptable knowledge; along the *observable/measurable phenomena* vs. subjective meaning continuum, and the law-like generalisations vs. details of specific continuum; and (2) the relationship between a researcher and what is researched; along the *distant from phenomenon* vs. interact/involved with phenomenon continuum. *Axiology* is a branch of philosophy that comprises the role that a researcher's own values can play in informing his/her judgements throughout the research inquiry along the *value-free* vs. value-laden continuum (Bryman, 2012; Collis & Hussey, 2014; Neuman, 2014; Saunders *et al.*, 2012).

In this sense, according to Creswell (2014) and Mertens (2015), there are four main research philosophical worldviews, namely pragmatism, constructivism, transformative, and *post-positivism*, as explained next.

Firstly, from a pragmatism perspective, a researcher is unrestricted to a specific research approach, strategy, method, or procedure; instead, he/she has a full freedom to combine diverse methodologies that serve a specific research purpose. Pragmatism emphasises the impracticality of continually asking questions about reality and nature's laws, hence, pragmatism constitutes an "ends justify the means" perspective, and is not committed or subscribed to any one perspective of philosophy or reality. However, without such a commitment, there is no theoretical framework to justify or support a researcher's adopted methodology (Collis & Hussey, 2014; Creswell, 2014; Saunders *et al.*, 2012).

Secondly, constructivism (frequently related to interpretivism) is the philosophical worldview that is commonly adopted in qualitative research, whereby the emphasis is on the social construction of reality by seeking subjective and contingent understandings/meanings of a social phenomenon within its context. However, these subjective understandings/meanings are numerous, diverse, as well as socially, culturally, and historically negotiable. Additionally, constructivists admit that their own values, experiences, and backgrounds considerably influence their interpretations of an investigated social phenomenon (Bryman, 2012; Creswell, 2014; Howell, 2013).

Thirdly, the transformative philosophical worldview emphasises that social transformation's realisation is contingent on the cooperation between researchers and ignored peoples in the society. It is dedicated to study the experiences and lives of diverse neglected groups in a specific society, and the constrains that they face regarding discrimination, power, oppression, inequality, and injustice, as well as the strategies that they use to challenge, undermine, and resist these constraints. Transformative research encloses an action agenda for reform that may transform/change participants lives and their working institutions, as well as the researcher's life (Creswell, 2014; Mertens, 2015).

Finally, *post-positivism*, the fourth philosophical worldview, was adopted in the current study as its assumptions (which hold true more for quantitative than qualitative research) have dominated the business and management research (e.g., Creswell, 2014; Howell, 2013; Lincoln *et al.*, 2011; Mertens, 2015; Phillips & Burbules, 2000). Post-positivism represents the thinking after positivism (i.e., as reality can only be imperfectly apprehended, research is not about the discovery of immutable laws but it is just an approximation of truth). In this sense, it challenges the traditional notion of the absolute truth of knowledge and consequently recognising that positivism is not relevant to the knowledge claims in business and management research.

Post-positivists assume that scientific findings are temporary and fallible (i.e., findings are accepted as probably true until they have empirically been proven false). Therefore, research is the process of making claims and then refining or abandoning some of them for other claims more strongly warranted. The continuous generation, testing and refinement of knowledge and theories can enable researchers to improve their understanding of reality. Post-positivists hold a deterministic view in which causes (probably) determine effects/outcomes. Thus, the problems studied by post-positivists necessitate the identification/assessment of the causes that influence outcomes, which is relevant to the current study's investigation of the (probable) causal relationships among the product innovation's critical firm-based enablers, process execution proficiency, and performance outcomes (Howell, 2013; Lincoln *et al.*, 2011; Mertens, 2015). Additionally, post-positivism is also reductionist in that the intent is to reduce the ideas into a small, discrete set to test, such as the variables that comprise hypotheses and research questions, which is relevant to the current study as, for example, product innovation performance is measured along three sequential dimensions (OperLP, ProdLP, and FirmLP), and each of these dimensions are further measured by a number of questions (Creswell, 2014; Phillips & Burbules, 2000).

Furthermore, data, evidence, and rational considerations shape knowledge. The knowledge that develops through a post-positivist lens is based on careful observation and measurement of the objective reality that exists “out there” in the world. Thus, developing numeric measures of observations and studying the behaviour of individuals becomes paramount for a post-positivist, which is relevant to this study’s empirical investigation of the product innovation practices and performance for U.S. restaurants, by utilising a questionnaire survey comprising the observable measures of the study variables and the statistical analysis of their numerical values (Creswell, 2014; Phillips & Burbules, 2000).

Moreover, theory development is open to criticism. There are laws and theories that govern the world, and these need to be tested/verified and refined to allow for a better understanding of the world. Research seeks to develop relevant, true statements, ones that can serve to explain the situation of concern or that describe the (probable) causal relationships of interest. Post-positivists begin with a theory, collect data that either supports or refutes the theory, and then make necessary revisions and conduct additional tests if necessary, which is relevant to the current study’s development, empirical testing, and statistical analysis of a theory-informed, hypothesised research model of the product innovation practices and performance for U.S. restaurants (Mertens, 2015; Phillips & Burbules, 2000).

Finally, as it is the case in the current study, being objective, bias examination, and limiting researcher’s intervention are essential aspects of a competent post-positivist inquiry, because researcher’s value-intervention, involvement and presence with participants answers are perceived as subjective and a threat to objectivity and validity (Howell, 2013; Lincoln *et al.*, 2011).

4.3. Research Approach: Deductive

The research approach is centred on the direction of reasoning/theorising. In this respect, there are two main research approaches: inductive and *deductive*. With the inductive approach, to explore a research phenomenon, data (mainly subjective) are collected through a research method (chiefly interview), a research strategy (mostly grounded theory), and a research design (commonly qualitative) so as to conduct data analysis (primarily words/contents analysis) that enable the detection of the recurring themes and patterns associated with this research phenomenon, which eventually, can lead to theory development and generation. As it is useful to attach these research approaches to the different research philosophies, the *deductive approach* owes more to, and is the dominant research approach adopted in, the positivism and post-positivism paradigms, where laws present the basis of explanation, allow the anticipation of phenomena, predict their occurrence and therefore permit them to be controlled. With the deductive approach, in order to explain the causal relationships among research variables, theory-informed hypotheses are developed and a research design (chiefly quantitative), a research strategy (mainly survey), and a research method (commonly questionnaire) are utilised for data (primarily numerical) collection, and analysis undertaken (usually statistical) to test (verify/falsify) these theory-informed hypotheses (Collis & Hussey, 2014; Creswell, 2014; Neuman, 2014; Saunders *et al.*, 2012).

The deductive approach possesses several other important characteristics. Firstly, it is *explanatory* research in which the researcher aims to explain causal relationships between two or more variables through the utilisation of a highly *structured methodology* to facilitate replication; as an important issue to ensure reliability. In order to pursue the principle of scientific rigour, deduction dictates that the researcher should be independent of what is being observed through focusing only on absolute data or facts. An additional important characteristic of deduction is that concepts need to be *operationalised* in a way that enables facts to be measured quantitatively. This includes following the principle of *reductionism*; which holds that problems as a whole are better understood if they are reduced to the simplest possible elements. The final characteristic of deduction is *generalisation*. In order to be able to generalise statistically about regularities in human social behaviour, it is necessary for the researcher to select samples of sufficient numerical size (Gill & Johnson, 2010; Saunders *et al.*, 2012).

Based on the aforesaid characteristics of the two research approaches, the deductive approach was adopted as it was considered consistent with the adopted philosophical worldview (post-positivism), and fit-well-with this study’s aim in developing and empirically testing, within U.S. restaurants context, an integrated, theory-informed model comprehensively: (1) explicating the simultaneous direct and indirect/mediated interrelationships among the product innovation’s critical firm-based enablers (PFit, CrosFI, and TMS), PEProf, and performance outcomes (OperLP, ProdLP, and FirmLP); as well as (2) explaining/predicting the variation of the PEProf, OperLP, ProdLP, and FirmLP.

4.4. Research Design: Quantitative

The *research design* constitutes the way by which a research question can be turned into a research project. It is a general plan of how researchers go about answering their research questions. It contains clear objectives derived from the research questions; specifies the data’s sources, collection, and analysis procedures; and considers the ethical issues and encountered constraints concerning access to data, time, location and money (Robson, 2011; Saunders *et al.*, 2012). Research design and research tactics are not the same. The former is concerned with the overall plan for a research execution, while the latter is concerned about the finer details of data collection and analysis. The adopted research philosophy and approach influence and inform the choice of the way by which researchers can answer their research questions (i.e., research design), which in turn influence and inform the researchers choice of the research strategy, data collection techniques and analysis procedures, and the time horizon over which they undertake their research projects (Creswell, 2014; Saunders *et al.*, 2012).

Research design can be classified into two broad categories: qualitative research and *quantitative research*. Additionally, from a pragmatic philosophical perspective, these two categories can be mixed, if necessary, to answer the research questions. Mixing them has advantages (i.e., build on their complementary strengths), but adds complexity and is more time consuming. In *qualitative research*, which is mainly associated with the interpretivism's philosophical perspective, researchers try to immerse themselves fully in a range of data while being attentive to new insights throughout their process of data gathering. Qualitative researchers are concerned about how they can best capture the richness, texture, and feeling of dynamic social life. Qualitative research can be conceived as a research design that predominantly: (1) emphasises words rather than quantification in non-standardised data collection (grounded theory and ethnography based on interviews and focus groups) and analysis (through themes and contents analysis); (2) emphasises an inductive approach to the relationship between theory and research in which the emphasis is placed on theories generation; (3) rejects the practices and norms of the natural scientific model (i.e., positivism and post-positivism) in preference for an emphasis on the ways in which individuals interpret their social world (individuals socially constructed subjective meanings and experiences of a social phenomenon); and (4) embodies a view of social reality as a constantly shifting emergent property of individuals creation (Bryman, 2012; Creswell, 2014; Neuman, 2014; Saunders *et al.*, 2012).

Contrarily, in *quantitative research*, which is mainly associated with the post-positivism's philosophical perspective, researchers need to plan a highly structured quantitative study in detail before they collect or analyse their data. Quantitative researchers are concerned about how they can best create a logically rigorous design that defines and measures all variables precisely and consistently, select a representative sample to enable generalisation, collect data, and conduct statistical analysis to test (verify/falsify) the hypothesised causal relationships among the research variables.

Quantitative research can be conceived as a research design that primarily: (1) emphasises quantification (numerical data) in data collection (via questionnaire surveys) and analysis (via statistical analysis); (2) entails a deductive approach to the relationship between theory and research in which the focus is placed on theories testing; (3) incorporates the practices and norms of the natural scientific model (i.e., positivism and post-positivism); and (4) embodies a view of social reality as an external, objective reality (Bryman, 2012; Creswell, 2014; Neuman, 2014; Saunders *et al.,* 2012).

Based on the aforesaid characteristics of the two research designs, the quantitative design was adopted as it was considered consistent with the adopted philosophical worldview (post-positivism), research approach (deductive), and fit-well-with this study’s aim: to empirically investigate the nature (positive or negative) and significance of the direct and indirect (mediated) causal interrelationships among the product innovation’s critical firm-based enablers, PEProf, and performance outcomes in U.S. restaurants. This deductive investigation draws from the empirical relevant literature and the development of a theory-informed hypothesised model. Therefore, testing (verifying/falsifying) this theory-informed hypothesised model necessitates the utilisation of a questionnaire survey comprised of a quantifiable (numerical) measures of the investigated research variables needed for conducting the statistical data analysis that enable the explication of their interrelationships.

4.5. Research Strategy: Survey

Research strategies refer to the basic frameworks within which social research is carried out (Bryman, 2012). It is the methodological link between research philosophy and the subsequent choice of methods to collect and analyse data (Howell, 2013; Lincoln *et al.*, 2011). Again, beside the research questions and objectives, the adopted research philosophy, approach, and design influence and inform the researchers choice of the relevant research strategy, data collection techniques and analysis procedures, and the time horizon over which they undertake their research projects (Creswell, 2014).

Different research traditions have led to a number of possible research strategies, such as *survey*, experiment, archival research, case study, ethnography, action research, grounded theory, and narrative inquiry research. The first two research strategies are exclusively linked to a quantitative research design. The next two may involve quantitative, qualitative, or a mixed research design combining both. The final four research strategies are exclusively linked to a qualitative research design. Although, both the survey and experiment research strategies are commonly associated with the quantitative research design, the former owes more to the social and business research, while the latter owes more to the natural science research (Saunders *et al.*, 2012).

Survey research reflects, primarily, post-positivist philosophical assumptions, deductive approach, and quantitative research design. For example, determinism suggests that examining the relationships between and among variables is central to answering research questions and hypotheses through surveys. Additionally, the reduction to a parsimonious set of variables – tightly controlled through design or statistical analysis – provides measures or observations for testing a theory. Furthermore, objective data result from empirical observations and measures. Moreover, validity and reliability of scores on instruments lead to meaningful interpretations of data (Creswell, 2014).

In a survey research, the researcher systematically asks a large number of respondents the same questions and records their answers (Neuman, 2014). As it is the case in this study, a survey research: (1) seeks to collect *primary data* (data gathered and assembled specifically for the project at hand; Zikmund *et al.*, 2013); (2) comprises a data collected mainly by questionnaire on numerous cases at a single point in time (*cross-sectional*) in order to collect a body of quantitative or quantifiable data in connection with two or more variables, which are then examined to detect patterns of association (Bryman, 2012); and (3) provides a quantitative or numeric description of trends, attitudes, or behaviours of a population by studying a sample of that population, from which, the researcher generalises (draws inferences) to the whole population (Creswell, 2014).

The survey research is a popular and common strategy in business and management research and is most frequently used to answer who, what, where, how much and how many questions. Surveys are popular as they allow the collection of a large amount of data from a sizeable population in a highly economical way, and provide a quick, inexpensive, efficient, and accurate means of assessing information about a population. Additionally, the survey strategy is generally perceived as authoritative by the potential respondents and is both comparatively easy to be explained and understood. Furthermore, the survey strategy allows the researcher to collect quantitative data, which he/she can analyse quantitatively by using descriptive and inferential statistics. Moreover, the data collected by using a survey strategy can be used to suggest possible reasons and/or mechanisms for particular relationships between variables and to produce models of these relationships (Saunders *et al.*, 2012; Zikmund *et al.*, 2013). Based on the aforementioned characteristics of the survey research, it was deemed the most relevant research strategy for this study as it was considered consistent with the adopted philosophical worldview (post-positivism), research approach (deductive), research design (quantitative), and fit-well-with this study's aim and objectives.

4.6. Research Method: Self-Completed (Web-Based via Email) Questionnaire Survey

Although a questionnaire is not the only data collection technique that belongs to the survey strategy, it is the most commonly data collection technique used under the survey strategy within business and management research, especially explanatory ones. *Explanatory research*, as it is the case in the current study, enables the researcher to examine and explain relationships between variables, in particular cause-and-effect relationships. A *questionnaire survey* refers to a data collection technique in which each respondent is asked to respond to the same set of questions (usually closed and standardised questions) in a predetermined order. Because each participant is asked to respond to the same set of questions, whereby all respondents can understand these questions in the same way, a questionnaire survey facilitates comparisons among responses and provides an efficient way of collecting responses from a large sample prior to quantitative analysis (de Vaus, 2014; Robson, 2011; Saunders *et al.,* 2012). Based on its previously mentioned characteristics, a questionnaire survey was adopted, as it was deemed the most suitable data collection method for the current study.

Having determined the questionnaire survey as the data collection method for the current study, questions arise as to how to deliver, complete, and return the questionnaire survey, as well as the magnitude of contact between the researcher and the respondents. In this regard, there are two main types of questionnaires: interviewer-completed and *self-completed*. The obvious difference between them is that, with the self-completed questionnaire, there is no interviewer to ask the questions; instead, respondents must read and answer each question themselves. For *interviewer-completed questionnaires*, the interviewer records responses based on each respondent’s answers. Such questionnaires can be achieved by using the telephone (telephone questionnaires), or structured interviews—interviewers physically meet (face-to-face) and ask respondents based on a predefined set of questions. Contrarily, for *self-completed questionnaires*, respondents usually complete it themselves. Such questionnaires are hand-delivered to each respondent and collected later (delivery and collection questionnaires); posted to respondents who return them by post after completion (postal or mail questionnaires); or sent electronically using the Internet (email-based or Web-based questionnaires) (Saunders *et al.,* 2012).

According to Bryman (2012), *self-completed questionnaires* tend to have the following advantages over interviewer-completed ones. *Cheaper to administer*, especially for geographically widely dispersed samples. *Quicker to administer*, as self-completed questionnaires can simultaneously be sent out via the post or otherwise (e.g., Internet) distributed in very large quantities (thousands), but, even with a team of interviewers, it would take a long time to conduct personal interviews with a sample of that size.

Free from interviewer effects, as interviewers characteristics such as ethnicity, gender, and the social background may combine to bias the answers that respondents provide. Additionally, when an interviewer is present, there is a tendency for respondents to be more likely to exhibit social desirability bias and to under-report activities that induce anxiety or are sensitive. *Free from interviewer variability*, as self-completed questionnaires are standardised and do not suffer from the problem of interviewers asking questions in a different order or in different ways. *More convenient for respondents*, as respondents can complete it anonymously at a convenient place, time, and speed. *Easier for response and analysis*, as self-completed questionnaires tend to be comprised primarily from closed questions, while have fewer, if any, open questions. Based on its previously mentioned advantages over an interviewer-completed questionnaire, a self-completed questionnaire survey was adopted in the current study.

Within the self-completed questionnaires category, there is an ample amount of literature reporting the benefits of conducting questionnaire surveys online. Conducting questionnaire surveys online is advantageous over traditional modes (e.g., postal and delivery and collection questionnaires) in terms of low cost, high speed, worldwide coverage, large sample size, convenience for researchers and respondents, enhanced design appearance and flexibility, anonymity, as well as the automation and accuracy in data's collection, entry, and file generation for statistical analysis purposes (e.g., Bachman *et al.*, 2000; de Vaus, 2014; Dillman *et al.*, 2014; Hewson *et al.*, 2015; Litvin & Kar, 2001; Oppenheim, 1992; Saunders *et al.*, 2012; Sheehan, 2001; Sheehan & McMillan, 1999). A combination of HTML file on the Internet and email is being used and recommended to control and limit the access only to the intended population. In this way, email is used as an active medium to contact the respondents, to solicit their cooperation, to provide them the hyperlink, and send them reminders. Respondents access the survey by clicking the included hyperlink that would take them to the survey on the Internet server (Couper, 2000; Tasci & Knutson, 2003).

Therefore, in light of its aforementioned advantages, a *Web-based via email* questionnaire as a self-completed questionnaire survey was adopted because it was assumed the most relevant, convenient, and efficient data collection mode for answering the current study's questions and achieving its aim and objectives.

4.7. Research Population, Unit/Level of Analysis, and Level of Respondents Seniority

This study's targeting criteria for its potential respondents comprises the restaurants owners/senior executives of U.S. commercial (full-service and limited-service) restaurants that have developed and launched a new-menu item within the previous five years that has been in the market for at least 12 months, as detailed and justified next.

Before doing so, it should be noted that, as the focus of this empirical study was on product innovation within the commercial U.S. restaurants context, thus the generalisability of this study's findings could be verified and enriched (e.g., identifying potential differences caused by diverse cultural and/or business environments) by future research that replicate this study utilising one or more of the: (1) other innovation types (e.g., service, process, technological, marketing, and organisational innovation); (2) developing countries and the other developed countries; (3) other contexts within the restaurant, foodservice, hospitality, tourism, service, and manufacturing industries.

Additionally, this study used a single new product that was representative of the firm's NPD programme. Future research may consider using data on multiple new products embedded within the firms NPD programme, as well as differentiating and comparing between successful and failed new products in relation to their respective product innovation practices, processes, and performance outcomes.

4.7.1. Research Population: U.S. Commercial Restaurants

The research population for the current study comprises U.S. commercial restaurants that have developed and launched a new-menu item within the previous five years that has been in the market for at least 12 months, and classified under the 2012's North American Industry Classification System (NAICS)'s code 722511 for full-service restaurants (e.g., fine dining and casual restaurants) and 722513 for limited-service restaurants (e.g., fast casual and quick service/fast food restaurants).

4.7.2. Unit/Level of Analysis: Restaurants New Menu-Items

Previous studies have adopted various levels of analysis (i.e., individual project/product, programme, or firm level. However, adopting an individual product level for analysis was deemed superior to the programme and firm levels (Calantone *et al.*, 1996), as it permits a study to capture the unique situational attributes that influence the processes and outcomes of a specific product/project (Kessler & Bierly, 2002).

Contrarily, studies at the programme and firm levels tend to mix the results of a group of NPD products/projects for a firm, confusing each product/project's specific characteristics and their associated differential effects on the different performance outcomes (Chen *et al.*, 2005).

Accordingly, an individual product level (a restaurant's new menu-item) was adopted as the analysis unit for the current study. In this sense, all the main constructs for the current study (i.e., PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP) were examined for a specific new-product in each firm (a restaurant's new menu-item).

Consistent with the relevant previous research, respondents were asked to base their answers on a new menu-item that was most recently developed and introduced into the marketplace within the previous five years (Calantone & di Benedetto, 1988, 2012); and has been in the market for at least 12 months to ensure that the restaurant had accurate and sufficient data on the product and its performance (Langerak *et al.*, 2004a, b, 2008; Molina-Castillo *et al.*, 2011, 2013; Rodríguez-Pinto *et al.*, 2011).

4.7.3. Level of Respondents Seniority: Restaurants Owners/Senior Executives

In line with the relevant empirical studies on product innovation literature (e.g., Calantone & di Benedetto, 2012; Kleinschmidt *et al.*, 2007; Lee & Wong, 2011; Millson & Wilemon, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1999; Song *et al.*, 2011; Thieme *et al.*, 2003), the chosen level of respondents seniority for the current study was the restaurants owners/senior executives.

The restaurants owners/senior executives were chosen as they were considered involved and knowledgeable key informants—have access to and can provide the detailed, accurate, and complete information (regarding the product innovation practices, activities, and performance of their restaurants) required in the current study's questionnaire survey.

4.8. Ethical Considerations

In order to avoid research misconduct from an ethical perspective, the researcher ensured that the current study's data collection, analysis and reporting are conducted in accordance with the ethical guidelines and policies provided by the relevant literature and institutions (e.g., Bryman, 2012; Fink, 2013; Plymouth University, 2013; Saunders *et al.*, 2012; SurveyMonkey, 2013b, 2014c, e).

Preceding the data collection (piloted and final questionnaire), an application form for ethical approval was submitted to, reviewed, and granted by the Faculty Research Ethical Approval Committee (FREAC), as the current study's survey was deemed complied with the University of Plymouth's ethical standards for researching human participants (Plymouth University, 2013).

Additionally, after designing the online survey in accordance with the ethical policy of the SurveyMonkey audience (SurveyMonkey, 2013b, 2014c, e), an online survey hyperlink was submitted to, reviewed, and granted by a SurveyMonkey audience's project manager.

Alongside maintaining objectivity, accuracy, and impartiality throughout the data analysis and findings interpretation, the researcher ensured that the current study's respondents were treated in accordance with the ethical guidelines and policies concerning: (A) voluntary participation and right to withdraw; (B) privacy, confidentiality, and protection from harm; and (C) openness, honesty, and informed consent (Bryman, 2012; Fink, 2013; Plymouth University, 2013; Saunders *et al.*, 2012).

(A) Voluntary participation and right to withdraw:

All the potential survey respondents have received an invitation email that indicated clearly that their participations are voluntary and that they can withdraw from participation at any time without any exchanged data, penalty, or need to mention the reasons for their withdrawal.

(B) Privacy, confidentiality, and protection from harm:

Procedures put in place to ensure that all the respondents answers were treated with complete anonymity and confidentiality, as well as analysed and interpreted in an aggregated format, solely, for the study's academic purpose. Therefore, respondents were protected from any potential harm associated with their participations.

In line with the SurveyMonkey audience's policy (SurveyMonkey, 2013b, 2014c, e), the survey was free from any questions that ask for information regarding the respondents and their firms names or contact details. However, the survey's invitation email included the researcher email for any respondent who have any enquiry and/or would like to receive a free executive summary of the survey findings. Additionally, SurveyMonkey prevents tracking respondents IP addresses. Furthermore, the survey's data file was stored on a password protected thumb drive with the researcher, and will not be shared with any external bodies.

(C) Openness, honesty, and informed consent:

An invitation email, including research details, was sent to all the potential survey respondents. This email fully detailed clear and accurate information about the questionnaire's purpose, length, target respondents/firms and participation's benefits, rights, and conditions, as well as the researcher's name, email, and institution (Faculty of Business, Plymouth University). Additionally, a note in the invitation email was included to inform the potential respondents that by clicking on the survey hyperlink button, they are giving their consent and are happy to start answering the online questionnaire survey in light of the mentioned participation's rights and conditions.

4.9. Questionnaire's Design, Measures, Validation (Pre-Testing and Piloting), and Final Questionnaire's Content

4.9.1. Questionnaire Design

As mentioned earlier (section 4.6), a *Web-based via email* questionnaire as a self-completed questionnaire survey was adopted because it was assumed the most relevant, convenient, and efficient data collection mode for answering the current study's questions and achieving its aim and objectives.

In order to design the online questionnaire survey for the current study, an affordable, effective, user-friendly, and popular online-survey tool/software for academics and managers, namely SurveyMonkey™, was utilised by subscribing to a Gold account plan. In this sense, using SurveyMonkey™ allowed for a proficient creation and deployment of the online questionnaire survey, and facilitated/automated data's collection, entry, coding, SPSS file generation/download, and descriptive statistics (Creswell, 2014; de Vaus, 2014; Rudestam & Newton, 2015; Sue & Ritter, 2012; Saunders *et al.*, 2012; Zikmund *et al.*, 2013).

Drawing from the relevant literature, considerable efforts were devoted to ensure the, as far as possible, attainment of the following main guidelines regarding the design of the current study's online questionnaire survey:

- To ensure coherence, as well as avoiding needless lengthiness and respondents confusion and fatigue: (1) only the relevant questions that can aid in accomplishing the research aim and objectives were included; (2) a multi-page questionnaire format was adopted alongside the navigation guides (current part number in relation to the total parts, and "Next", "Back", and "Done" buttons); and (3) questions relating to a similar topic were grouped together in their designated windows and progressed in a logical order (Dillman *et al.*, 2014; Fink, 2013; Rea & Parker, 2014; Sue & Ritter, 2012).

- For the sake of simplicity and consistency that can facilitate data's collection, coding, entry and analysis, as well as minimise the space and cognitive complexity of questions, a *matrix-question* style was utilised throughout the questionnaire (section 4.9.4) in which a labelled, *five-point Likert scale* (ranging from very negative, with mid-point, to very positive attitudes towards each statement) was associated with the main constructs questions groups in their designated windows (Neuman, 2014; Rea & Parker, 2014).

- To check and enhance the validity, usefulness, and prober technical functioning of the questionnaire and its items, and based on the questionnaire pre-testing and piloting (section 4.9.3), the questionnaire was established to be valid, technically well-functioning, and its items were considered valid, relevant to their associated constructs, unambiguous, and meaningful to the potential respondents (Rea & Parker, 2014; Saunders *et al.*, 2012; Zikmund *et al.*, 2013).

- For attaining collected data's accuracy and validity, questionnaire questions response options were ensured to be exhaustive (including "other, please specify" when necessary), mutually exclusive, and included radio buttons, whereby respondents were not able to select more than one answer for a specific question (de Vaus, 2014; Fink, 2013; Sue & Ritter, 2012).

- In an endeavour to enhance the response rate, forcing (mandatory for survey's continuation) questions were avoided, as such unescapable questions can lead respondents to abandon the whole survey (Sue & Ritter, 2012; Zikmund *et al.*, 2013). Additionally, questionnaire questions were accompanied by clear instructions, and ensured to be self-explanatory, specific, short, visually appealing, and free from double negatives, as well as easy to read, understand, answer, and follow (de Vaus, 2014; Neuman, 2014).

- In order to eliminate, or at least minimise, social desirability bias (i.e., respondents incline to give what they perceive the "favourable or acceptable" answer to a specific question instead of the real or valid one), the following procedural remedies were ensured: (1) respondents were assured full anonymity and confidentiality (the survey was free from any questions about respondents and their firms names or contact details); (2) leading questions were avoided and respondents clearly instructed to base their answers on a specific new product in terms of what was actually done rather than what should have been done; and (3) the adopted questions grouping and order disallowed respondents from identifying the specific investigated variables and their interrelationships (Fowler, 2014; Podsakoff *et al.*, 2003).

- In an attempt to enhance the response rate, ensure that the collected data were accurate and valid, and that the survey participants would fit-well-with the target respondents selection criteria (section 4.7), the online questionnaire survey (section 4.9.4): (1) was preceded by an invitation email, sent exclusively to the potential target respondents (prohibiting more than one response from the same respondent), including the survey participation's invitation, hyperlink, importance, conditions/terms, and benefits; and the researcher's contact details alongside the logo of the Faculty of Business, Plymouth University; (2) started by three sequential windows contained three screening/qualification questions; (3) followed by a window that provided a brief survey introduction to remind the participants with the survey participation's purpose and conditions; and (4) concluded by a window comprised relevant (multiple-choice) questions about the sample and respondents characteristics (Dillman *et al.*, 2014; Fink, 2013; Rea & Parker, 2014).

Although, a questionnaire can be structured, semi-structured, or unstructured questionnaire, a *structured questionnaire* is more suitable for quantitative studies (Hague, 2002). In this sense, as survey questions could be closed-ended, open-ended, or contingency questions; however, utilising closed-ended (multiple-choice/rating scale) questions, enables researchers to ask their respondents to select a choice/rating amongst predefined set of answers/ratings.

Whether yes/no questions, positive to negative responses; represented in three, five or more answers (Siniscalco & Auriat, 2005), *closed-ended questions* provide a number of predefined alternative answers from which respondents are instructed to choose one of them (de Vaus, 2014; Fink, 2013).

Compared to open-ended questions, *closed-ended questions* have several advantages: (1) require less interviewer skills; (2) yield more accurate, bias-free, and comparable data; (3) take less time and are easier for respondents to answer; and (4) are quicker, cheaper, and easier for surveyors to code, analyse and interpret (Bryman, 2012; Oppenheim, 1992; Rea & Parker, 2014; Zikmund, 2013).

Accordingly, beside three screening/qualification (contingency) questions, a structured questionnaire, with mainly closed-ended (multiple-choice/rating scale) questions, was utilised for the current study. Additionally, there are three types of questions: opinion, behaviour, and attribute questions (Dillman *et al.*, 2014; Saunders *et al.*, 2012), as detailed next.

Opinion-questions capture how respondents feel about something or what they think or believe is true or false, while questions on behaviours and attributes acquire what respondents actually do and are. When asking respondents about what they do, surveyors are attaining the respondents behaviour. This differs from respondents opinions, as surveyors, in the former, are seeking a concrete experience.

Behavioural-questions seek what respondents and/or their firms did in the past, do now or will do in the future. Hence, rating-questions were utilised in this study by asking each respondent about how strongly he/she disagreed/agreed with a series of behavioural statements covering the study's main constructs, on a five-point *Likert-style* rating scale.

Contrarily, *attribute-questions* ask about the characteristics of respondents and/or their firms (i.e., things that respondents and/or their firms possess rather than do). They are used to explore how certain behaviours differ among respondents, and to verify sample's representativeness of the total population. Attributes include characteristics such as respondent's occupation, experience, and/or a firm's type, age, size, etc. Accordingly, both the *behavioural* and *attribute questions* were utilised in the current study's online questionnaire survey.

4.9.2. Questionnaire Measures

As mentioned previously (section 3.2.10), the current study's theoretical model (i.e., CFEMOs) comprises seven main constructs (i.e., PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP) and three control variables (i.e., firm size, firm age, and NP innovativeness to firm).

Drawing from a comprehensive review of the relevant literature, the operationalisation of all the measurement indices of the current study's main constructs were based on: (1) existing, well-validated measurement scales from relevant empirical studies adapted to the context of restaurant firms; and (2) five-point Likert, multiple-item, subjective, first-order, and formative measurement indices. In an attempt to maximise their potential validity and comparability with the relevant previous studies, all the research constructs and their measures were drawn and adapted from *existing, well-validated measurement scales* (Bryman, 2012; Saunders *et al.*, 2012; Schrauf & Navarro, 2005).

In this sense, drawing from a comprehensive review of the relevant product innovation literature, and specifically, based on *existing, well-validated measurement scales* successfully used by renowned scholars in influential articles published in highly ranked journals, Table 4.1 displays the adapted items used to measure/validate the current study's main constructs along with their sources.

Table 4.1. Research variables measures

Formative Constructs	Formative Items	Description	Adapted From
PFit	TFit1	New menu-item development's skills/resources	(Harmancioglu et al., 2009)
	TFit2	Cooking/production skills/resources	
	MFit1	Marketing research skills/resources	
	MFit2	Sales force skills/resources	
	MFit3	Advertising and promotion skills/resources	
	Global Item	Overall technical and marketing skills/resources	
CrosFI	CrosFI1	Tried to achieve goals jointly	(Rodríguez et al., 2008)
	CrosFI2	Communicated openly and frequently	
	CrosFI3	Shared ideas, information and resources	
	Global Item	Worked together as a team	
TMS	TMS1	Was involved throughout all the activities for developing and introducing this new menu-item	(Cooper & Kleinschmidt, 1987; Rodríguez et al., 2008; Zirger & Maidique, 1990)
	TMS2	Was committed to develop and introduce this new menu-item	
	TMS3	Has provided the necessary resources to develop and introduce this new menu-item	
	Global Item	Has provided full support to develop and introduce this new menu-item	
PEProf	MAProf1	Searching for and generating new menu-item ideas	(Harmancioglu et al., 2009; Langerak et al., 2004b; Song & Montoya-Weiss, 2001; Song & Parry, 1999)
	MAProf2	Conducting a detailed study of market potential, customer preferences, purchase process, etc.	
	MAProf3	Testing this new menu-item under real-life conditions, e.g., with customers and/or in restaurants	
	MAProf4	Introducing this new menu-item into the marketplace; advertising, promotion, selling, etc.	
	TAProf1	Developing and producing the new menu-item's exemplar/prototype	
	TAProf2	Testing and revising the new menu-item's exemplar/prototype according to the desired and feasible features	
	TAProf3	Executing new menu-item's cooking/production start-up	
	Global Item	The overall marketing and technical activities carried out for developing and introducing this new menu-item	
OperLP	NPQS1	Was superior to competitors' products by offering some unique features or attributes to customers	(García et al., 2008; Kessler & Bierly, 2002; Lynn et al., 1999; Stanko et al., 2012; Weiss et al., 2011)
	NPQS2	Had a higher quality than competing products	
	NPDTS1	Was developed and introduced into the marketplace on or ahead of the original schedule	
	NPDTS2	Was developed and introduced into the marketplace faster than the similar competitors' products	
	NPDCS1	Had a development and introduction cost that was equal to or below the estimated budget	
	NPDCS2	Had a development and introduction cost that was below the cost of similar new menu-items your restaurant has developed and introduced before	
	Global Item	Had an overall superior performance in terms of quality, development and introduction speed and cost	
ProdLP	ProdLP1	Has met or exceeded customers' expectations	(Atuahene-Gima & Ko, 2001; Durmuşoğlu & Barczak, 2011; Li & Huang, 2012)
	ProdLP2	Has met or exceeded its sales objective	
	ProdLP3	Has met or exceeded its profit objective	
	Global Item	Could be considered a successful product	
FirmLP	FirmLP1	Has contributed to enhance restaurant's overall sales	(Atuahene-Gima, 1995; Cooper & Kleinschmidt, 1995c; Wei et al., 2012)
	FirmLP2	Has contributed to enhance restaurant's overall profit	
	FirmLP3	Has contributed to enhance restaurant's market share	
	Global Item	Has contributed to enhance restaurant's overall success	

In line with previous empirical studies in the relevant product innovation literature (e.g., Chryssochoidis & Wong, 2000; Kim *et al.*, 2014; Langerak & Hultink, 2005; Sandvik *et al.*, 2011; Song *et al.*, 1997a), all the main constructs were measured by asking restaurants owners/senior executives to express their perceptions of each item using a *five-point Likert scale*, where (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), except PEProf was measured based on a five-point Likert scale, where (1 = very poorly done, 2 = poorly done, 3 = fairly done, 4 = well done, 5 = very well done). This allows for sufficient variability among respondents answers along the different questions, and on the same time, is more convenient, easier, and quicker for respondents to answer and for researchers to design, code, analyse and interpret (McNabb, 2013; Monette *et al.*, 2014; Zikmund *et al.*, 2013).

In general, *multiple-item measurement scales* outperform single-item measurement scales (Langerak *et al.*, 2008). Single-item scales exhibit significantly lower levels of predictive validity compared to multi-item scales, which may be particularly problematic when using a variance-based analysis technique such as PLS-SEM (Diamantopoulos *et al.*, 2012; Sarstedt *et al.*, 2014), accordingly, the multiple-item constructs (with at least three items per construct) were utilised in the current study.

Constructs can be measured either (1) objectively by utilising secondary sources or by asking respondents to report absolute values, or (2) *subjectively* by asking respondents to assess the constructs, based on their perceptions, relative to industry norms, past performance, other products, predefined objectives, or competitors. In order to test the research hypotheses, the current study has utilised subjective data for several reasons, as detailed and justified below.

First, and to the best of the author knowledge, there is no available secondary data on the current study's constructs, within U.S. restaurants context, that fit-well-with the current study's aim and objectives. *Second*, objective performance measures were difficult to obtain during the pre-test stage of the current study, as restaurants owners/senior executives regarded these objective measures as sensitive/secret data. *Third*, a major advantage of utilising a subjective/perceived measurement scale is that it captures the respondents perceptions regarding their product innovation practices, activities, and performance, which allows for making comparisons among different products, firms, and studies, on the basis of firms individual assessments given their specific products, goals, time horizons, industries, countries, and market and economic conditions (Atuahene-Gima & Ko, 2001; Calantone *et al.*, 1996; Cooper & Kleinschmidt, 1994; Langerak *et al.*, 2008; Song & Parry, 1997a, b).

Fourth, subjective measures have been shown to be highly correlated with objective measures of product innovation performance (e.g., Chryssochoidis & Wong, 1998; Sandvik *et al.*, 2011; Song & Parry, 1996, 1997b). *Fifth*, subjective measures have often been used successfully by previous empirical studies in relevant product innovation literature (e.g., Calantone & di Benedetto, 2012; Kleinschmidt *et al.*, 2007; Lee & Wong, 2011; Millson & Wilemon, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1999).

Constructs measurements can be specified as (1) either *first/lower-order* (a single-layer construct at a lower level of abstraction; composed of observable measures), or second/higher-order (a multidimensional construct at a higher level of abstraction; its dimensions are first-order constructs); and (2) either reflective (a construct causes measurement/covariation of indicator variables, and the direction of arrows is from a construct to indicator variables), or *formative* (indicator variables cause the measurement of a construct, and the direction of arrows is from indicator variables to a construct) (Hair *et al.*, 2014a; Jarvis *et al.*, 2003; Podsakoff *et al.*, 2006).

For success factors studies, as it is the case in the current study, Albers (2010) recommended the utilisation of *first-order constructs* instead of second-order ones (first-order factors reflecting/forming the second-order factor). Contrarily to first-order constructs, second-order constructs utilisation means that each first-order construct (i.e., a component of a second-order construct) is explained by just one indicator (i.e., replacing the first-order factors by the summated scores of their indicators) and consequently does not allow for identifying the simultaneous differential impacts/weights of the various constructs multiple-indicators along the first and second level of abstraction. Accordingly, it is better to refrain from using the highly abstract second-order construct and work with all the first-order factors as constructs, as this will give richer information on the impact of the various constructs (Albers, 2010). Therefore, all the current study's main constructs were conceptualised and specified as first-order constructs.

Albers (2010) extended his recommendation further in favour of utilising *formative constructs* in success factor studies, instead of the reflective ones. In this respect, such studies should concentrate on the differential impacts/weights of the various success factors actionable indicators/drivers. With the assumption of reflective indicators, it is only possible to derive results for the constructs-level but not for the differential effects of the indicators. This is especially a problem in success factor studies where supporting a hypothesis that, for example, market orientation has a positive effect on firm performance should not be the top priority, as such a relationship is highly probable, while managers have no precise knowledge of how to achieve this market orientation. Alternatively, with formative indicators, valuable managerial implications would be more achievable, as the differential impacts/weights of the various market orientation's actionable indicators/drivers, which are mostly responsible for the success, are identifiable and more achievable. To this end, success factor studies should utilise actionable indicators, which implies that these indicators must form a construct (formative) and not reflect it (reflective). Moreover, only by using formative indicators, it is possible to extract the influence/weight of every single formative indicator on not only its corresponding construct, but also on the other subsequent/target construct(s) (Albers, 2010; Boßow-Thies & Albers, 2010; Eberl, 2010; Hair *et al.*, 2014a; Höck *et al.*, 2010). Accordingly, all the current study's main constructs were conceptualised and specified as formative constructs.

The problem of misspecifying formative constructs as reflective constructs is evident in the published articles of the leading academic journals in marketing, information systems, operations management, and strategic management literatures. For example, Jarvis *et al.* (2003) concluded that 28% of the latent multiple-item constructs published in the top four marketing journals (i.e., *Journal of Marketing Research, Journal of Marketing, Journal of Consumer Research*, and *Marketing Science*) were erroneously specified as reflective when they should have been formative. In a follow-up study, Petter *et al.* (2007) found that 30% of the studies published in two leading journals in information systems (i.e., *MIS Quarterly* and *Information Systems Research*) have the same misspecification problems.

This type of measurement model's misspecification has a negative effect on numerous of the most widely used constructs in the field, as it severely biases structural parameter estimates and can lead to inappropriate/different conclusions regarding the hypothesised relationships between constructs. Thus by implication, a considerable part of the empirical results in the literature may be possibly misleading. Hence, measurement relationships must be correctly conceptualised and specified (Jarvis *et al.*, 2003; MacKenzie *et al.*, 2005).

In a similar vein, Roberts *et al.*'s (2010) review of operations management literature suggested that 97% of all studies specified constructs as reflective. Only four studies specified at least one formative construct, which noticeably understates the true theoretical nature of constructs, as such commonly researched constructs (e.g., firm performance) should be conceptualised and specified as formative rather than reflective. Regarding the leading strategic management journals (e.g., *Academy of Management Journal, Administrative Science Quarterly*, and *Strategic Management Journal*), Podsakoff *et al.* (2003) and Podsakoff *et al.* (2006) reported constructs misspecification rates of 47% and 62%, respectively.

In agreement with the aforementioned studies (Jarvis *et al.*, 2003; Petter *et al.*, 2007; Podsakoff *et al.*, 2003, 2006; Roberts *et al.*, 2010), a researcher's comprehensive review of the relevant product innovation literature, concerning the current study's main constructs (i.e., PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP), suggested that the majority of the relevant empirical studies constructs were erroneously specified as reflective when they should have been formative. These studies adopted reflective indicators for their constructs, while these constructs actually have *formative items characteristics*, such as: (1) items are defining characteristics of their constructs; a formative construct does not occur naturally but is instead ''formed'' by the presence of its underlying measures (items); (2) any changes in the items should cause changes in their associated constructs rather than the vice versa; (3) items are different facets of their constructs, hence, omitting an item may alter the conceptual domain of the construct; (4) items are not mutually interchangeable; (5) it is not necessary for items to covary with each other; and (6) items are not required to have the same antecedents and consequences (Diamantopoulos & Winklhofer, 2001; Diamantopoulos *et al.*, 2008; Hair *et al.*, 2014a, b; Jarvis *et al.*, 2003; MacKenzie *et al.*, 2005, 2011; Peng & Lai, 2012; Petter *et al.*, 2007; Podsakoff *et al.*, 2006; Roberts *et al.*, 2010).

In this respect, Peng and Lai (2012) used the *operational performance* (one of the current study's constructs) as an illustrative example of a formative construct because it is a multi-dimensional concept that typically comprises quality, time, and cost. In the operations management literature, while operational performance is modelled as a reflective construct in some studies, it is more appropriate to model it as a formative construct based on the guidelines set by Diamantopoulos and Winklhofer (2001) and Jarvis *et al.* (2003).

First, as the *operational performance* is typically defined jointly by its quality, time, and cost, the causality direction should be from the indicators to the construct rather than the vice versa. Conceptually, researchers cannot assume that an underlying latent construct of operational performance causes quality, time, and cost indicators to all covary in the same direction and with the same magnitude. *Second*, the measurement indicators of a specific operational performance dimension are not interchangeable with items measuring other performance dimensions. For example, items measuring quality cannot be replaced by items measuring time or cost, and vice versa. *Third*, a variation in one performance indicator is not automatically associated with similar variations in other indicators. For example, conceptually, an indicator measuring quality does not have to correlate with an indicator measuring time. *Fourth*, researchers cannot assume that different operational performance indicators will be affected by the identical set of antecedents or lead to the identical set of consequences, as empirical evidence suggests that different antecedents may influence various operational performance dimensions to different extents. Likewise, the influences of the different operational performance dimensions on an outcome variable such as firm performance can differ noticeably (Peng & Lai, 2012).

In light of the aforesaid guidelines, characteristics, and examples of formative constructs, it was evident that the formative measurement model's conceptualisation and specification were fitting well with all the current study's main constructs, hence, all the current study's main constructs (i.e., PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP) were conceptualised and specified as formative (rather than reflective) constructs.

4.9.2.1. New-Product Fit-to-Firm's Skills and Resources (PFit)

Beside its *global item* (i.e., a single-item reflective construct that summarises the essence of and is used to validate a formative construct; Hair *et al.*, 2014a; Sarstedt *et al.*, 2014) "*overall technical and marketing skills/resources*", *PFit* was measured using five items adapted from Harmancioglu *et al.* (2009) to investigate the extent to which the suggested new menu-item innovation requirements fit-well-with the available restaurant's technical (*TFit*: R&D and production) and marketing (*MFit*: marketing research, sales force, advertising and promotion) skills/resources.

4.9.2.2. Internal Cross-Functional Integration (CrosFI)

Alongside its *global item* "*worked together as a team*", *CrosFI* was measured using three items adapted from Rodríguez *et al.* (2008) to examine the magnitude of joint goals achievement, open and frequent communications, as well as sharing ideas, information, and resources among the internal restaurant's functions/departments (e.g., R&D, production, and marketing) to develop and introduce a new menu-item into the marketplace.

4.9.2.3. Top-Management Support (TMS)

Together with its *global item* "*has provided full support to develop and introduce this new menu-item*", *TMS* was measured using three items adapted from Cooper and Kleinschmidt (1987), Zirger and Maidique (1990), and Rodríguez *et al.* (2008) to investigate the extent of support provided by a restaurant's top-management – to develop and introduce a new menu-item into the marketplace – through top-management's resources dedication, commitment, and involvement.

4.9.2.4. Product Innovation Process Execution Proficiency (PEProf)

Beside its *global item* "*the overall marketing and technical activities carried out for developing and introducing this new menu-item*", *PEProf* was measured using seven items adapted from Song and Parry (1999), Song and Montoya-Weiss (2001), Langerak *et al.* (2004b), and Harmancioglu *et al.* (2009) to assess how well/adequately an overall product innovation process for a restaurant is carried out – to develop and introduce a new menu-item into the marketplace – in terms of: (1) *marketing activities (MAProf)*—1a) searching for and generating new menu-item ideas, 1b) conducting a detailed study of market potential, customer preferences, purchase process, etc., 1c) testing the new menu-item under real-life conditions, and 1d) introducing the new menu-item into the marketplace; advertising, promotion, selling, etc.; and (2) *technical activities (TAProf)*—2a) developing and producing the new menu-item exemplar/prototype, 2b) testing and revising the new menu-item exemplar/prototype according to the desired and feasible features, and 2c) executing new menu-item production start-up.

4.9.2.5. Product Innovation Performance (OperLP, ProdLP, and FirmLP)

Alongside its *global item* "*had an overall superior performance in terms of quality, development and introduction speed and cost*", *OperLP* was measured using six items adapted from Lynn *et al.* (1999), Kessler and Bierly (2002), García *et al.* (2008), Weiss *et al.* (2011), and Stanko *et al.* (2012) to investigate a restaurant's: (1) *new menu-item quality superiority (NPQS)*—the extent to which the new menu-item is: 1a) superior to competitors products by offering some unique features or attributes to customers, and 1b) has a higher quality than competing products; (2) *new menu-item development and launching time superiority (NPDTS)*—the extent to which the new menu-item is developed and introduced into the marketplace: 2a) on or ahead of the original schedule, and 2b) faster than the similar competitors products; and (3) *new menu-item development and launching cost superiority (NPDCS)*—the extent to which the cost of developing and introducing the new menu-item is: 3a) equal to or below the estimated budget, and 3b) below the cost of similar new menu-items a restaurant has developed and introduced before.

Together with its *global item* "*could be considered a successful product*", *ProdLP* was measured using three items adapted from Atuahene-Gima and Ko (2001), Durmuşoğlu and Barczak (2011), and Li and Huang (2012) to assess the extent of a restaurant's achievement of the desired outcomes – for developing and introducing a new menu-item into the marketplace – in terms of new menu-item customer satisfaction, sales, and profits. Beside its *global item* "*has contributed to enhance restaurant's overall success*", *FirmLP* was measured using three items adapted from Atuahene-Gima (1995), Cooper and Kleinschmidt (1995c), and Wei *et al.* (2012) to evaluate the magnitude of a restaurant's achievement of the desired outcomes – for developing and introducing a new menu-item into the marketplace – in terms of new menu-item contributions to enhance the restaurant's overall sales, profits, and market share.

4.9.2.6. Control Variables (Firm Size, Firm Age, and NP Innovativeness)

In addition to the aforementioned main constructs, the current study incorporated three control variables, namely firm size, firm age, and NP innovativeness to firm. In line with the relevant previous studies (e.g., Hsieh *et al.*, 2008; Li & Huang, 2012; Marion & Meyer, 2011; Sheng *et al.*, 2013; Wei & Morgan, 2004), *firm size* was measured in terms of a restaurant's employees number range (i.e., below 10 employees, 10-49 employees, 50-99 employees, 100-249 employees, 250-500 employees, or over 500 employees), while *firm age* was measured in terms of a restaurant's operation years range (i.e., below 5 years ago, 5-10 years ago, 11-15 years ago, 16-20 years ago, 21-25 years ago, or over 25 years ago). Finally, drawing from Kleinschmidt and Cooper (1991), *NP innovativeness to firm* was measured for each restaurant's new menu-item along three choices (i.e., low innovative menu-item, moderately innovative menu-item, or highly innovative menu-item).

4.9.3. Questionnaire Validation (Pre-Testing and Piloting)

Even the most-crafted questionnaire's questions and carefully constructed response options sometimes fail to collect valid and useful information that can help in answering the research question and achieving its aim and objectives. Especially with the structured, self-completed questionnaires (as there is no an interviewer present to clarify any confusion), the only way to find out if it will work smoothly and effectively (yield valid and useful data), improve it, and avoid the risk of wasting effort, time, money, and collected responses with a malfunctioning questionnaire and/or questions (measures), is to validate the questionnaire and its questions before its full deployment through pre-testing (Dillman *et al.*, 2014; Mesch, 2012; Rea & Parker, 2014; Sarstedt & Mooi, 2014; Sue & Ritter, 2012; Zikmund, 2013) and piloting (Bryman, 2012; Creswell, 2014; de Vaus, 2014; Fink, 2013; Gaiser & Schreiner, 2009; Saunders *et al.*, 2012).

In keeping with the aforesaid literature, preceding the creation and deployment of the final questionnaire version (sections 4.9.4 and 4.10), the current study's questionnaire validation comprised testing, enhancing, and ensuring questionnaire validity along: (1) the appropriateness and well-functioning of the whole questionnaire; and (2) the questionnaire's questions (measures) in terms of face, content, and construct validities. Such a validation was accomplished through two sequential stages: (1) questionnaire's pre-testing; followed by (2) questionnaire's piloting.

In an endeavour to maximise their potential validity and comparability with the relevant previous studies, and drawing from a comprehensive review of the relevant product innovation literature, all the research constructs and their measures were drawn and adapted from *existing, well-validated measurement scales* (Bryman, 2012; Saunders *et al.*, 2012; Schrauf & Navarro, 2005) successfully used by renowned scholars in influential articles published in highly ranked journals (section 4.9.2).

4.9.3.1. Questionnaire's Pre-Testing Stage

Building upon the aforesaid *existing, well-validated measurement scales*, the questionnaire was iteratively written, designed, shared with experts known (accessible) to the researcher (five PhD students, five academic staff, and ten restaurants owners/senior executives) for feedback/suggestions, and accordingly revised (Dillman *et al.*, 2014; Sue & Ritter, 2012; Zikmund, 2013). Throughout this *pre-testing stage*, that took about one month, the communication with the five PhD students and five academic staff (who have the relevant background and experience from Faculty of Business, Plymouth University) was achieved through interviews and emails, while the communication with the ten restaurants owners/senior executives (who were actively involved in and have experience on restaurants product innovation) was conducted via their personal pages on Facebook and/or LinkedIn.

The aforementioned expert academics and managers were asked to provide their feedback/suggestions regarding: (1) the clarity, relevance, comprehensiveness, length, structure, navigation, and flow of the invitation email, whole questionnaire, and its questions (measures); and (2) the validity of the questionnaire's questions (measures) concerning: (2a) *face validity* (i.e., the extent to which the questionnaire's measures seem to make sense); and (2b) *content validity* (i.e., the extent to which the questionnaire's measures [items] provide adequate, relevant, and representative coverage of the different facets of their associated constructs) (Bryman, 2012; Rea & Parker, 2014; Sarstedt & Mooi, 2014). The main received, considered, and fulfilled suggestions for modification were as follow:

- Make the invitation email more attractive, concise, include the logo of the Faculty of Business, Plymouth University, and emphasise the participation's importance, conditions, and benefits, in order to enhance the potential response rate.
- Precede the questionnaire with screening/qualification questions to serve as initial filters of the irrelevant respondents.

- Start the questionnaire with a brief introduction to reemphasise the participation’s purpose and conditions.
- Remove the constructs names, and replace questions grouping according to their constructs, with grouping questions relating to a similar topic together in a separate page/window, to ensure coherence and avoid respondents bias, confusion, and fatigue.
- Replace general terms (e.g., firm, product, R&D, etc.) with more specific terms relevant to the restaurant context (e.g., restaurant, menu-item, culinary innovation, etc.).
- Inactivate forcing/unescapable (mandatory for survey’s continuation) questions to avoid respondents abandonment of the whole survey.
- Remove irrelevant, double-negative, and redundant/repetitive questionnaire’s questions (measures) and make them more relevant, clear, specific, short, visually appealing, as well as easy to read, understand, answer, and follow, in order to enhance the potential response rate and measurement scales validity.
- Adopt a multi-page questionnaire format (instead of putting all questions on one page) alongside the navigation guides (current part number in relation to the total parts, and “Next”, “Back”, and “Done” buttons), to enhance the potential response rate by making the questionnaire more attractive, as well as easy to answer and follow.
- Utilise multiple-item constructs, with at least three items per construct, that provide adequate and representative coverage of the different facets of their associated constructs (instead of single-item constructs), to improve the measurement scales validity.
- Employ subjective measures instead of objective measures, because compared to the latter that were regarded by restaurants owners/senior executives as sensitive/secret data, the former can be provided more easily, and can allow for making comparisons among different products, firms, and studies, on the basis of firms individual assessments given their specific products, goals, time horizons, industries, countries, and market and economic conditions.

By considering and fulfilling the aforesaid received suggestions, this *pre-testing stage*, over its three-progressed questionnaire's drafts, helped to test, enhance, and establish: (1) the clarity, relevance, comprehensiveness, length [10-15 minutes along seven pages/windows], structure, and well-functioning (e.g., sending, responding, navigation, flow, and data's recording and downloading) of the invitation email, whole questionnaire, and its questions (measures); as well as (2) the validity of the questionnaire's questions (measures) in terms of: (2a) *face validity* (i.e., the questionnaire's measures seemed to make sense); and (2b) *content validity* (i.e., the questionnaire's measures [items] provided adequate, relevant, and representative coverage of the different facets of their associated constructs) (Oppenheim, 1992; Saunders *et al.*, 2012; Sue & Ritter, 2012; Zikmund, 2013).

4.9.3.2. Questionnaire's Piloting Stage

Relying on the questionnaire's pre-testing stage, the *questionnaire's piloting stage* aimed to advance: (1) the verification of the well-functioning (e.g., sending, responding, length, and data's collection [access to potential target respondents], recording and downloading) of the whole questionnaire including its invitation email, but this time, by trying it out, before its full deployment, with a small sample that is similar in characteristics to the one that ultimately will be sampled; and (2) the validation of the questionnaire's questions (measures), but this time, in terms of its *constructs validity* (i.e., how well the questionnaire's measures [items] actually measure the concepts/constructs that are supposed to measure?) (Creswell, 2014; de Vaus, 2014; Fink, 2013; Gaiser & Schreiner, 2009; Sarstedt & Mooi, 2014; Saunders *et al.*, 2012; Zikmund, 2013).

To do so, and after attempting several routes (section 4.10.1), the social media/networking platforms were utilised (Bartholomew & Smith, 2006; Ho, 2014; Skeels & Grudin, 2009; Tuškej *et al.*, 2013), whereby an invitation message comprised the participation's purpose, conditions, benefits, and the hyperlink for the revised online questionnaire was posted (after subscription and portal admin's review and approval) on the page wall (timeline) of the *relevant groups* (i.e., groups that their members characteristics/interests are close to the targeting criteria for the current study's potential respondents, section 4.7) on the most popular social media/networking platforms among American adults who use the internet, namely Facebook (71%) and LinkedIn (28%) (Duggan *et al.*, 2015; Mangold & Faulds, 2009). Those respondents who self-selected by clicking on the hyperlink embedded in the invitation message were automatically taken to the online questionnaire.

By utilising this method that was characterised by a limited cooperation from groups portal admins, and after weekly reposting of the above invitation message over two months till responses barely increased, only 87 questionnaires were received, with further reduction to 50 valid questionnaires (after eliminating incomplete responses and irrelevant respondents) that, although, were sufficient for achieving the *piloting stage's* aims (i.e., verifying the well-functioning of the whole questionnaire including its invitation email; and validating the questionnaire's questions [measures] in terms of its constructs validity), this method, in light of its aforesaid constraints and limited outcomes, was considered insufficient for the large-scale implementation of the final questionnaire's deployment and data collection, which in turn raised the need for finding a more effective and efficient alternative, as explained later in section 4.10.2.

Nonetheless, this *piloting stage*, helped to advance the verification of and basically established the well-functioning (e.g., sending, responding, length [10-15 minutes along seven pages/windows], and data's collection [access to potential target respondents, section 4.10.1], recording and downloading) of the whole questionnaire including its invitation email, by trying it out, before its full deployment, with a small sample that was similar in characteristics to the one that ultimately will be sampled (Creswell, 2014; de Vaus, 2014; Gaiser & Schreiner, 2009). Additionally, it allowed for verifying and fundamentally established the constructs validity of the questionnaire's questions (measures) (i.e., the questionnaire's measures [items] actually measured the concepts/constructs that were supposed to measure) (Fink, 2013; Sarstedt & Mooi, 2014; Saunders *et al.*, 2012; Zikmund, 2013), as explained below.

As justified in section 4.9.2, it was evident that the formative measurement model's conceptualisation and specification were fitting well with all the current study's main constructs, hence, all the current study's main constructs (i.e., PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP) were conceptualised and specified as formative (rather than reflective) constructs. Contrary to reflective constructs indicators, *formative constructs items* have the following characteristics: (1) are defining characteristics of their constructs; a formative construct does not occur naturally but is instead ''formed'' by the presence of its underlying measures (items); (2) any changes in items should cause changes in their associated constructs rather than the vice versa; (3) are different facets of their associated constructs, hence, omitting an item may alter the conceptual domain of the construct; (4) are not mutually interchangeable; (5) it is not necessary to covary with each other; and (6) are not required to have the same antecedents and consequences (Diamantopoulos & Winklhofer, 2001; Diamantopoulos *et al.*, 2008; Hair *et al.*, 2014a, b; Jarvis *et al.*, 2003; MacKenzie *et al.*, 2005, 2011; Peng & Lai, 2012; Petter *et al.*, 2007; Podsakoff *et al.*, 2006; Roberts *et al.*, 2010).

That being said, the evaluation of formatively measured constructs relies on a totally different set of criteria compared to their reflective counterparts. Specifically, *the same traditional assessment criteria for reflective constructs* in terms of: (1) *constructs reliability* (i.e., the composite reliability [P_c] and Cronbach's alpha [α] as measures of the internal consistency reliability should be ≥ .70); (2) *indicators reliability* (i.e., the indicators [standardised] outer loadings should be significant [$p < .05$] and ≥ 0.70); (3) *constructs convergent validity* (i.e., the Average Variance Extracted [AVE] for a set of indicators by their underlying latent construct should be ≥ .50; Fornell & Larcker, 1981); (4) *constructs discriminant validity* (i.e., the AVE for a set of indicators by their underlying latent construct should be greater than the squared correlation between the focal construct and the other constructs; Fornell & Larcker, 1981, and/or the indicators loadings with their associated constructs should be larger than their cross loadings with other constructs); and (5) the *exploratory and confirmatory factor analyses* (for verifying constructs unidimensionality), *are irrelevant to formative constructs assessment* (Bagozzi, 1994; Bollen, 1989, 2011; Bollen & Lennox, 1991; Diamantopoulos, 1999, 2005; Edwards & Bagozzi, 2000; Hulland, 1999; Podsakoff *et al.*, 2006; Rossiter, 2002).

Alternatively, formative constructs should be assessed: (1) in a questionnaire's pre-testing stage in terms of (1a) *constructs face validity* (i.e., the constructs measures seem to make sense), and (1b) *constructs content validity* (i.e., the questionnaire's measures [items] provide adequate, relevant, and representative coverage of the different facets of their associated constructs); and (2) statistically after the questionnaire's deployment and data collection in terms of (2a) *constructs convergent validity* [redundancy analysis] (i.e., a formatively measured construct should explain at least 50% to 64% of the variance [R^2] of a global [single-item] reflective construct that captures the "overall" meaning/essence of the same construct, coincided by a significant [$p < .05$] standardised path coefficient [β has a magnitude of at least .70 to .80] going from the formative construct towards the reflective one), (2b) *absence of substantial multicollinearity issues* [redundant/repetitive items] among a set of items forming a construct (i.e., the Variance Inflation Factors [VIFs] as measures of items multicollinearity should not exceed 5 to 10), and (2c) *significance and relevance of items weights* (i.e., the items [standardised] outer weights [β] should be significant [$p < .05$] and relevant by actually contributing to forming their associated constructs) (Cenfetelli & Bassellier, 2009; Chin, 2010; Diamantopoulos & Winklhofer, 2001; Diamantopoulos *et al.*, 2008; Götz *et al.*, 2010; Hair *et al.*, 2014a, b; Henseler *et al.*, 2009; Jarvis *et al.*, 2003; Lee *et al.*, 2011; MacKenzie *et al.*, 2005, 2011; Peng & Lai, 2012; Petter *et al.*, 2007; Ringle *et al.*, 2012; Sarstedt *et al.*, 2014).

First of all, in addition to the constructs face and content validities that have been verified and established before in the questionnaire's pre-testing stage (section 4.9.3.1), within this questionnaire's piloting stage, and by utilising a statistical analysis software program, namely *WarpPLS v. 4* (Kock, 2013) as a variance-based, Partial Least Squares Structural Equation Modelling PLS-SEM, the formative measurement model was assessed in terms of the *constructs convergent validity* (redundancy analysis) to ensure that the entire domain of each of the formative construct and all of its relevant facets have been sufficiently covered/captured by its formative items (Chin, 2010; Hair *et al.*, 2014a, b; Henseler *et al.*, 2009; Sarstedt *et al.*, 2014), as detailed and shown next in Table 4.2 and Fig. 4.1.

Table 4.2. Constructs convergent validity (redundancy analysis)

Independents (Formative Constructs)	**Dependents** (Global single-item Reflective Constructs)	***P***	***β***	***R^2***
PFit	PFitG	< .001	0.91	0.83
CrosFI	CrosFIG	< .001	0.91	0.84
TMS	TMSG	< .001	0.82	0.68
PEProf	PEProfG	< .001	0.91	0.82
OperLP	OperLPG	< .001	0.92	0.84
ProdLP	ProdLPG	< .001	0.95	0.91
FirmLP	FirmLPG	< .001	0.84	0.71

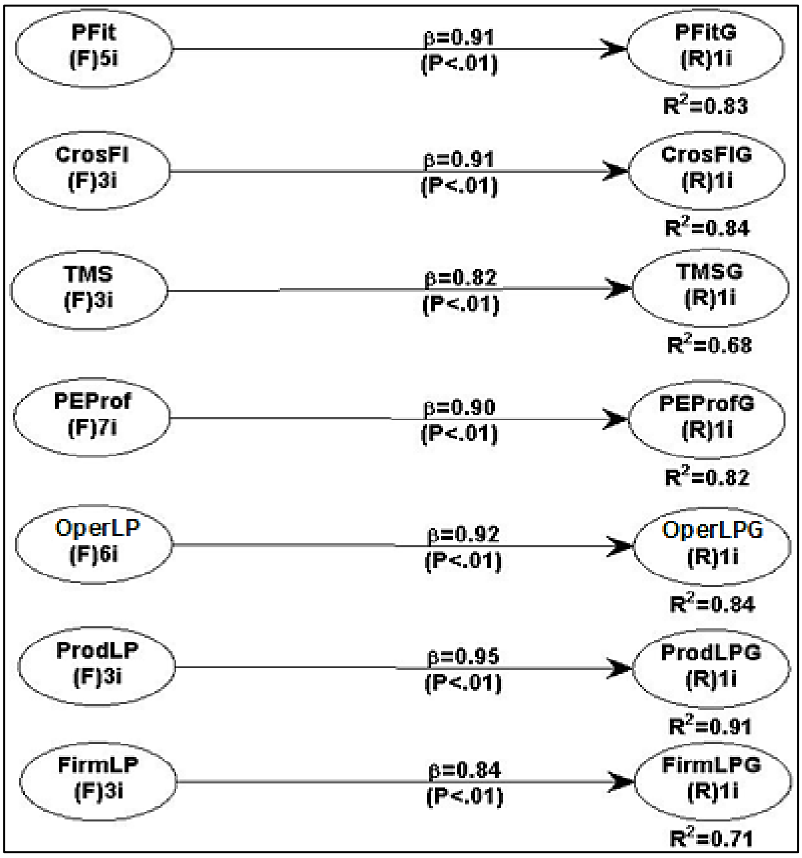


Fig. 4.1. Constructs convergent validity (redundancy analysis)

As displayed above in Table 4.2 and Fig. 4.1, the conducted redundancy analysis has revealed that the *constructs convergent validity* was established, because all the model's formative constructs (PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP) have greatly exceeded: (1) the minimum required explained variance (i.e., R^2 = 50% to 64%) of their corresponding global (single-item) reflective constructs (i.e., alternative measurements that capture the "overall" meaning/essence of their associated formative constructs), with PFitG's R^2 = 83%, CrosFIG's R^2 = 84%, TMSG's R^2 = 68%, PEProfG's R^2 = 82%, OperLPG's R^2 = 84%, ProdLPG's R^2 = 91%, and FirmLPG's R^2 = 71%; and (2) the minimum required standardised path coefficient's magnitude (i.e., β = .70 to .80) and significance (i.e., $p < .05$), with PFit→PFitG ($p < .001$; $\beta = .91$), CrosFI→CrosFIG ($p < .001$; $\beta = .91$), TMS→TMSG ($p < .001$; $\beta = .82$), PEProf→PEProfG ($p < .001$; $\beta = .90$), OperLP→OperLPG ($p < .001$; $\beta = .92$), ProdLP→ProdLPG ($p < .001$; $\beta = .95$), and FirmLP→FirmLPG ($p < .001$; $\beta = .84$).

Next, the assessment of the formative constructs items validity necessitates an examination of the potential high multicollinearity issues among these items. Contrary to their reflective counterparts, as formative constructs items are expected to measure different facets of the same construct, they should not be redundant/repetitive. Typically caused by the existence of redundant/repetitive items (i.e., items that have/cover the same meaning/information), the presence of substantial levels of multicollinearity (overlap: nearly perfect correlations) among formative items can be problematic as it can have a threatening bias influence on the multiple regression analysiss estimations and results. In this sense, high collinearity levels among formative items can: (1) increase the items weight's standard errors and consequently reduce their statistical significance; and (2) cause reversed signs and incorrect estimation of the items weights. To detect the level of multicollinearity among a set of items forming their associated construct, the Variance Inflation Factor (VIF)'s value for each item of this set should be calculated based on running a multiple regression analysis for each item of the formative construct on all the other measurement items of the same construct. As a rule of thumb, VIF values exceeding 5 (or exceeding 10 as a more relaxed, yet commonly acceptable threshold) indicate a potential multicollinearity problem (Götz *et al.*, 2010; Hair *et al.*, 2014a, b; Peng & Lai, 2012; Sarstedt *et al.*, 2014).

In keeping with the aforesaid guidelines, the formative measurement model was also assessed in terms of the *absence of substantial multicollinearity issues* among the set of items forming their associated constructs by calculating the VIF value for each item of these sets. As displayed below in Table 4.3, the conducted multicollinearity assessments by means of the VIF for all the formative constructs items, yielded VIF values that ranged between 1.405 (TFit1: PFit) and 4.798 (ProdLP1: ProdLP), which were not exceeding the common cut-off threshold of 5 to 10, hence, confirming that the measurement model results were not negatively affected by the items multicollinearity.

Table 4.3. Items multicollinearity assessment: Variance Inflation Factors (VIFs)

Formative Constructs	Formative Items	VIFs
PFit	TFit1	1.405
	TFit2	1.749
	MFit1	1.627
	MFit2	1.938
	MFit3	2.849
CrosFI	CrosFI1	1.811
	CrosFI2	3.310
	CrosFI3	2.574
TMS	TMS1	2.855
	TMS2	1.414
	TMS3	3.200
PEProf	MAProf1	3.001
	MAProf2	3.085
	MAProf3	3.216
	MAProf4	3.626
	TAProf1	3.210
	TAProf2	2.445
	TAProf3	4.081
OperLP	NPQS1	1.441
	NPQS2	2.204
	NPDTS1	2.908
	NPDTS2	3.295
	NPDCS1	2.827
	NPDCS2	1.475
ProdLP	ProdLP1	4.798
	ProdLP2	4.208
	ProdLP3	3.488
FirmLP	FirmLP1	3.627
	FirmLP2	2.649
	FirmLP3	3.380

Finally yet importantly, to complete the verification of the formative constructs items validity, the formative constructs items have to be individually evaluated based on their specific contributions to forming their associated constructs by evaluating their standardised path weights (β) and their significance ($p < .05$). Formative items "compete" with one another to be explanatory of their targeted construct, therefore, beside its significance, the most important statistic for evaluating a formative item is its *weight* (i.e., partial effect on, or contribution in, forming its intended construct controlling for the effects/contributions of all other items forming the same construct). In relation to significance, if the item weight is statistically significant ($p < .05$), the item is typically retained. With reference to relevance, item weights are standardised to values between – 1 and + 1, with weights closer to + 1 representing strong positive relationships and weights closer to – 1 indicating strong negative relationships. However, it should be noted that the weight is a function of the number of items used to measure a construct, whereby the higher the number of items, the lower the average weights (Cenfetelli & Bassellier, 2009; Hair *et al.*, 2014a, b; Lee *et al.*, 2011; Petter *et al.*, 2007; Sarstedt *et al.*, 2014).

In line with the above recommendations, the formative measurement model was finally evaluated in terms of the *significance and relevance of items weights*. As displayed next in Table 4.4, these analyses have revealed that all the formative items had significant ($p < .001$) positive standardised outer weights (β) that ranged between: .224 (TFit1) and .318 (MFit3) for *PFit*; .354 (CrosFI1) and .400 (CrosFI2) for *CrosFI*; .338 (TMS2) and .418 (TMS3) for *TMS*; .145 (TAProf2) and .199 (TAProf3) for *PEProf*; .169 (NPDCS2) and .234 (NPDTS2) for *OperLP*; .350 (ProdLP3) and .358 (ProdLP3) for *ProdLP*; .354 (FirmLP2) and .367 (FirmLP1) for *FirmLP*. Therefore, all the formative items were retained, as they deemed significant and relevant by actually contributing to forming their associated constructs.

Table 4.4. Significance and relevance of items weights

Formative Constructs	Formative Items	P	Outer Weights β
PFit	TFit1	<0.001	0.224
	TFit2	<0.001	0.255
	MFit1	<0.001	0.246
	MFit2	<0.001	0.285
	MFit3	<0.001	0.318
CrosFI	CrosFI1	<0.001	0.354
	CrosFI2	<0.001	0.400
	CrosFI3	<0.001	0.378
TMS	TMS1	<0.001	0.404
	TMS2	<0.001	0.338
	TMS3	<0.001	0.418
PEProf	MAProf1	<0.001	0.162
	MAProf2	<0.001	0.182
	MAProf3	<0.001	0.190
	MAProf4	<0.001	0.195
	TAProf1	<0.001	0.157
	TAProf2	<0.001	0.145
	TAProf3	<0.001	0.199
OperLP	NPQS1	<0.001	0.173
	NPQS2	<0.001	0.220
	NPDTS1	<0.001	0.227
	NPDTS2	<0.001	0.234
	NPDCS1	<0.001	0.232
	NPDCS2	<0.001	0.169
ProdLP	ProdLP1	<0.001	0.358
	ProdLP2	<0.001	0.355
	ProdLP3	<0.001	0.350
FirmLP	FirmLP1	<0.001	0.367
	FirmLP2	<0.001	0.354
	FirmLP3	<0.001	0.364

To sum up the questionnaire's measures validity, in addition to the previously established constructs face and content validities (section 4.9.3.1), within this questionnaire's piloting stage, the results of the formative measurement model's assessment (constructs validity) in terms of (1) *constructs convergent validity*, (2) *absence of substantial items multicollinearity issues*, and (3) *significance and relevance of items weights*, were verified and deemed well satisfactory, which in turn allowed for proceeding to this study's final questionnaire's deployment and data collection, as detailed in the following sections.

4.9.4. Final Questionnaire's Content

Beside the survey participation's invitation email (Fig. 4.2), the current study's online questionnaire survey was composed of seven sequential windows. The first three windows were for three screening/qualification questions (Fig. 4.3 to Fig. 4.5). The fourth window was for the survey's introduction and part one (Fig. 4.6). The last three windows, namely the fifth window (Fig. 4.7), sixth window (Fig. 4.8), and seventh window (Fig. 4.9a and Fig. 4.9b), were for the survey's part two, part three, and part four, respectively. Initially, all the potential respondents have received a survey participation's invitation email (Fig. 4.2). This invitation email enclosed: (1) the survey participation's invitation, hyperlink, importance, conditions/terms, and benefits; and (2) the researcher's contact details along with the logo of the Faculty of Business, Plymouth University.

THE BUSINESS SCHOOL WITH PLYMOUTH UNIVERSITY

Please complete the
New Menu-Item Innovation in U.S. Restaurants Survey

You are invited to complete this 10-15 minutes survey.

Your participation is so crucial and will enable this PhD study to help U.S. Restaurateurs in finding the best ways for improving their new menu-item innovation's activities and success.

Your response will remain completely **anonymous, confidential,** and will be used only in an **aggregated format** for the **academic purpose** of the current study.

Your participation is **voluntary:** you can exit participation with no penalty at any time.

To answer the survey questions, please select **a new menu-item that was most recently developed and introduced into the marketplace by your restaurant within the past 5 years** for which your restaurant has available information regarding new menu-item innovation's activities and performance.

Note: By clicking the **CLICK here**, you consent that you are willing to answer the questions in this survey according to the above terms.

To begin answering the survey, please CLICK here.

If you are not involved in new menu-item innovation's activities, please pass this survey along to the most knowledgeable person.

For Further Enquiries and/or receiving a Free Executive Summary of the Survey Findings, please email Mohamed Ali at mohamed.ali@plymouth.ac.uk.

Thank you very much in advance for your time and your kind cooperation.

Fig. 4.2. The survey participation's invitation email

In an endeavour to ensure that the collected data were accurate and that the survey participants would fit-well-with the target respondents selection criteria (section 4.7), the survey's first three windows were for three screening/qualification questions (Sue & Ritter, 2012). In this respect, once a potential respondent click the survey hyperlink (embedded in the invitation email), this will lead him/her to the survey's first window including the first screening/qualification question (Fig. 4.3); "*Is your business a U.S. restaurant?*" along with two possible answers to choose from, either "*Yes*" or "*No*", whereby choosing "*No*", followed by clicking "*Next*", leads to a "*Disqualifying*" page, while choosing "*Yes*", followed by clicking "*Next*", leads to the survey's second window.

Fig. 4.3. The survey's first window: The first screening/qualification question

The survey's second window included the second screening/qualification question (Fig. 4.4); "*Within the past 5 years, has your restaurant developed and introduced a new menu-item into the marketplace?*", again, alongside two possible answers to choose from, either "*Yes*" or "*No*", whereby choosing "*No*", followed by clicking "*Next*", leads to a "*Disqualifying*" page, while choosing "*Yes*", followed by clicking "*Next*", leads to the survey's third window.

Fig. 4.4. The survey's second window: The second screening/qualification question

The survey's third window comprised the third and final screening/qualification question (Fig. 4.5); "*Your restaurant has developed and introduced this new menu-item into the marketplace:*" next to three possible answers to choose from, either "*Below 1 year ago*", "*1 year to 5 years ago*", or "*Over 5 years ago*", whereby choosing "*Below 1 year ago*" or "*Over 5 years ago*", followed by clicking "*Next*", leads to a "*Disqualifying*" page, while choosing "*1 year to 5 years ago*", followed by clicking "*Next*", leads to the survey's fourth window.

Fig. 4.5. The survey's third window: The third screening/qualification question

The survey's fourth window contained the survey's introduction and part one (Fig. 4.6). Again, to ensure that the collected data were accurate and that the survey participants would fit-well-with the target respondents selection criteria (section 4.7), the survey's introduction was to remind the participants with the survey participation's conditions.

Following the survey's introduction, and within the same window (fourth window), the survey's part one (Question 1) was to assess *PEProf*, in terms of how well or adequately an overall product innovation process (MAProf: marketing activities, and TAProf: technical activities) for a restaurant was carried out to develop and introduce a new menu-item into the marketplace.

To do so, restaurants owners/senior executives were asked to express their perceptions of each of the *PEProf's eight items* using a *five-point Likert scale*, where (1 = very poorly done, 2 = poorly done, 3 = fairly done, 4 = well done, 5 = very well done). Clicking "*Next*" leads to the survey's fifth window.

New Menu-Item Innovation in U.S. Restaurants Survey

To answer the survey questions, please select a new menu-item that was most recently developed and introduced into the marketplace by your restaurant within the past 5 years for which your restaurant has available information regarding new menu-item innovation's activities and performance.

Please answer all questions.

Thank you very much in advance for your time and your kind cooperation

PART 1 of 4:

Q1) The following activities are frequently part of a new menu-item innovation's process. On a scale running from 1 (very poorly done) to 5 (very well done), please indicate how well or adequately your restaurant has carried out each of these activities in developing and introducing the new menu-item that you selected—relative to how you think it should have been done:

	Very Poorly Done	Poorly Done	Fairly Done	Well Done	Very Well Done
Searching for and generating new menu-item ideas	○	○	○	○	○
Conducting a detailed study of market potential, customer preferences, purchase process, etc.	○	○	○	○	○
Testing this new menu-item under real-life conditions, e.g., with customers and/or in restaurants	○	○	○	○	○
Introducing this new menu-item into the marketplace; advertising, promotion, selling, etc.	○	○	○	○	○
Developing and producing the new menu-item's exemplar/prototype	○	○	○	○	○
Testing and revising the new menu-item's exemplar/prototype according to the desired and feasible features	○	○	○	○	○
Executing new menu-item's cooking/production start-up	○	○	○	○	○
The overall marketing and technical activities carried out for developing and introducing this new menu-item	○	○	○	○	○

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Fig. 4.6. The survey's fourth window: The survey's introduction and part one

The survey's part two (Fig. 4.7), enclosed in the survey's fifth window, was to assess *PFit*, *CrosFI*, and *TMS*. *Firstly*, *PFit* (Question 2) was assessed with regard to the extent to which the suggested new menu-item innovation requirements fit-well-with the available restaurant's technical skills and resources (TFit), and marketing skills and resources (MFit).

Secondly, *CrosFI* (Question 3) was assessed in relation to the magnitude of joint goals achievement, open and frequent communications, as well as sharing ideas, information, and resources among the internal restaurant's functions/departments (e.g., R&D, production, and marketing) to develop and introduce a new menu-item into the marketplace.

Thirdly, *TMS* (Question 4) was assessed with reference to the extent of support provided by a restaurant's top-management – to develop and introduce a new menu-item into the marketplace – through top-management's resources dedication, commitment, and involvement.

These assessments were done by asking restaurants owners/senior executives to state their perceptions of each of the *PFit's six items*, *CrosFI's four items*, and *TMSs four items*, via a *five-point Likert scale*, where (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Clicking "*Next*" leads to the survey's sixth window.

New Menu-Item Innovation in U.S. Restaurants Survey

PART 2 of 4:

On a scale running from 1 (strongly disagree) to 5 (strongly agree), please indicate your extent of disagreement/agreement with the following:

Q2) Before starting new menu-item innovation's activities, this new menu-item was selected to ensure it will fit well with your restaurant's:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
New menu-item development's skills/resources	○	○	○	○	○
Cooking/production skills/resources	○	○	○	○	○
Marketing research skills/resources	○	○	○	○	○
Sales force skills/resources	○	○	○	○	○
Advertising and promotion skills/resources	○	○	○	○	○
Overall technical and marketing skills/resources	○	○	○	○	○

Q3) To develop and introduce the selected new menu-item into the marketplace, all your restaurant's departments/functions (e.g., Marketing, Culinary innovation, Cooking/Production, etc.):

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Tried to achieve goals jointly	○	○	○	○	○
Communicated openly and frequently	○	○	○	○	○
Shared ideas, information and resources	○	○	○	○	○
Worked together as a team	○	○	○	○	○

Q4) Your restaurant's top management:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Was involved throughout all the activities for developing and introducing this new menu-item	○	○	○	○	○
Was committed to develop and introduce this new menu-item	○	○	○	○	○
Has provided the necessary resources to develop and introduce this new menu-item	○	○	○	○	○
Has provided full support to develop and introduce this new menu-item	○	○	○	○	○

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Fig. 4.7. The survey's fifth window: The survey's part two

The survey's part three (Fig. 4.8), included in the survey's sixth window, was to assess the three sequential dimensions (i.e., *OperLP*, *ProdLP*, and *FirmLP*) of product innovation performance (Question 5).

Firstly, *OperLP* was assessed with regard to the level of a restaurant's: (1) new menu-item quality superiority (NPQS); (2) new menu-item development and launching time superiority (NPDTS); and (3) new menu-item development and launching cost superiority (NPDCS).

Secondly, *ProdLP* was assessed in relation to the extent of a restaurant's achievement of the desired outcomes – for developing and introducing a new menu-item into the marketplace – in terms of new menu-item customer satisfaction, sales, and profits.

Thirdly, *FirmLP* was assessed with reference to the magnitude of a restaurant's achievement of the desired outcomes – for developing and introducing a new menu-item into the marketplace – in terms of new menu-item contributions to enhance the restaurant's overall sales, profits, and market share.

Again, these assessments were accomplished by asking restaurants owners/senior executives to indicate their perceptions of each of the *OperLP's seventh items*, *ProdLP's four items*, and *FirmLP's four items*, utilising a *five-point Likert scale*, where (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Clicking "*Next*" leads to the survey's seventh and final window.

New Menu-Item Innovation in U.S. Restaurants Survey

PART 3 of 4:

Q5) On a scale running from 1 (strongly disagree) to 5 (strongly agree), please indicate your extent of disagreement/agreement with how well each of the following statements is an accurate description of the new menu-item that you selected:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Was superior to competitors' products by offering some unique features or attributes to customers					
Had a higher quality than competing products					
Was developed and introduced into the marketplace on or ahead of the original schedule					
Was developed and introduced into the marketplace faster than the similar competitors' products					
Had a development and introduction cost that was equal to or below the estimated budget					
Had a development and introduction cost that was below the cost of similar new menu-items your restaurant has developed and introduced before					
Had an overall superior performance in terms of quality, development and introduction speed and cost					
Has met or exceeded customers' expectations					
Has met or exceeded its sales objective					
Has met or exceeded its profit objective					
Could be considered a successful product					
Has contributed to enhance restaurant's overall sales					
Has contributed to enhance restaurant's overall profit					
Has contributed to enhance restaurant's market share					
Has contributed to enhance restaurant's overall success					

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Fig. 4.8. The survey's sixth window: The survey's part three

The survey's part four (Fig. 4.9a and Fig. 4.9b), contained in the survey's seventh and final window, was to identify the sample characteristics (Sue & Ritter, 2012) along three categories: restaurants; new menu-items; and respondents, as detailed below.

The first category was regarding *Restaurants*:

- Affiliations (Question 6),
- Geographical widespread (Question 7),
- Concepts (Question 8),
- Sizes/employees numbers (Question 9: control variable),
- Ages/operations years (Question 10: control variable), and
- Averages numbers of new menu-items developed and introduced into the marketplace per year (Question 11).

The second category was in relation to *New Menu-Items*:

- Innovativeness to the restaurant/firm (Question 12: control variable), and
- Development and introduction recency (Question 13).

The third category was concerning *Respondents*:

- Positions (Question 14), and
- Experiences with new menu-items development and introduction activities (Question 15).

Finally, clicking "*Done*" leads the respondent to the "*End of Survey*" page; thanking the respondent for his/her participation; informing him/her that this is the survey's end; and that his/her response has been recorded.

New Menu-Item Innovation in U.S. Restaurants Survey

PART 4 of 4:

Q6) How can you describe your restaurant's affiliation?

- ◯ Independent
- ◯ Chain

Q7) How can you describe your restaurant's geographical widespread?

◯ Local ◯ National ◯ International

Q8) How can you describe your restaurant's concept?

◯ Fine dining ◯ Quick service/Fast food ◯ Casual ◯ Fast casual

◯ Other (please specify)

Q9) How many employees work in your restaurant?

◯ Below 10 employees ◯ 10-49 employees ◯ 50-99 employees ◯ 100-249 employees

◯ 250-500 employees ◯ Over 500 employees

Q10) When was your restaurant founded?

◯ Below 5 years ago ◯ 5-10 years ago ◯ 11-15 years ago ◯ 16-20 years ago

◯ 21-25 years ago ◯ Over 25 years ago

Q11) On average, how many new menu-items developed and introduced into the marketplace by your restaurant per year?

◯ 1 new menu-item ◯ 2 new menu-items ◯ 3 new menu-items ◯ 4 new menu-items

◯ 5 new menu-items ◯ Over 5 new menu-items

Fig. 4.9a. The survey's seventh window (A): The survey's part four

Q12) How can you describe the innovativeness level of the selected new menu-item to your restaurant?

- ◯ Low innovative menu-item
- ◯ Moderately innovative menu-item
- ◯ Highly innovative menu-item

Q13) When was the selected new menu-item developed and introduced into the marketplace by your restaurant?

- ◯ 1 year ago
- ◯ 2 years ago
- ◯ 3 years ago
- ◯ 4 years ago
- ◯ 5 years ago

Q14) How can you describe your position?

- ◯ CEO
- ◯ Owner
- ◯ Restaurant manager
- ◯ Executive/Sous chef
- ◯ Culinary innovation manager
- ◯ Other (please specify)

Q15) How long have you been involved in new menu-items' development and introduction activities?

- ◯ Below 5 years ago
- ◯ 5-10 years ago
- ◯ 11-15 years ago
- ◯ 16-20 years ago
- ◯ 21-25 years ago
- ◯ Over 25 years ago

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Fig. 4.9b. The survey's seventh window (B): The survey's part four

4.10. Access to Target Respondents and Final Questionnaire's Deployment and Data Collection

4.10.1. Access to Target Respondents

To access the potential target respondents, taking into account the current study's adopted data collection mode (i.e., Web-based via email questionnaire survey, section 4.6), and targeting criteria for its potential respondents (i.e., restaurants owners/senior executives of U.S. commercial [full-service and limited-service] restaurants that have developed and launched a new-menu item within the previous five years and has been in the market for at least 12 months, section 4.7), the following main routes were progressively attempted:

- After conducting a thorough search over the Internet about a sampling frame (email list) of the potential respondents that meet the previously mentioned targeting criteria, it was evident that there is no available one.
- Consequently, another attempt was taken, but this time, towards getting a more general sampling frame (email list) comprises U.S. restaurants, and it was evident that having such a sampling frame can be reached by either self-compiling it or buying it.
- After trying the self-compiling option, it was deemed both impractical (unachievable in light of the time constrain) and inconclusive (unrepresentative of the whole population).
- Therefore, the second option was pursued and fulfilled by buying a sampling frame (email list) comprises U.S. restaurants (after a consultation with one of the academic staff outside the supervisory team) from *CustomLists.net*, as the latter claimed to be a major list broker with one of the largest worldwide marketing databases online that provides targeted marketing lists, mailing & email lists, email database, marketing database, and direct mail lists for small businesses, charities, research organisations and more, in Australia, United Kingdom, United States, Canada, and New Zealand. Unfortunately, after several altered

tries in purifying this email list (from double records and invalid emails) and sending emails, it was deemed unworkable, which in turn raised the need for finding a totally different alternative, especially after spending about one month since the first attempt till this point without any realised responses.

- After further investigation, the social media/networking platforms were utilised (Bartholomew & Smith, 2006; Ho, 2014; Skeels & Grudin, 2009; Tuškej *et al.*, 2013) within the *questionnaire's piloting stage* (section 4.9.3.2), whereby an invitation message comprised the participation's purpose, conditions, benefits, and the hyperlink for the revised online questionnaire was posted (after subscription and portal admin's review and approval) on the page wall (timeline) of the *relevant groups* (i.e., groups that their members characteristics/interests are close to the targeting criteria for the current study's potential respondents, section 4.7) on the most popular social media/networking platforms among American adults who use the internet, namely Facebook (71%) and LinkedIn (28%) (Duggan *et al.*, 2015; Mangold & Faulds, 2009). Those respondents who self-selected by clicking on the hyperlink embedded in the invitation message were automatically taken to the online questionnaire. By utilising this method that was characterised by a limited cooperation from groups portal admins, and after weekly reposting of the above invitation message over two months till responses barely increased, only 87 questionnaires were received, with further reduction to 50 valid questionnaires (after eliminating incomplete responses and irrelevant respondents) that, although, was sufficient for achieving the *piloting stage's* aims (i.e., verifying the well-functioning of the whole questionnaire including its invitation email; and validating the questionnaire's questions [measures] in terms of its constructs validity), this method, in light of its aforesaid constraints and limited outcomes, was considered insufficient for the large-scale implementation of the final questionnaire's deployment and data collection, which in turn raised the need for finding a more effective and efficient alternative, as explained in the following section.

4.10.2. Final Questionnaire's Deployment and Data Collection

After further investigation, the final questionnaire's deployment to and data collection from the potential target respondents were attempted and accomplished via a commercial online survey service, namely "SurveyMonkey Audience" (SurveyMonkey, 2012, 2013a, 2014a, b, d), as detailed and justified below alongside this method adoption's motivation, sample size and implementation, and outcome.

A) Motivation:

SurveyMonkey Audience's service (SurveyMonkey, 2012, 2013a, 2014a, b, d) was attempted for the following main reasons:

- To overcome the constraints and limited outcomes of the previously attempted routes for accessing the potential target respondents (section 4.10.1), and the unattainability of a sampling frame (email list) of the potential respondents that perfectly fit with the current study's targeting criteria (section 4.7).
- SurveyMonkey, in a similar condition, has been effectively used in relevant top academic journals, such as: *Journal of Product Innovation Management* (e.g., Lamore *et al.*, 2013), *Journal of Operations Management* (e.g., Bregman *et al.*, 2015; Gattiker & Carter, 2010), *Annals of Tourism Research* (e.g., Jo *et al.*, 2014; Woo *et al.*, 2015), *Tourism Management* (e.g., Boo *et al.*, 2009; Chen & Chen, 2015; Xiao & Smith, 2010), *Journal of Travel Research* (e.g., Kneesel *et al.*, 2010), and *International Journal of Hospitality Management* (e.g., Chi *et al.*, 2013; Lee & Hwang, 2011).
- SurveyMonkey is one of the most affordable, effective, user-friendly, and popular online-survey tool/software for academics and managers that its utilisation can allow for a proficient creation and deployment of the online questionnaire survey, and a facilitated/automated data's collection, entry, coding, SPSS file generation/download, and descriptive statistics (Creswell, 2014; de Vaus, 2014; Rudestam & Newton, 2015; Sue & Ritter, 2012; Saunders *et al.*, 2012; Zikmund *et al.*, 2013).

- Compared to other similar service providers, SurveyMonkey was proven (after discussions with the company and its previous customers—fellow PhD students) to be able to collect (within a week and with less cost) completed responses that are closer to the current study's targeting criteria (section 4.7) and sufficient for conducting its statistical analysis (SurveyMonkey, 2012, 2013a, 2014a, b, d).

Furthermore, according to SurveyMonkey (2012, 2013a, 2014a, b, d), SurveyMonkey Audience's samples: (1) can be targeted based on, for example, location (United States), industry (Restaurants), and job level (owner/executive/c-level and senior management); and (2) can accurately reflect/represent various targeted U.S. populations (including U.S. restaurants), taking into account the following:

- The Internet has become an integral part of everyday life across diverse parts of the American society. About 84% of American adults have access to and use the Internet (Perrin & Duggan, 2015). Likewise, over 80% of firms in the United States have broadband connection. The rapid growth in Internet usage by U.S. firms employees, alongside the increasing popularity of Web-based surveys can negate the issues of online population's coverage/representativeness (Saunders, 2012).
- Building upon this very high internet penetration rate in U.S.A., SurveyMonkey Audience's respondents: (1) are at least 18 years old and recruited from a diverse population of over 45 million respondents who take SurveyMonkey surveys every month; (2) have participated before in several SurveyMonkey' surveys and are interested in taking additional surveys (with no more than one survey per month) to support other customers seeking their valuable insights; and (3) complete surveys voluntarily in return for small non-cash awards (charitable donations and sweepstake entries), and assured full anonymity and data's security and confidentiality, which in turn can allow for high quality, representative, and valid responses free from social desirability bias (SurveyMonkey, 2012, 2013a, 2014a, b, d).

- SurveyMonkey has widespread geographical coverage and global partner network to find harder-to-reach respondents. Additionally, it runs regular benchmarking surveys to ensure its members are representative of U.S. population. Furthermore, the SurveyMonkey's solicitation process starts with sending an email invitation to members utilising a proprietary random selection algorithm, based on a previously collected members background and demographic information, to help ensure balanced representative samples (SurveyMonkey, 2012, 2013a, 2014a, b, d).

B) Sample Size and Implementation:

"*Adequacy of sample size has a significant impact on the reliability of parameter estimates, model fit, and statistical power*" (Shah & Goldstein, 2006, p. 154). "*Statistical power reflects the degree to which differences in sample data in a statistical test can be detected. A high power is required to reduce the probability of failing to detect an effect when it is present*" (Verma & Goodale, 1995, p. 139). In other words, the statistical power represents the probability of correctly rejecting a false null hypothesis of no/zero effect in the population. Therefore, the chances of making a correct decision in hypothesis testing increase with higher statistical power.

In an endeavour to achieve a high statistical power ($1 - \beta$ error probability) by identifying the adequate sample size for the current study, the researcher has followed Cohen's (1992) recommendations for multiple OLS regression analysis coincided by running a power analysis using the statistical power software program, namely *G*Power v. 3.1.9.2* (Faul *et al.*, 2007, 2009), as the most convenient, rigor and highly regarded way to determine in advance the required minimum sample size to support the robustness/faithfulness of study's findings and statistical inferences (Cohen *et al.*, 2003; Ellis, 2010; Hair *et al.*, 2014a; Keith, 2015; Marcoulides & Chin, 2013; Marcoulides & Saunders, 2006; Mayr *et al.*, 2007; Peng & Lai, 2012).

According to such a way, with a maximum of *eight* independent variables/arrowheads (five main constructs and three control variables) predicting (pointing at) a dependent variable in the measurement and structural models (i.e., the ProdLP's predictors in the current study's structural model), at a well-regarded statistical significance (α error probability) level of 5% and a statistical power ($1 - \beta$ error probability) level of 80% (considered by most researchers as acceptable power level), the minimum sample size required to detect (in sample data) a high valued:

- Small effect size ($f^2 = 0.02$) is 757-759;
- Medium effect size ($f^2 = 0.15$) is 107-109; and
- Large effect size ($f^2 = 0.35$) is 50-52.

Taking into account (1) the above guidelines; (2) the current study's constraints regarding time, cost, and access to target respondents; and (3) after a discussion with SurveyMonkey regarding the expected (achievable) completed questionnaires from the potential target respondents, it was deemed *optimal* to target a sample size around 400.

By utilising SurveyMonkey Audience's service, SurveyMonkey has assigned a project manager for implementation's verification, discussion, communication, and handling of the final questionnaire's deployment and data collection based on the following main project details:

- Number of questions: 3 screening/qualification questions and 47 main questions
- Expected questionnaire's completion time: 10-15 minutes
- Targeting options: location (United States), industry (Restaurants), and job level (owner/executive/c-level and senior management)
- Required completed responses: 400
- Expected time for project completion: one week

Taking into account the aforesaid project details, and after the researcher has designed and validated the final version of the online questionnaire survey (sections 4.9.1 to 4.9.4), a project manager (assigned by SurveyMonkey) has verified the questionnaire and handled its deployment (sending invitation emails including the survey hyperlink) to 2000 potential target respondents for completion. There were continuous communication, monitoring, and update regarding project progress between the project manager and the researcher. This online survey was administered in July 2013.

C) Outcome:

As a more effective and efficient alternative to the previously attempted methods for accessing the potential target respondents (section 4.10.1), utilising "SurveyMonkey Audience" (SurveyMonkey, 2012, 2013a, 2014a, b, d) yielded (within only one week) 424 (21.2% response rate) total, with 386 (19.3% response rate) usable/valid responses (out of the 2000 invitation emails sent to the potential target respondents) that were meeting the targeting criteria (section 4.7) and well sufficient for conducting the PLS-SEM analysis of the current study.

Given that, this survey process took only one week and without follow-up solicitations, and that low response rates are typical for online surveys especially those mailed to top executives and small firms (e.g., Anseel *et al.*, 2010; Bartholomew & Smith, 2006; Baruch & Holtom, 2008; Cycyota & Harrison, 2006; Kaplowitz *et al.*, 2004; Klassen & Jacobs, 2001), as it is the case with this study, this response rate seems very favourable compared to similar relevant studies (e.g., Calantone & di Benedetto, 2012; Davis *et al.*, 2002; García *et al.*, 2008; Molina-Castillo *et al.*, 2011, 2013; Rodríguez-Pinto *et al.*, 2011; Stanko *et al.*, 2012; Thomas & Wood, 2014). Furthermore, these collected responses were automatically recorded, coded, and downloaded as an SPSS data file ready for statistical analysis. However, before statistically analysing these collected responses, they were investigated for potential data quality issues as detailed later in section 5.2.

4.11. Data Analysis Procedures

Initially, this study has utilised three statistical analysis softwares: (1) the Statistical Package for the Social Sciences (IBM SPSS v. 21) for conducting the descriptive statistics and non-response bias test; (2) PLS-SEM (WarpPLS v. 4; Kock, 2013) for the validation, estimation, and results evaluation of this study's measurement and structural models; and (3) G*Power v. 3.1.9.2 (Faul *et al.*, 2007, 2009) for examining the achieved level of statistical power/robustness of this study's model. A detailed explanation and justification of the utilised data analysis technique (multivariate: Structural Equation Modelling, SEM); SEM type (PLS-SEM); and PLS-SEM software program (WarpPLS v. 4) is provided next in sections 4.11.1, 4.11.2, and 4.11.3, respectively.

4.11.1. Data Analysis Technique (Multivariate: SEM)

Compared to the first-generation statistical analysis techniques (e.g., correlations, regressions, or difference of means tests) that have limited capabilities regarding complex causal modelling, the *second-generation* ones (e.g., Covariance-Based SEM, CB-SEM; and *Partial Least Squares SEM*, *PLS-SEM*) allow for better, comprehensive, and closer to reality investigation and comprehension of the simultaneous and complex relationships commonly associated with various empirical business and management research. *SEM* is a prominent and advanced *multivariate* data analysis technique for theory testing and development, and causal modelling as it allows for a simultaneous examination of the measurement (outer) and structural (inner) models. In this sense, its outstanding capabilities lies in analysing simultaneous and complex (hypothesised direct and indirect) interdependencies across multiple (independent, mediating, and dependent) latent constructs (i.e., unobserved concepts/phenomena) alongside their observed measures/variables, within a single comprehensive approach (Götz *et al.*, 2010; Hair *et al.*, 2014a, b; Reisinger & Mavondo, 2007; Sarstedt *et al.*, 2014). Accordingly, SEM was adopted in the current study's statistical analysis.

4.11.2. SEM Type (PLS-SEM)

Specifically, drawing from the most relevant and highly influential literature (e.g., Albers, 2010; Cenfetelli & Bassellier, 2009; Chin, 2010; Götz *et al.*, 2010; Hair *et al.*, 2014a, b; Henseler *et al.*, 2009; Hulland, 1999; Lee *et al.*, 2011; Peng & Lai, 2012; Petter *et al.*, 2007; Ringle *et al.*, 2012; Sarstedt *et al.*, 2014; Sosik *et al.*, 2009), the researcher has utilised *PLS-SEM* instead of CB-SEM, as it has several characteristics that make it superior over the latter and fit-well-with the current study's data, aim, and objectives, for example, PLS-SEM is more:

- Appropriate for success factors studies.
- Dominant in explaining and predicting dependant (endogenous/criterion/target) variables/constructs.
- Advantageous for theories development/building and integration in new contexts (exploratory research), yet still suitable for theories testing (explanatory research).
- Powerful and easier in analysing models that contain formatively measured constructs and different scale types (e.g., dichotomous, ordinal, etc.).
- Robust and able to handle/tolerate problematic modelling issues that typically characterise business and management research, such as: (1) non-normal data; (2) small sample sizes; and (3) analysing simultaneous and highly complex (hypothesised direct and indirect) interdependencies across multiple (independent, mediating, and dependent) latent constructs and observed measures/variables, within a single model.

4.11.3. PLS-SEM Software Program (WarpPLS v. 4)

Having decided on PLS-SEM as the followed SEM type, a question arise regarding the suitable PLS-SEM software program. In this respect, PLS-SEM software programs include *PLS-Graph*, *SmartPLS*, and *WarpPLS*, among others. However, *WarpPLS v. 4* (Kock, 2013) was utilised in this study, as it provides its users with a wide range of features, several of which (at the time of conducting this study's data analysis) were not available from the other alternatives, such as:

- It was the first and only one to explicitly identify whether the relationships among latent variables in SEM models are non-linear (warped) or linear and calculate multivariate coefficients of association accordingly. In this respect, based on conducting a comparison between linear (i.e., SmartPLS) and non-linear (i.e., WarpPLS) PLS-SEM software programs, Brewster (2011) concluded that non-linearity (detected by WarpPLS) may better (more accurately) describe the reality of the research question under study because few management phenomena behave linearly (i.e., exist in a straight-line cause and effect relationship). Therefore, at best, the findings are not as strong as they could be if a non-linear technique was available and applied appropriately. Results obtained from a non-linear program (i.e., WarpPLS) may be more complete or provide useful insights into the management phenomena under study.
- It can independently provide an extensive set of generated statistical outputs (textually and graphically downloadable) that were relevant to this study and make its statistical analysis easier, straightforward, as well as more comprehensive and effective, such as: (1) p value, standard errors, β, f^2, and VIFs for the formative measurement model; (2) R^2, adjusted R^2, full collinearity VIFs for constructs; and (3) p value, standard errors, β, and f^2 for total, direct, specific indirect, sequential indirect, and total indirect effects).

- All of its provided features have been extensively tested with both real (empirical) and simulated (generated by Monte Carlo procedures) data.
- More powerful in handling outliers presence issues (i.e., biased parameters estimates and results regarding, for example, the mean, standard deviation, *p* value, β, etc.) by two ways. *Firstly,* through providing researchers with *jackknifing* as a resampling method that tends to outperform its alternative (i.e., bootstrapping) in generating more stable/unbiased significance testing of both direct and indirect (mediated) parameter estimates with data containing outliers (Bollen & Stine, 1990; Chiquoine & Hjalmarsson, 2009; Kock, 2011, 2013). *Secondly*, by providing researchers with an option, namely "only ranked data used in analysis", that its selection can significantly reduce the standardized and/or unstandardized value distances that typify outliers in data on ratio scales, which in turn effectively eliminates outliers from the data set, without any needed decrease in the sample size (Kock, 2013).

4.12. Summary

In this chapter, the utilised research: philosophical worldview (post-positivism); approach (deductive); design (quantitative); strategy (survey); and method (self-completed, web-based via email, questionnaire survey) were presented and rationalised. Additionally, the adopted research: population (U.S. commercial restaurants); unit/level of analysis (restaurants new menu-items); level of respondents seniority (restaurants owners/senior executives); and ethical considerations were explained and justified. Furthermore, the questionnaire's design, measures, validation (pre-testing and piloting), and the final questionnaire's content were described and substantiated. Moreover, this chapter has explained the access to target respondents and final questionnaire's deployment and data collection. Finally, it has concluded by detailing the utilised data analysis technique (multivariate: SEM), SEM type (PLS-SEM), and PLS-SEM software program (WarpPLS v. 4).

Following the completion of data collection (section 4.10.2), the next chapter starts with assessing the quality of these collected data (section 5.2). Next, it describes the sample characteristics (section 5.3). Followed by presenting this study's constructs and items scores (mean and standard deviation), and the significance, sign, and magnitude of its constructs intercorrelations (section 5.4). Additionally, it provides the selected PLS-SEM algorithmic options and parameters estimates settings (section 5.5.1).

Furthermore, it details the validation of this study's formative measurement model (section 5.5.2) and structural model (section 5.5.3). Moreover, it explains the hypotheses testing based on conducting comprehensive mediation analyses explicating the total, direct, total indirect, specific indirect, and sequential indirect effects among the investigated constructs of this study (section 5.5.4). This chapter ends with further analysis, by conducting an Importance-Performance Matrix Analysis (IPMA) for the formative constructs by their items; target constructs by their predictor constructs; and target constructs by their predictor constructs items (section 5.5.5).

Chapter 5: Data Analysis and Research Results

5.1. Introduction

Following the completion of data collection (section 4.10.2), this chapter starts with assessing the quality of these collected data (missing data and irrelevant respondents, outliers, data distribution, non-response bias, common method bias, and confounders; section 5.2). Next, it describes the sample characteristics (restaurants, new menu-items, and respondents; section 5.3). Followed by presenting this study's constructs and items scores (mean and standard deviation), and the significance, sign, and magnitude of its constructs intercorrelations (section 5.4). Additionally, it provides the selected PLS-SEM algorithmic options and parameters estimates settings (section 5.5.1). Furthermore, it details the validation of this study's formative measurement model (section 5.5.2) and structural model (section 5.5.3). Moreover, it explains the hypotheses testing based on conducting comprehensive mediation analyses explicating the total, direct, total indirect, specific indirect, and sequential indirect effects among the investigated constructs of this study (section 5.5.4). This chapter ends with further analysis, by conducting an Importance-Performance Matrix Analysis (IPMA) for the formative constructs by their items; target constructs by their predictor constructs; and target constructs by their predictor constructs items (section 5.5.5).

This study has utilised three statistical analysis softwares: (1) the Statistical Package for the Social Sciences (IBM SPSS v. 21) for conducting the descriptive statistics and non-response bias test; (2) PLS-SEM (WarpPLS v. 4; Kock, 2013) for the validation, estimation, and results evaluation of this study's measurement and structural models; and (3) G*Power v. 3.1.9.2 (Faul *et al.*, 2007, 2009) for examining the achieved level of statistical power/robustness of this study's model.

5.2. Data Quality Assessment

If the data are inappropriate, all the resulting analysis become meaningless. Devoting significant effort, time, and caution are so crucial when collecting and analysing the data needed for conducting multivariate analysis techniques. Therefore, after using a questionnaire survey to collect empirical data, a researcher must address and examine a number of data quality and collection issues, such as missing data, irrelevant respondents, outliers, data distribution, non-response bias, common method bias, and confounders (Armstrong & Overton, 1977; Hair *et al.*, 2014a; Kock, 2013; Liang *et al.*, 2007; Podsakoff *et al.*, 2003; Williams *et al.*, 2003). In this sense, following the completion of data collection (section 4.10.2), this section aims to assess the quality of these collected data in terms of: missing data and irrelevant respondents, outliers, data distribution, non-response bias, common method bias, and confounders, as detailed next in sections 5.2.1 to 5.2.6, respectively.

5.2.1. Missing Data and Irrelevant Respondents

Missing data is "an information not available for a subject (or case) for which other information is available" (Hair *et al.*, 1998, p.38). Missing data is one of the most common challenges that face social science researchers who obtain their data by utilising a questionnaire survey. It occurs because of a purposeful or accidental fail of respondents to answer one or more question(s). As a rule of thumb, it is recommended to use mean value replacement when 5% of values per item are missing. Additionally, if the missing values percentage has exceeded 15% in a specific case/observation (questionnaire), it should be omitted from the data set (Hair *et al.*, 2014a). Therefore, the researcher has excluded 17 cases/observations (questionnaires) that have exceeded the 15% missing values percentage.

Additionally, the chosen level of respondents seniority for this study was the restaurants owners/senior executives, as they were considered involved/knowledgeable key informants—have access to and can provide the detailed, accurate, and complete information (regarding the product innovation practices, activities, and performance of their restaurants) required in the current study's questionnaire survey. Accordingly, the researcher has excluded further 21 irrelevant cases that their respondents were, for example, from: front-line employees, work positions typically away from product innovation activities, or businesses that were not considered as commercial restaurants. Consequently, out of the 2000 invitation emails sent to the potential target respondents, the received responses (response rates %) were reduced from 424 (21.2%) to 386 (19.3%) usable/valid questionnaires that were meeting the targeting criteria (section 4.7) and well sufficient for conducting the PLS-SEM analysis of this study.

5.2.2. Outliers

An outlier is an extreme response (either positively or negatively) to a particular question (Hair *et al.*, 2014a) that can bias the parameters estimates and results regarding, for example, the mean, standard deviation, p value, β, etc.). To address such potential issues of outliers existence, the current study has utilised WarpPLS v. 4 (Kock, 2013) to address this issue in two ways. *Firstly*, through adopting jackknifing as a resampling method. Jackknifing tends to outperform bootstrapping in generating more stable/unbiased significance testing of both direct and indirect (mediated) parameter estimates with data containing outliers (Bollen & Stine, 1990; Chiquoine & Hjalmarsson, 2009; Kock, 2011, 2013). *Secondly*, by selecting the option of ranked data when conducting the analysis. Data ranking can significantly reduce the standardized and/or unstandardized value distances that typify outliers in data on ratio scales, which in turn effectively eliminates outliers from the data set, without any needed decrease in the sample size (Kock, 2013).

5.2.3. Data Distribution

Unlike Covariance-Based SEM (CB-SEM), *PLS-SEM* is considered a non-parametric statistical method that does not necessitate normally distributed data. However, as the extremely non-normal distributed data can cause severe accuracy problems in the assessment of the parameters significances, it is essential to substantiate that the data are not too far from normal. To this end, researchers should assess skewness and kurtosis. On one hand, *skewness* examines whether a variable's distribution along both the right and left tails is symmetrical. On the other hand, *kurtosis* examines the extent to which the distribution is too peaked (a very narrow distribution with most of the responses in the centre). When both skewness and kurtosis are close to zero (a situation that researchers are very unlikely to ever encounter), the pattern of responses is considered a normal distribution. As a rule of thumb, distributions showing skewness and/or kurtosis that exceed "greater than + 1 or lower than – 1" thresholds are regarded as non-normal (Hair *et al.*, 2014a).

In this sense, the current study has examined the research variables skewness and kurtosis, as displayed next in Table 5.1 in which the values of both skewness and kurtosis values for all the variables were between – 1 and + 1, hence, provided support for the data normality.

Table 5.1. Variables Skewness and Kurtosis

Formative Constructs	Formative Items	Skewness	Kurtosis
PFit	TFit1	-.394	-.224
	TFit2	-.327	-.485
	MFit1	-.462	.086
	MFit2	-.362	-.206
	MFit3	-.450	.040
CrosFI	CrosFI1	-.817	.450
	CrosFI2	-.663	.075
	CrosFI3	-.630	.406
TMS	TMS1	-.686	.419
	TMS2	-.584	.145
	TMS3	-.598	.106
PEProf	MAProf1	-.345	.095
	MAProf2	-.384	.021
	MAProf3	-.489	-.071
	MAProf4	-.425	-.168
	TAProf1	-.358	-.064
	TAProf2	-.475	.278
	TAProf3	-.605	.564
OperLP	NPQS1	-.570	.320
	NPQS2	-.650	.232
	NPDTS1	-.610	.282
	NPDTS2	-.385	-.151
	NPDCS1	-.623	.354
	NPDCS2	-.432	.004
ProdLP	ProdLP1	-.699	.223
	ProdLP2	-.708	.464
	ProdLP3	-.845	.930
FirmLP	FirmLP1	-.756	.361
	FirmLP2	-.705	.200
	FirmLP3	-.584	-.019

5.2.4. Non-Response Bias

The issue of non-response bias is commonly associated with conducting questionnaire survey research. By assuming that the characteristics of the late respondents are like the non-respondents, *non-response bias* occurs if the early respondents answers to the questionnaire survey differ significantly from the late respondents answers and consequently the results obtained from the sample cannot be generalised to the whole population. To check for the non-response bias existence, both Levene's test (for equality of variances) and *t*-test (for equality of means), can be utilised to compare between the early and late respondents answers to the primary research variables. The minimum number to be considered in this comparison is 30 cases for each group of early and late respondents (Armstrong & Overton, 1977; Groves, 2006; Lambert & Harrington, 1990; Lindner *et al.*, 2001).

Accordingly, for the current study, the researcher has compared the first 50 cases as representative of the early respondents group, and the last 50 cases as representative of the late respondents group. By utilising both Levene's test and *t*-test, this comparison has covered all the research model's variables. As displayed next in Table 5.2, the results for the non-response bias assessment have revealed no statistical significant differences between the early and late respondents answers in terms of variance and means, hence, the current study was deemed free from the non-response bias issue, and there is no evidence suggesting that the respondents were not a representative sample of the whole population.

Table 5.2. Assessment of non-response bias

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TFit1	Equal variances assumed	2.391	.125	-.942	98	.348	-.180	.191	-.559	.199
	Equal variances not assumed			-.942	93.157	.348	-.180	.191	-.559	.199
TFit2	Equal variances assumed	5.420	.022	-.713	98	.477	-.140	.196	-.530	.250
	Equal variances not assumed			-.713	91.299	.478	-.140	.196	-.530	.250
MFit1	Equal variances assumed	3.047	.084	-.510	98	.611	-.100	.196	-.489	.289
	Equal variances not assumed			-.510	93.239	.611	-.100	.196	-.489	.289
MFit2	Equal variances assumed	3.501	.064	-.404	98	.687	-.080	.198	-.473	.313
	Equal variances not assumed			-.404	92.543	.687	-.080	.198	-.474	.314
MFit3	Equal variances assumed	1.646	.202	-.309	98	.758	-.060	.194	-.445	.325
	Equal variances not assumed			-.309	95.314	.758	-.060	.194	-.445	.325
CrosFI1	Equal variances assumed	.009	.924	-.102	98	.919	-.020	.196	-.408	.368
	Equal variances not assumed			-.102	97.383	.919	-.020	.196	-.408	.368
CrosFI2	Equal variances assumed	.415	.521	-.600	98	.550	-.120	.200	-.517	.277
	Equal variances not assumed			-.600	97.901	.550	-.120	.200	-.517	.277
CrosFI3	Equal variances assumed	.193	.662	-.648	98	.519	-.120	.185	-.488	.248
	Equal variances not assumed			-.648	98.000	.519	-.120	.185	-.488	.248
TMS1	Equal variances assumed	.785	.378	-.681	98	.497	-.120	.176	-.470	.230
	Equal variances not assumed			-.681	97.741	.497	-.120	.176	-.470	.230
TMS2	Equal variances assumed	.367	.546	-.852	98	.396	-.160	.188	-.533	.213
	Equal variances not assumed			-.852	97.981	.396	-.160	.188	-.533	.213
TMS3	Equal variances assumed	.784	.378	-.205	98	.838	-.040	.195	-.427	.347
	Equal variances not assumed			-.205	97.515	.838	-.040	.195	-.427	.347
MAProf1	Equal variances assumed	1.111	.294	.346	98	.730	.060	.173	-.284	.404
	Equal variances not assumed			.346	95.713	.730	.060	.173	-.284	.404
MAProf2	Equal variances assumed	1.327	.252	-.353	98	.725	-.060	.170	-.397	.277
	Equal variances not assumed			-.353	94.040	.725	-.060	.170	-.397	.277
MAProf3	Equal variances assumed	.003	.955	-1.036	98	.303	-.180	.174	-.525	.165
	Equal variances not assumed			-1.036	95.606	.303	-.180	.174	-.525	.165
MAProf4	Equal variances assumed	.200	.656	-.616	98	.539	-.100	.162	-.422	.222
	Equal variances not assumed			-.616	96.327	.539	-.100	.162	-.422	.222
TAProf1	Equal variances assumed	.324	.571	-.346	98	.730	-.060	.173	-.404	.284
	Equal variances not assumed			-.346	94.398	.730	-.060	.173	-.404	.284
TAProf2	Equal variances assumed	1.225	.271	.119	98	.906	.020	.168	-.314	.354
	Equal variances not assumed			.119	93.833	.906	.020	.168	-.314	.354
TAProf3	Equal variances assumed	.067	.797	-.995	98	.322	-.160	.161	-.479	.159
	Equal variances not assumed			-.995	95.508	.322	-.160	.161	-.479	.159

Table 5.2. Assessment of non-response bias *(Continued)*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
NPQS1	Equal variances assumed	1.295	.258	1.249	98	.215	.200	.160	-.118	.518
	Equal variances not assumed			1.249	97.964	.215	.200	.160	-.118	.518
NPQS2	Equal variances assumed	.769	.383	.770	98	.443	.120	.156	-.189	.429
	Equal variances not assumed			.770	95.049	.443	.120	.156	-.189	.429
NPDTS1	Equal variances assumed	1.579	.212	.599	98	.550	.100	.167	-.231	.431
	Equal variances not assumed			.599	93.880	.551	.100	.167	-.231	.431
NPDTS2	Equal variances assumed	2.741	.101	1.084	98	.281	.160	.148	-.133	.453
	Equal variances not assumed			1.084	95.973	.281	.160	.148	-.133	.453
NPDCS1	Equal variances assumed	.669	.415	1.209	98	.229	.200	.165	-.128	.528
	Equal variances not assumed			1.209	95.864	.229	.200	.165	-.128	.528
NPDCS2	Equal variances assumed	2.462	.120	1.645	98	.103	.260	.158	-.054	.574
	Equal variances not assumed			1.645	94.245	.103	.260	.158	-.054	.574
ProdLP1	Equal variances assumed	.110	.741	.271	98	.787	.040	.147	-.252	.332
	Equal variances not assumed			.271	97.963	.787	.040	.147	-.252	.332
ProdLP2	Equal variances assumed	.264	.609	.126	98	.900	.020	.158	-.294	.334
	Equal variances not assumed			.126	97.253	.900	.020	.158	-.294	.334
ProdLP3	Equal variances assumed	.106	.745	1.501	98	.136	.240	.160	-.077	.557
	Equal variances not assumed			1.501	94.876	.137	.240	.160	-.077	.557
FirmLP1	Equal variances assumed	2.237	.138	-.894	98	.374	-.140	.157	-.451	.171
	Equal variances not assumed			-.894	94.857	.374	-.140	.157	-.451	.171
FirmLP2	Equal variances assumed	1.546	.217	.507	98	.614	.080	.158	-.233	.393
	Equal variances not assumed			.507	94.311	.614	.080	.158	-.233	.393
FirmLP3	Equal variances assumed	.580	.448	-.804	98	.424	-.120	.149	-.416	.176
	Equal variances not assumed			-.804	97.369	.424	-.120	.149	-.416	.176
FSize	Equal variances assumed	.613	.435	-.808	98	.421	-.200	.247	-.691	.291
	Equal variances not assumed			-.808	97.983	.421	-.200	.247	-.691	.291
FAge	Equal variances assumed	3.044	.084	-1.232	98	.221	-.440	.357	-1.149	.269
	Equal variances not assumed			-1.232	96.036	.221	-.440	.357	-1.149	.269
NPI	Equal variances assumed	.092	.762	-.142	98	.888	-.020	.141	-.300	.260
	Equal variances not assumed			-.142	97.881	.888	-.020	.141	-.300	.260

5.2.5. Common Method Bias

There is agreement among most researchers that common method variance (i.e., variance explained by the measurement method instead of the constructs the measures represent) is a potential severe biasing threat in business and management research, particularly with cross-sectional studies that utilise a single informant for all the research model's variables. Although its causal inferences were strongly grounded on the extant theoretical and empirical literature, this study has employed cross-sectional data, which might lead to causal inferences issues. Although practically challenging, basing future research on longitudinal samples might overcome such issues.

Common method bias can have a serious confounding impact on empirical findings and consequently can yield potentially misleading conclusions (Lindell & Whitney, 2001; Podsakoff *et al.*, 2003; Williams *et al.*, 2003). Drawing from both Podsakoff *et al.*'s (2003) and Williams *et al.*'s (2003) studies, Liang *et al.* (2007) developed – specifically for PLS-SEM analysis – a method for common method bias assessment. Accordingly, for the current study, the researcher has utilised Liang *et al.*'s (2007) method by including in the PLS-SEM model analysis a common method factor that comprised the entire principal constructs items. Next, the researcher has calculated and compared each item variances substantively explained by its principal construct, on one hand, and by the common method factor, on the other hand.

As shown next in Table 5.3, the results for the common method bias assessment demonstrated that the average substantively explained variance of the items was 0.797, while the average method-based variance was only 0.006. Additionally, all the principal constructs items loadings were highly significant, while most method factor's loadings were insignificant. Given the small magnitude and insignificance of the method variance, it was concluded that the common method bias had no threatening effect upon the accuracy of the current study's results and their interpretations.

Table 5.3. Assessment of common method bias; following Liang *et al.*'s (2007) method

Constructs	Items	Substantive Factor Loading (R1)	$R1^2$	*P*	Method Factor Loading (R2)	$R2^2$	*P*
PFit	TFit1	0.898	0.806	<0.001	0.014	0.000	0.35
	TFit2	0.834	0.696	<0.001	-0.001	0.000	0.49
	MFit1	0.854	0.729	<0.001	0.062	0.004	0.05
	MFit2	0.883	0.780	<0.001	0.036	0.001	0.14
	MFit3	0.878	0.771	<0.001	-0.028	0.001	0.42
CrosFI	CrosFI1	0.956	0.914	<0.001	0.011	0.000	0.45
	CrosFI2	1.040	1.082	<0.001	0.110	0.012	0.01
	CrosFI3	0.773	0.598	<0.001	0.135	0.018	0.01
TMS	TMS1	1.015	1.030	<0.001	0.073	0.005	0.01
	TMS2	0.870	0.757	<0.001	0.070	0.005	0.04
	TMS3	0.938	0.880	<0.001	0.007	0.000	0.46
PEProf	MAProf1	0.921	0.848	<0.001	0.037	0.001	0.31
	MAProf2	0.918	0.843	<0.001	0.048	0.002	0.25
	MAProf3	0.827	0.684	<0.001	0.043	0.002	0.30
	MAProf4	0.886	0.785	<0.001	-0.017	0.000	0.43
	TAProf1	0.970	0.941	<0.001	0.096	0.009	0.10
	TAProf2	0.709	0.503	<0.001	0.170	0.029	0.02
	TAProf3	0.858	0.736	<0.001	0.014	0.000	0.43
OperLP	NPQS1	0.794	0.630	<0.001	0.065	0.004	0.14
	NPQS2	0.654	0.428	<0.001	0.196	0.038	0.01
	NPDTS1	0.749	0.561	<0.001	0.097	0.009	0.08
	NPDTS2	0.925	0.856	<0.001	0.077	0.006	0.09
	NPDCS1	0.976	0.953	<0.001	0.121	0.015	0.01
	NPDCS2	0.983	0.966	<0.001	0.119	0.014	0.01
ProdLP	ProdLP1	0.853	0.728	<0.001	0.076	0.006	0.02
	ProdLP2	0.984	0.968	<0.001	0.042	0.002	0.05
	ProdLP3	0.949	0.901	<0.001	0.021	0.000	0.27
FirmLP	FirmLP1	0.952	0.906	<0.001	0.025	0.001	0.22
	FirmLP2	0.907	0.823	<0.001	0.017	0.000	0.32
	FirmLP3	0.903	0.815	<0.001	-0.015	0.000	0.48
Average Variance Explained		0.889	**0.797**		0.057	**0.006**	

It should be noted that this study's measurements were based on subjective (perceptual) data collected from a senior key informant in each firm, which might bring about common-method bias. Although the relevant procedural precautions for the common-method bias were followed in data collection and its absence from the current study was statistically verified, such a bias might be avoided by future research employing a multiple informant design based on objective (secondary) data. However, besides the problems of having access to multiple respondents in each firm, such an endeavour would have to surmount the challenges of objective (secondary) data availability.

5.2.6. Confounders

According to Kock (2013), if the error terms for two latent variables are strongly and significantly correlated, a hidden confounder might be exist. This hidden confounder may be the real cause behind the significant association between those two latent variables. To rule out this potential problem for unrealistic causality, it is recommended that the variance inflation factors (VIFs), associated with the error terms for those two latent variables, to be ≤ 3.3.

In this respect, the utilised WarpPLS V. 4 (Kock, 2013) provides a table, as shown below in Table 5.4, with correlations among latent variable error terms containing the VIFs associated with the error terms on the diagonal. This table can be beneficial in detecting if any error terms are highly correlated, which would establish the presence of confounders. As all the VIFs were below 3.3, and all the correlations among the error terms were insignificant, hence, there is no existence for any confounder's threat within the current study's data.

Table 5.4. Correlations among latent variable error terms with VIFs

Constructs	(e)PEProf	(e)OperLP	(e)ProdLP	(e)FirmLP
(e)PEProf	**1.003**			
(e)OperLP	0.010	**1.001**		
(e)ProdLP	0.024	0.011	**1.001**	
(e)FirmLP	0.044	0.027	0.017	**1.003**

Note: Variance inflation factors (VIFs) are shown on diagonal, while error terms are shown off diagonal. All correlations are not significant; $p > 0.10$.

5.3. Sample Characteristics

This section provides the sample characteristics along three categories: restaurants; new menu-items; and respondents. The *first category* was regarding *restaurants*: affiliations

(Question 6), geographical widespread (Question 7), concepts (Question 8), sizes/employees numbers (Question 9: control variable), ages/operations years (Question 10: control variable), and averages numbers of new menu-items developed and introduced into the marketplace per year (Question 11). The *second category* was in relation to *new menu-items*: innovativeness to the restaurant/firm (Question 12: control variable), and development and introduction recency (Question 13). The *third category* was concerning *respondents*: positions (Question 14), and experiences with new menu-items development and introduction activities (Question 15).

Referring to restaurants affiliations (Question 6), as depicted in Table 5.5 and Fig. 5.1, independent restaurants were about three quarters (73.6%; 284) of the 386 surveyed restaurants, while the remaining quarter was for chain restaurants (26.4%; 102).

Table 5.5. Restaurants affiliations (Question 6)

	Frequency	**%**
Independent	284	73.6
Chain	102	26.4
Total	**386**	**100**

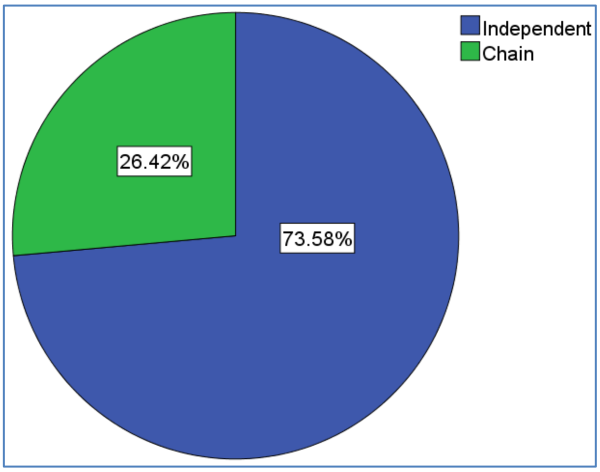


Fig. 5.1. Restaurants affiliations (Question 6)

Regarding restaurants geographical widespread (Question 7), as shown in Table 5.6 and Fig. 5.2, out of the 386 sampled restaurants, local restaurants were the majority (62.7%;

242), followed by national restaurants with about one quarter (24.9%; 96), and finally international restaurants (12.4%; 48).

Table 5.6. Restaurants geographical widespread (Question 7)

	Frequency	**%**
Local	242	62.7
National	96	24.9
International	48	12.4
Total	**386**	**100**

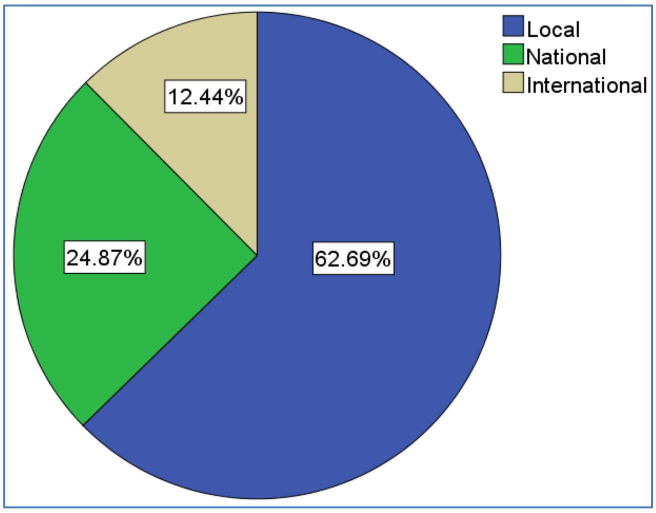


Fig. 5.2. Restaurants geographical widespread (Question 7)

With reference to restaurants concepts (Question 8), as displayed in Table 5.7 and Fig. 5.3, casual restaurants were about half (49.7%; 192) of the 386 surveyed restaurants, while quick service/fast food restaurants accounted for about one quarter (24.1%; 93), followed by fine dining restaurants (19.2%; 74), and fast casual restaurants (7%; 27).

Table 5.7. Restaurants concepts (Question 8)

	Frequency	**%**
Fine dining	74	19.2
Quick service/Fast food	93	24.1
Casual	192	49.7
Fast casual	27	7.0
Total	**386**	**100**

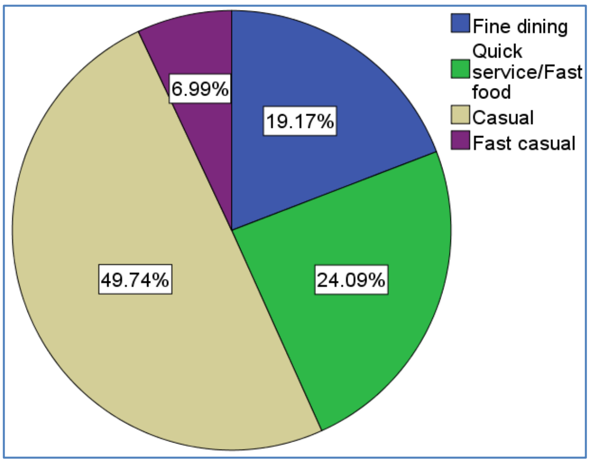


Fig. 5.3. Restaurants concepts (Question 8)

Respecting restaurants sizes/employees numbers (Question 9: control variable), as depicted in Table 5.8 and Fig. 5.4, restaurants that had "10-49 employees" were about half (50.3%; 194) of the 386 sampled restaurants, followed by "below 10 employees" restaurants with about one quarter (26.2%; 101), while the remaining quarter was shared by restaurants that had "50-99 employees" (9.6%; 37), "100-249 employees" (5.7%; 22), "over 500 employees" (5.4%; 21), and "250-500 employees" (2.8%; 11).

Table 5.8. Restaurants sizes/employees numbers (Question 9: control variable)

	Frequency	**%**	Cumulative **%**
Below 10 employees	101	26.2	26.2
10-49 employees	194	50.3	76.4
50-99 employees	37	9.6	86.0
100-249 employees	22	5.7	91.7
250-500 employees	11	2.8	94.6
Over 500 employees	21	5.4	**100**
Total	**386**	**100**	

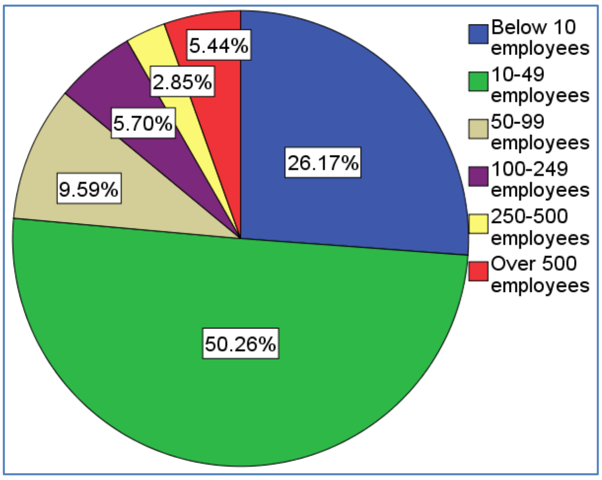


Fig. 5.4. Restaurants sizes/employees numbers (Question 9: control variable)

In relation to restaurants ages/operations years (Question 10: control variable) shown in Table 5.9 and Fig. 5.5, cumulatively, about three quarters (73.6%; 284) of the 386 surveyed restaurants were founded less than 16 years ago, while the remaining quarter was shared by restaurants that were founded “over 25 years ago” (14.2%; 55), “16-20 years ago” (9.1%; 35), and “21-25 years ago” (3.1%; 12).

Table 5.9. Restaurants ages/operations years (Question 10: control variable)

	Frequency	**%**	Cumulative **%**
Below 5 years ago	115	29.8	29.8
5-10 years ago	115	29.8	59.6
11-15 years ago	54	14.0	73.6
16-20 years ago	35	9.1	82.6
21-25 years ago	12	3.1	85.8
Over 25 years ago	55	14.2	**100**
Total	**386**	**100**	

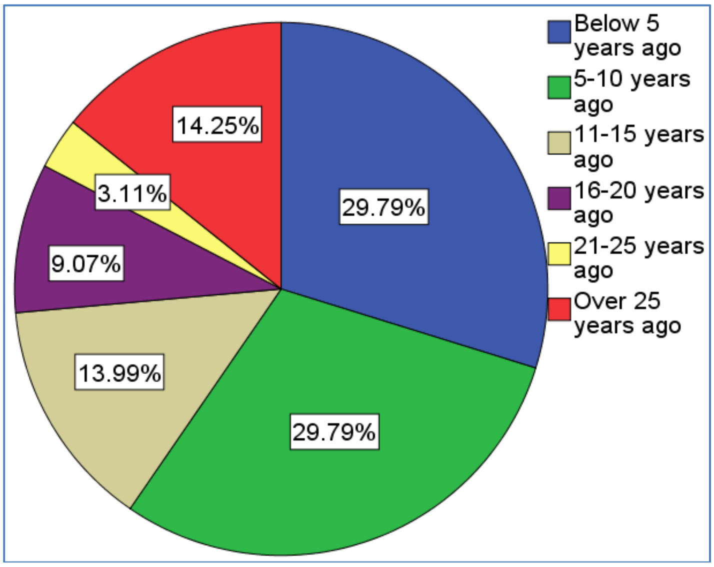


Fig. 5.5. Restaurants ages/operations years (Question 10: control variable)

Regarding restaurants averages numbers of new menu-items developed and introduced into the marketplace per year (Question 11) displayed in Table 5.10 and Fig. 5.6, out of the 386 sampled restaurants, those who had yearly developed and launched “over 5 new menu-items” came first (28.8%; 111), followed by restaurants with “3 new menu-items” (26.9%; 104), “4 new menu-items” (14.5%; 56), “2 new menu-items” (11.9%; 46), “5 new menu-items” (9.8%; 38), and lastly “1 new menu-item” (8%; 31).

Table 5.10. Restaurants averages numbers of new menu-items developed and introduced into the marketplace per year (Question 11)

	Frequency	**%**	Cumulative **%**
1 new menu-item	31	8.0	8.0
2 new menu-items	46	11.9	19.9
3 new menu-items	104	26.9	46.9
4 new menu-items	56	14.5	61.4
5 new menu-items	38	9.8	71.2
Over 5 new menu-items	111	28.8	**100**
Total	**386**	**100**	

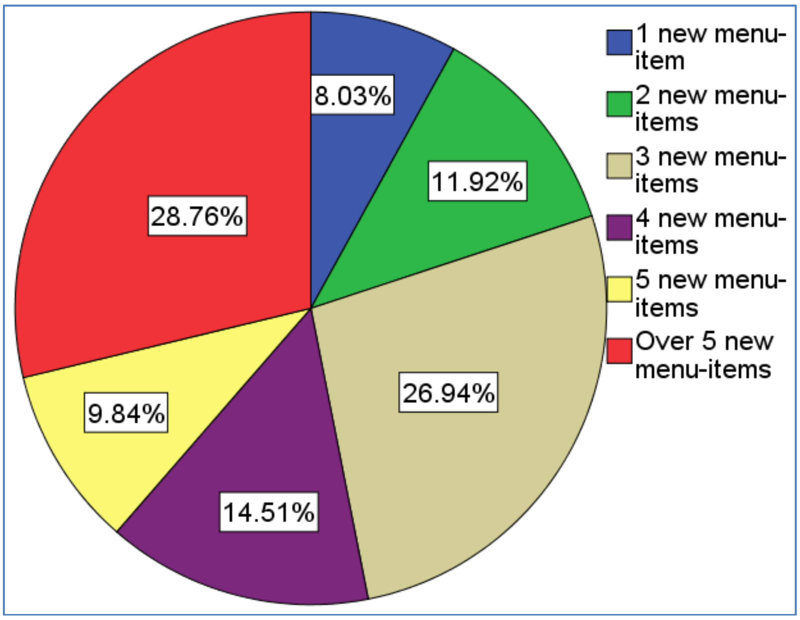


Fig. 5.6. Restaurants averages numbers of new menu-items developed and introduced into the marketplace per year (Question 11)

Turning to new menu-items innovativeness to the restaurant/firm (Question 12: control variable) depicted in Table 5.11 and Fig. 5.7, about half (50.3%; 194) of the 386 sampled restaurateurs perceived their reported new menu-items to be "highly innovative new menu-item", followed by "moderately innovative new menu-item" (36.5%; 141), and ending by "low innovative new menu-item" (13.2%; 51).

Table 5.11. New menu-items innovativeness to the restaurant/firm (Question 12: control variable)

	Frequency	**%**
Low innovative menu-item	51	13.2
Moderately innovative menu-item	141	36.5
Highly innovative menu-item	194	50.3
Total	**386**	**100**

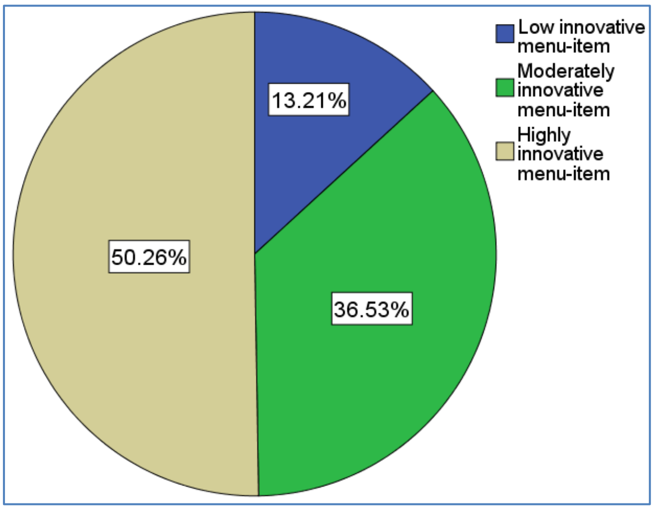


Fig. 5.7. New menu-items innovativeness to the restaurant/firm (Question 12: control variable)

On new menu-items development and introduction recency (Question 13) shown in Table 5.12 and Fig. 5.8, roughly half (46.6%; 180) of the 386 surveyed restaurants new menu-items were developed and launched “2 years ago”, followed by “3 years ago” with about one quarter (25.9%; 100), while the remaining quarter comprised “1 year ago” (13.2%; 51), “4 years ago” (11.4%; 44), and finally “5 years ago” (2.9%; 11).

Table 5.12. New menu-items development and introduction recency (Question 13)

	Frequency	**%**	Cumulative **%**
1 year ago	51	13.2	13.2
2 years ago	180	46.6	59.8
3 years ago	100	25.9	85.7
4 years ago	44	11.4	97.1
5 years ago	11	2.9	**100**
Total	**386**	**100**	

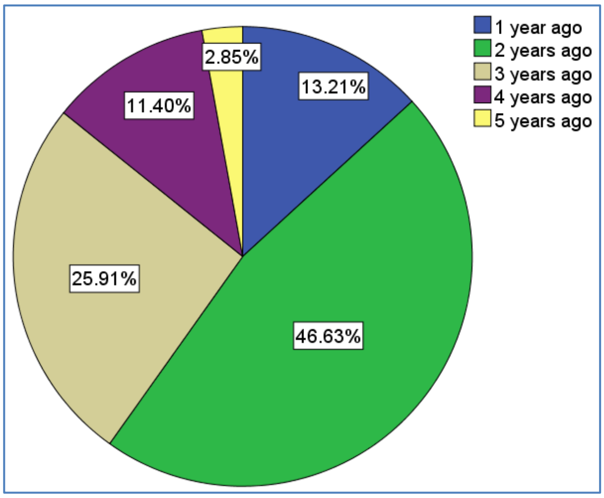


Fig. 5.8. New menu-items development and introduction recency (Question 13)

Moving to respondents positions (Question 14) displayed in Table 5.13 and Fig. 5.9, out of the 386 responded restaurateurs, those who were "owner" came first (30.6%; 118), followed by "restaurants manager" (26.7%; 103), "executive/sous chef" (19.7%; 76), "culinary innovation manager" (14.2%; 55), and finally "CEO" (8.8%; 34).

Table 5.13. Respondents positions (Question 14)

	Frequency	**%**
CEO	34	8.8
Owner	118	30.6
Restaurant manager	103	26.7
Executive/Sous chef	76	19.7
Culinary innovation manager	55	14.2
Total	**386**	**100**

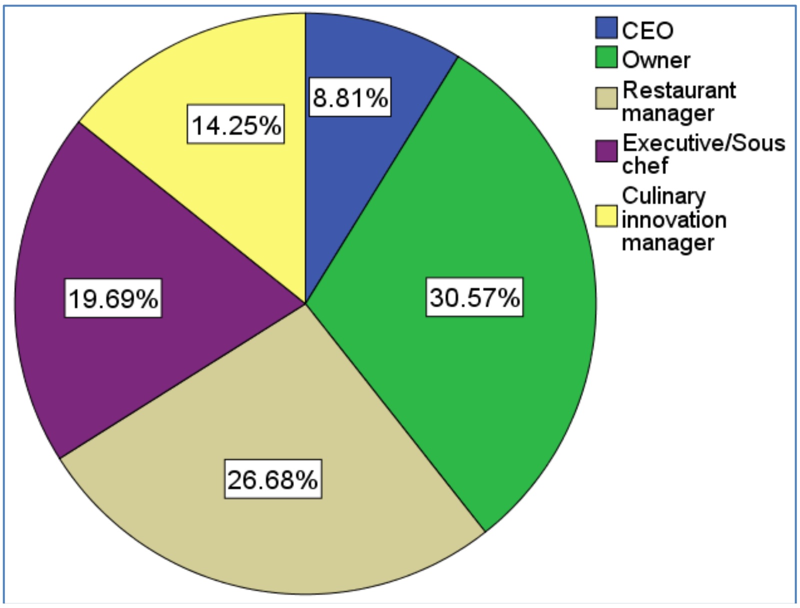


Fig. 5.9. Respondents positions (Question 14)

Regarding respondents experiences with new menu-items development and introduction activities (Question 15) depicted in Table 5.14 and Fig. 5.10, out of the 386 responded restaurateurs, those who had been involved in new menu-items development and launch activities "5-10 years ago" came first (38.1%; 147), followed by "11-15 years ago" (33.4%; 129), "16-20 years ago" (12.4%; 48), "21-25 years ago" (9.1%; 35), "over 25 years ago" (3.9%; 15), and lastly "below 5 years ago" (3.1%; 12).

Table 5.14. Respondents experiences with new menu-items development and introduction activities (Question 15)

	Frequency	**%**	Cumulative **%**
Below 5 years ago	12	3.1	3.1
5-10 years ago	147	38.1	41.2
11-15 years ago	129	33.4	74.6
16-20 years ago	48	12.4	87.0
21-25 years ago	35	9.1	96.1
Over 25 years ago	15	3.9	**100**
Total	**386**	**100**	

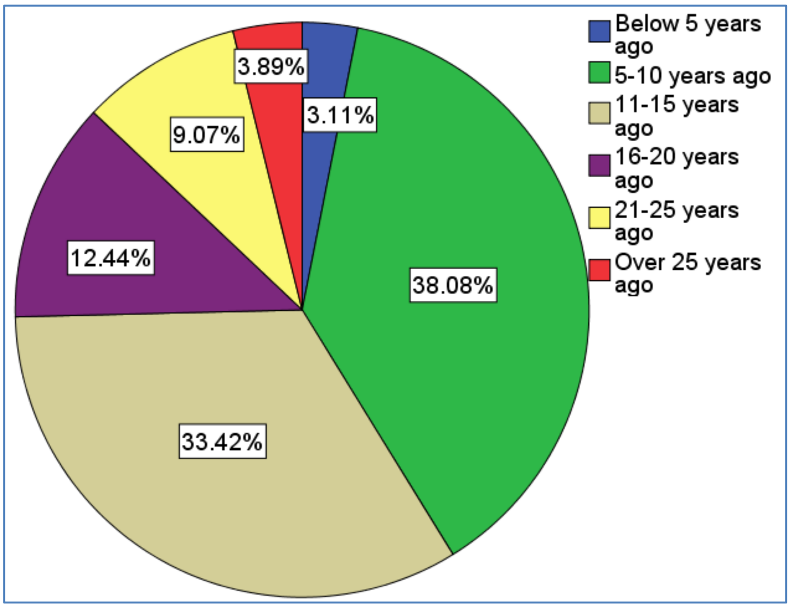


Fig. 5.10. Respondents experiences with new menu-items development and introduction activities (Question 15)

5.4. Constructs and Items Scores and Constructs Intercorrelations

This section starts with explaining this study's constructs and items scores (M: Mean, and SD: Standard Deviation), followed by presenting the significance, sign, and magnitude of its constructs intercorrelations. Initially, all the following *constructs and items scores* were based on *five-point Likert scale*, whereby (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), except for PEProf, whereby (1 = very poorly done, 2 = poorly done, 3 = fairly done, 4 = well done, 5 = very well done), and a total sample size (*N*) of 386.

According to the constructs scores displayed in Table 5.15, on average, the sampled restaurateurs perceived their *firm-level performance* (FirmLP) to be slightly higher (M = 4.11) with less variability (SD = .81) than their *product-level performance* (ProdLP: M = 4.04; SD = .83), followed by their *overall operational-level performance* (OperLP: M = 3.96; SD = .80) regarding *new menu-item quality superiority* (NPQS), *new menu-item development and launching time superiority* (NPDTS), and *new menu-item development and launching cost superiority* (NPDCS).

Additionally, compared to their above performance outcomes, they achieved a lower mean (3.80) of their *overall NPD process execution proficiency* (PEProf) with higher variability (SD = .86) concerning *NPD process marketing (MAProf) and technical (TAProf) activities*. Furthermore, their implementation level of *internal cross-functional integration* (CrosFI) was relatively higher (M = 3.74) with the same variability (SD = .96) than *top-management support* (TMS: M = 3.68), followed by the *overall new-product fit-to-firm* (PFit: M = 3.59; SD = .95) regarding *technical's (TFit) and marketing's (MFit) skills and resources*. For a deeper understanding of the above constructs scores, Table 5.15 provides, on average, the items scores within each construct, as detailed below.

Among the considered selection criteria for ensuring an overall new-product fit-to-firm (PFit) regarding technical's (TFit) and marketing's (MFit) skills and resources, "*TFit2: cooking/production skills/resources"* was the first considered criterion in restaurateurs selection of their new menu-items concepts (M = 3.65), followed by *"TFit1: new menu-item development's skills/resources"* (M = 3.61), *"MFit3: advertising and promotion skills/resources"* (M = 3.60), *"MFit2: sales force skills/resources"* (M = 3.55), and finally *"MFit1: marketing research skills/resources"* (M = 3.53).

In their attempts to base their new menu-item innovation activities on an internal cross-functional integration (CrosFI), the sampled restaurateurs firstly ensured that their restaurants departments/functions (e.g., marketing, culinary innovation, cooking/production, etc.) *"CrosFI2: communicated openly and frequently"* (M = 3.79), followed by "*CrosFI1: tried to achieve goals jointly*" (M = 3.77), and lastly "*CrosFI3: shared ideas, information and resources*" (M = 3.66).

For supporting their new menu-item innovation activities (TMS), the surveyed restaurants primarily guaranteed that their restaurants top-management *"TMS2: was committed to develop and introduce this new menu-item"* (M = 3.71), followed by *"TMS3: has provided the necessary resources to develop and introduce this new menu-item"* (M = 3.67), and "*TMS1: was involved throughout all the activities for developing and introducing this new menu-item*" (M = 3.67).

Among their executed NPD process marketing (MAProf) and technical (TAProf) activities for ensuring an *overall NPD process execution proficiency* (PEProf), *"MAProf4: introducing this new menu-item into the marketplace; advertising, promotion, selling, etc."* was the top proficiently executed activity in the sampled restaurants (M = 3.87), followed by *"MAProf3: testing this new menu-item under real-life conditions, e.g., with customers and/or in restaurants"* (M = 3.86), *"TAProf3: executing new menu-item cooking/production start-up"* (M = 3.86), *"TAProf2: testing and revising the new menu-item exemplar/prototype according to the desired and feasible features"* (M = 3.82), *"TAProf1: developing and producing the new menu-item exemplar/prototype"* (M = 3.75), *"MAProf2: conducting a detailed study of market potential, customer preferences, purchase process, etc."* (M = 3.75), and finally *"MAProf1: searching for and generating new menu-item ideas"* (M = 3.69).

Of the overall operational-level performance (OperLP) of the sampled restaurants regarding new menu-item quality superiority (NPQS), new menu-item development and launching time superiority (NPDTS), and new menu-item development and launching cost superiority (NPDCS), *"NPQS2: had a higher quality than competing products"* was the highest achieved performance measure (M = 4.05), followed by *"NPQS1: was superior to competitors products by offering some unique features or attributes to customers"* (M = 4.02), *"NPDTS1: was developed and introduced into the marketplace on or ahead of the original schedule"* (M = 3.99), *"NPDCS1: had a development and introduction cost that was equal to or below the estimated budget"* (M = 3.95), *"NPDTS2: was developed and introduced into the marketplace faster than the similar competitors products"* (M = 3.89), and lastly *"NPDCS2: had a development and introduction cost that was below the cost of similar new menu-items your restaurant has developed and introduced before"* (M = 3.88).

In relation to product-level performance (ProdLP), the highest accomplished performance measure by the surveyed restaurants was *"ProdLP1: has met or exceeded customers' expectations"* (M = 4.08), followed by *"ProdLP2: has met or exceeded its sales objective"* (M = 4.03), and finally *"ProdLP3: has met or exceeded its profit objective"* (M = 4.01).

Regarding firm-level performance (FirmLP), among the forms of new menu-items contributions to the overall performance of the sampled restaurants, *"FirmLP3: has contributed to enhance restaurant's market share"* was first (M = 4.13), followed by *"FirmLP1: has contributed to enhance restaurant's overall sales"* (M = 4.11), and lastly *"FirmLP2: has contributed to enhance restaurant's overall profit"* (M = 4.10).

Table 5.15. Constructs and items scores (mean and standard deviation)

Formative Constructs	Formative Items		Mean (M)		Standard Deviation (SD)	
PFit	TFit1	New menu-item development's skills/resources	3.61	**3.59**	0.98	**0.95**
	TFit2	Cooking/production skills/resources	3.65		0.98	
	MFit1	Marketing research skills/resources	3.53		0.94	
	MFit2	Sales force skills/resources	3.55		0.95	
	MFit3	Advertising and promotion skills/resources	3.60		0.92	
CrosFI	CrosFI1	Tried to achieve goals jointly	3.77	**3.74**	0.99	**0.96**
	CrosFI2	Communicated openly and frequently	3.79		0.95	
	CrosFI3	Shared ideas, information and resources	3.66		0.93	
TMS	TMS1	Was involved throughout all the activities for developing and introducing this new menu-item	3.67	**3.68**	0.95	**0.96**
	TMS2	Was committed to develop and introduce this new menu-item	3.71		0.96	
	TMS3	Has provided the necessary resources to develop and introduce this new menu-item	3.67		0.96	
PEProf	MAProf1	Searching for and generating new menu-item ideas	3.69	**3.80**	0.86	**0.86**
	MAProf2	Conducting a detailed study of market potential, customer preferences, purchase process, etc.	3.75		0.90	
	MAProf3	Testing this new menu-item under real-life conditions, e.g., with customers and/or in restaurants	3.86		0.88	
	MAProf4	Introducing this new menu-item into the marketplace; advertising, promotion, selling, etc.	3.87		0.86	
	TAProf1	Developing and producing the new menu-item's exemplar/prototype	3.75		0.85	
	TAProf2	Testing and revising the new menu-item's exemplar/prototype according to the desired and feasible features	3.82		0.84	
	TAProf3	Executing new menu-item's cooking/production start-up	3.86		0.83	
OperLP	NPQS1	Was superior to competitors' products by offering some unique features or attributes to customers	4.02	**3.96**	0.77	**0.80**
	NPQS2	Had a higher quality than competing products	4.05		0.81	
	NPDTS1	Was developed and introduced into the marketplace on or ahead of the original schedule	3.99		0.82	
	NPDTS2	Was developed and introduced into the marketplace faster than the similar competitors' products	3.89		0.81	
	NPDCS1	Had a development and introduction cost that was equal to or below the estimated budget	3.95		0.82	
	NPDCS2	Had a development and introduction cost that was below the cost of similar new menu-items your restaurant has developed and introduced before	3.88		0.80	
ProdLP	ProdLP1	Has met or exceeded customers' expectations	4.08	**4.04**	0.82	**0.83**
	ProdLP2	Has met or exceeded its sales objective	4.03		0.82	
	ProdLP3	Has met or exceeded its profit objective	4.01		0.86	
FirmLP	FirmLP1	Has contributed to enhance restaurant's overall sales	4.11	**4.11**	0.83	**0.81**
	FirmLP2	Has contributed to enhance restaurant's overall profit	4.10		0.82	
	FirmLP3	Has contributed to enhance restaurant's market share	4.13		0.78	

Note: All constructs items were measured based on *five-point Likert scale*, (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), except PEProf, (1 = very poorly done, 2 = poorly done, 3 = fairly done, 4 = well done, 5 = very well done). *N* = 386.

Turning to the *significance, sign, and magnitude of constructs intercorrelations* (Pearson product-moment correlation coefficient: r), as displayed in Table 5.16, it was evident that all the constructs had significant ($p < .001$) positive intercorrelations, which in turn provided a rationale for proceeding to investigate the simultaneous direct and indirect (mediated) causality, explanation, and prediction among this study's constructs, as detailed later in sections 5.5.3 to 5.5.5. With reference to *PEProf*, TMS had the highest correlation ($r = .803$), followed by CrosFI ($r = .798$), and finally PFit ($r = .766$). In relation to *OperLP*, PEProf had the highest correlation ($r = .805$), followed by TMS ($r = .717$), CrosFI ($r = .708$), and lastly PFit ($r = .677$). Regarding *ProdLP*, OperLP had the highest correlation ($r = .816$), followed by PEProf ($r = .749$), TMS ($r = .666$), CrosFI ($r = .649$), and finally PFit ($r = .618$). Referring to *FirmLP*, ProdLP had the highest correlation ($r = .825$), followed by OperLP ($r = .788$), PEProf ($r = .756$), CrosFI ($r = .667$), TMS ($r = .665$), and lastly PFit ($r = .581$).

Although *these above constructs intercorrelations* provide an initial idea on the bicorrelations significance, sign, and magnitude for each pair of constructs, *they* cannot provide any information regarding the simultaneous direct and indirect (mediated) causality, explanation, and prediction among this study's constructs, which in turn raised the need for a more advanced statistical analysis technique, as explained in the following sections.

Table 5.16. Significance and magnitude of constructs intercorrelations

Constructs	PFit	CrosFI	TMS	PEProf	OperLP	ProdLP
PEProf	0.766	0.798	0.803			
OperLP	0.677	0.708	0.717	0.805		
ProdLP	0.618	0.649	0.666	0.749	0.816	
FirmLP	0.581	0.667	0.665	0.756	0.788	0.825

Note: All constructs intercorrelations (Pearson's r) are significant at $p < .001$. $N = 386$.

5.5. PLS-SEM Model's Estimation and Results Evaluation

5.5.1. Selected PLS-SEM Algorithmic Options and Parameters Estimates Settings

To conduct the *PLS-SEM model's estimation and results evaluation* of this study, WarpPLS v. 4 (Kock, 2013) software was utilised based on the following *selected PLS-SEM algorithmic options and parameters estimates settings*:

- Outer (measurement) model analysis algorithm: *PLS regression*
- Outer (measurement) model specification: *Formative*
- Inner (structural) model analysis algorithm: *Warp3*
- Inner (structural) model weighting scheme: *Path weighting scheme*
- Only ranked data used in analysis: *Yes*
- Number of latent variables in model: *10*
- Number of indicators used in model: *33*
- Number of cases (rows) in model data: *386*
- Resampling method (to calculate standard errors and *p* values) used in the analysis: *Jackknifing*
- Number of data resamples used: *386*

The last aforementioned two options regarding the *utilised resampling method (Jackknifing) and number of data resamples (386)* are explained next.

In order to estimate the precision of the PLS estimates, non-parametric techniques of resampling should be used. Consequently, either bootstrapping or jackknifing can be used to evaluate the accuracy and significance of the estimates for both the measurement and structural model (Barroso *et al.*, 2010; Chin, 1998, 2010; Gefen *et al.*, 2000; Petter *et al.*, 2007; Roberts *et al.*, 2010).

Bootstrapping employs a resampling algorithm that creates a number of resamples (a number that can be selected by the user), by a method known as "resampling with replacement". This means that each resample contains a random arrangement of the rows/cases of the original dataset, where some rows/cases may be repeated more than once, while some rows/cases may not be included at all (Cheung & Lau, 2007; Hair *et al.*, 2014a; Kock, 2013; Mallinckrodt *et al.*, 2006).

Because bootstrapping builds on randomly drawn subsamples, different subsamples could be drawn each time and consequently bootstrapping's results might differ when rerunning the bootstrapping routine. In addition, the random nature of the bootstrapping procedure might cause arbitrary sign changes in the parameter estimates (Hair *et al.*, 2014a).

Instead of resampling *n* observations with replacement in each bootstrapping sample, jackknifing, on the other hand, creates a number of resamples that equals the original sample size, and each resample has one row/case removed. That is, the sample size of each resample is the original sample size minus one (Cheung & Lau, 2007; Kock, 2013; Krause *et al.*, 2010).

Jackknifing method can be used to estimate the bias, standard errors, and confidence intervals of both direct and indirect (mediated) parameter estimates (Cheung & Lau, 2007; Krause *et al.*, 2010). Jackknifing can be used to provide parameter estimates and compensate for bias in statistical estimates by developing robust confidence intervals (Chin, 2010).

In addition, jackknifing resampling method is simple to implement and tends to outperform bootstrapping in generating more stable/unbiased significance testing of both direct and indirect (mediated) parameter estimates with data containing outliers (Bollen & Stine, 1990; Chiquoine & Hjalmarsson, 2009; Kock, 2011, 2013) and with warped analysis (Kock, 2010), as it is the case in the current study.

Furthermore, the results of Cheung and Lau's (2007) study showed that the performance of the confidence intervals based on the jackknifing method was better compared to those based on various versions of the Sobel standard errors. Jackknifing method effectively removes some of the effects of the influential cases (outliers), hence, produces smaller standard errors and narrower confidence intervals.

Based on the aforesaid relevant advantages of jackknifing, and in line with the same implementation of numerous previous studies (e.g., Barclay, 1991; Fornell & Johnson, 1993; Green *et al.*, 1995; Guenzi *et al.*, 2014; Igbaria *et al.*, 1994; Keil *et al.*, 2000; Kim *et al.*, 2010; McCutcheon *et al.*, 1997; Shamir *et al.*, 1998), the PLS jackknifing as a resampling method (with 386 resamples) was adopted in the current study for assessing the significance of both direct and indirect (mediated) parameter estimates regarding the measurement and structural models.

Having determined this study's *selected PLS-SEM algorithmic options and parameters estimates settings*, it is noteworthy that the current study's *PLS-SEM model's estimation and results evaluation* comprised a completion of two sequential stages: "*stage one" evaluating the measurement (outer) model* (i.e., the relationship between the latent/unobserved constructs/concepts and their respective items, as detailed in section 5.5.2); and *"stage two" evaluating the structural (inner) model* (i.e., the model's explanatory/predictive capabilities and structural relationships among its latent/unobserved constructs/concepts, as detailed in sections 5.5.3 and 5.5.4). Additionally, it was complemented by *"further analysis"* (section 5.5.5), by conducting an Importance-Performance Matrix Analysis (IPMA) for the formative constructs by their items; target constructs by their predictor constructs; and target constructs by their predictor constructs items. As the quality of the structural model's estimates and results is based on the quality of the measurement model's estimates and results, it is only possible and meaningful to proceed to "stage two" (concerning the structural model's evaluation) when the evaluated measurement model in "stage one" show evidence of sufficient validity (Albers, 2010; Cenfetelli & Bassellier, 2009; Chin, 2010; Götz *et al.*, 2010; Hair *et al.*, 2014a, b; Henseler *et al.*, 2009; Lee *et al.*, 2011; Peng & Lai, 2012; Petter *et al.*, 2007; Ringle *et al.*, 2012; Sarstedt *et al.*, 2014 ; Sosik *et al.*, 2009).

5.5.2. Formative Measurement Model's Assessment

To start with, this section details the *"first stage"* in *PLS-SEM model's estimation and results evaluation* regarding the *formative measurement (outer) model's assessment* (i.e., the relationship between the latent/unobserved constructs/concepts and their respective items).

As justified in section 4.9.2, it was evident that the formative measurement model's conceptualisation and specification were fitting well with all the current study's main constructs, hence, all the current study's main constructs (i.e., PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP) were conceptualised and specified as formative (rather than reflective) constructs.

Contrary to the reflective ones (Diamantopoulos & Winklhofer, 2001; Diamantopoulos *et al.*, 2008; Hair *et al.*, 2014a, b; Jarvis *et al.*, 2003; MacKenzie *et al.*, 2005, 2011; Peng & Lai, 2012; Petter *et al.*, 2007; Podsakoff *et al.*, 2006; Roberts *et al.*, 2010), *formative constructs items* have the following characteristics:

(1) are defining characteristics of their constructs; a formative construct does not occur naturally but is instead ''formed'' by the presence of its underlying measures (items);

(2) any changes in formative items should cause changes in their associated constructs rather than the vice versa;

(3) are different facets of their associated constructs; hence, omitting an item may alter the conceptual domain of the construct;

(4) are not mutually interchangeable;

(5) are not expected to covary with each other; and

(6) are not required to have the same antecedents and consequences.

That being said, the evaluation of the formatively measured constructs relies on a totally different set of criteria compared to their reflective counterparts (Bagozzi, 1994; Bollen, 1989, 2011; Bollen & Lennox, 1991; Diamantopoulos, 1999, 2005; Edwards & Bagozzi, 2000; Hulland, 1999; Podsakoff *et al.*, 2006; Rossiter, 2002). Specifically, it is considered irrelevant and meaningless to base the formative constructs assessment on the same traditional assessment criteria that typically used for reflective constructs examination, such as:

(1) *constructs reliability* (i.e., the composite reliability [P_c] and Cronbach's alpha [α] as measures of the internal consistency reliability should be ≥ .70);

(2) *indicators reliability* (i.e., the indicators [standardised] outer loadings should be significant [$p < .05$] and ≥ 0.70);

(3) *constructs convergent validity* (i.e., the Average Variance Extracted [AVE] for a set of indicators by their underlying latent construct should be ≥ .50; Fornell & Larcker, 1981);

(4) *constructs discriminant validity* (i.e., the AVE for a set of indicators by their underlying latent construct should be greater than the squared correlation between the focal construct and the other constructs; Fornell & Larcker, 1981, and/or the indicators loadings with their associated constructs should be larger than their cross loadings with other constructs); and

(5) the *exploratory and confirmatory factor analyses* (constructs unidimensionality).

Alternatively, in keeping with the guidelines of the most relevant and highly influential literature (Cenfetelli & Bassellier, 2009; Chin, 2010; Diamantopoulos & Winklhofer, 2001; Diamantopoulos *et al.*, 2008; Götz *et al.*, 2010; Hair *et al.*, 2014a, b; Henseler *et al.*, 2009; Jarvis *et al.*, 2003; Lee *et al.*, 2011; MacKenzie *et al.*, 2005, 2011; Peng & Lai, 2012; Petter *et al.*, 2007; Ringle *et al.*, 2012; Sarstedt *et al.*, 2014), *formative constructs should be assessed* as follow:

(1) *In a questionnaire's pre-testing stage*:

(1a) *constructs face validity* (i.e., the constructs measures seem to make sense).

(1b) *constructs content validity* (i.e., the questionnaire's measures [items] provide adequate, relevant, and representative coverage of the different facets of their associated constructs).

(2) *Statistically after the final questionnaire's full deployment and data collection*:

(2a) *constructs convergent validity* [redundancy analysis] (i.e., a formatively measured construct should explain at least 50% to 64% of the variance [R^2] of a global [single-item] reflective construct that captures the "overall" meaning/essence of the same construct, coincided by a significant [$p < .05$] standardised path coefficient [β has a magnitude of at least .70 to .80] going from the formative construct towards the reflective one).

(2b) *absence of substantial multicollinearity issues* [redundant/repetitive items] among a set of items forming a construct (i.e., the Variance Inflation Factors [VIFs] as measures of items multicollinearity should not exceed 5 to 10).

(2c) *significance and relevance of items weights* (i.e., the items [standardised] outer weights [β] should be significant [$p < .05$] and relevant by actually contributing to forming their associated constructs).

Accordingly, in addition to the constructs face and content validities that have been examined and established before in the questionnaire's pre-testing stage (section 4.9.3.1), and by utilising a PLS-SEM statistical analysis software program, namely *WarpPLS v. 4* (Kock, 2013), the formative measurement model was assessed in terms of (1) *constructs convergent validity*, (2) *absence of substantial items multicollinearity issues*, and (3) *significance and relevance of items weights*, as detailed in the following sections.

5.5.2.1. Constructs Convergent Validity: Redundancy Analysis

To start with, the formative measurement model was assessed in terms of the *constructs convergent validity* (redundancy analysis) to ensure that the entire domain of each of the formative construct and all of its relevant facets have been sufficiently covered/captured by its formative items (Chin, 2010; Hair *et al.*, 2014a, b; Henseler *et al.*, 2009; Sarstedt *et al.*, 2014), as displayed next in Table 5.17 and Fig. 5.11.

Table 5.17. Constructs convergent validity (redundancy analysis)

Independents (Formative Constructs)	**Dependents** (Global single-item Reflective Constructs)	***P***	***β***	R^2
PFit	PFitG	< .001	0.90	0.81
CrosFI	CrosFIG	< .001	0.84	0.71
TMS	TMSG	< .001	0.84	0.71
PEProf	PEProfG	< .001	0.85	0.72
OperLP	OperLPG	< .001	0.88	0.77
ProdLP	ProdLPG	< .001	0.92	0.84
FirmLP	FirmLPG	< .001	0.85	0.72

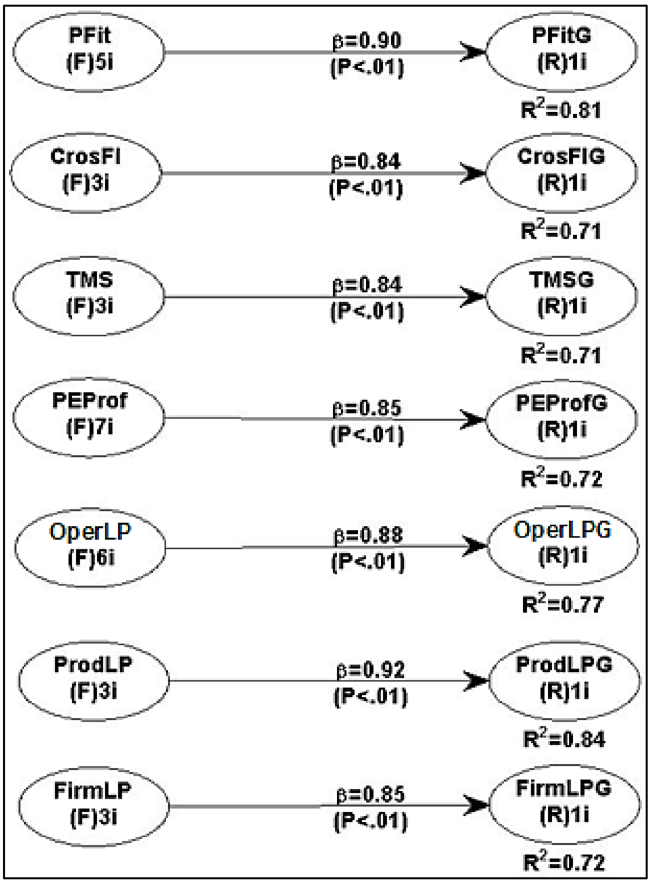


Fig. 5.11. Constructs convergent validity (redundancy analysis)

As displayed in Table 5.17 and Fig. 5.11, the conducted redundancy analysis has revealed that the *constructs convergent validity* was established, because all the model's formative constructs (PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP) have greatly exceeded: (1) the minimum required explained variance (i.e., R^2 = 50% to 64%) of their corresponding global (single-item) reflective constructs (i.e., alternative measurements that capture the "overall" meaning/essence of their associated formative constructs), with PFitG's R^2 = 81%, CrosFIG's R^2 = 71%, TMSG's R^2 = 71%, PEProfG's R^2 = 72%, OperLPG's R^2 = 77%, ProdLPG's R^2 = 84%, and FirmLPG's R^2 = 72%; and (2) the minimum required standardised path coefficient's magnitude (i.e., β = .70 to .80) and significance (i.e., $p < .05$), with PFit→PFitG ($p < .001$; $\beta = .90$), CrosFI→CrosFIG ($p < .001$; $\beta = .84$), TMS→TMSG ($p < .001$; $\beta = .84$), PEProf→PEProfG ($p < .001$; $\beta = .85$), OperLP→OperLPG ($p < .001$; $\beta = .88$), ProdLP→ProdLPG ($p < .001$; $\beta = .92$), and FirmLP→FirmLPG ($p < .001$; $\beta = .85$).

5.5.2.2. Items Multicollinearity Assessment: Variance Inflation Factors (VIFs)

Next, the assessment of the formative constructs items validity necessitates an examination of the potential high multicollinearity issues among them. Contrary to their reflective counterparts, as formative constructs items are expected to measure different facets of the same construct, they should not be redundant/repetitive. Typically caused by the existence of redundant/repetitive items (i.e., items that have/cover the same meaning/information), the presence of substantial levels of multicollinearity (overlap: nearly perfect correlations) among formative items can be problematic as it can have a threatening bias influence on the multiple regression analysiss estimations and results. In this sense, high collinearity levels among formative items can: (1) increase the items weight's standard errors, hence, reduce their statistical significance; and (2) cause reversed signs and incorrect estimation of the items weights. To detect the level of multicollinearity among a set of items forming their associated construct, the VIF value for each item of this set should be calculated based on running a multiple regression analysis for each item of the formative construct on all the other measurement items of the same construct. As a rule of thumb, VIF values exceeding 5 (or 10: a more relaxed, yet commonly acceptable threshold) indicate a potential multicollinearity problem (Götz *et al.*, 2010; Hair *et al.*, 2014a, b; Peng & Lai, 2012; Sarstedt *et al.*, 2014).

In keeping with the above guidelines, the formative measurement model was also assessed in terms of the *absence of substantial multicollinearity issues* among the set of items forming their associated constructs by calculating the VIF value for each item of these sets. As displayed next in Table 5.18, the conducted multicollinearity assessments by means of the VIF for all the formative constructs items, yielded VIF values that ranged between 2.388 (TFit2: PFit) and 4.811 (CrosFI1: CrosFI), which were not exceeding the common cut-off threshold of 5 to 10, hence, confirming that the measurement model results were not negatively affected by the items multicollinearity.

Table 5.18. Items multicollinearity assessment: Variance Inflation Factors (VIFs)

Formative Constructs	Formative Items	VIFs
PFit	TFit1	3.100
	TFit2	2.388
	MFit1	4.076
	MFit2	4.115
	MFit3	3.568
CrosFI	CrosFI1	4.811
	CrosFI2	4.698
	CrosFI3	2.414
TMS	TMS1	4.645
	TMS2	3.566
	TMS3	4.328
PEProf	MAProf1	3.704
	MAProf2	3.326
	MAProf3	3.124
	MAProf4	3.268
	TAProf1	3.467
	TAProf2	3.281
	TAProf3	3.152
OperLP	NPQS1	2.801
	NPQS2	2.600
	NPDTS1	2.418
	NPDTS2	2.715
	NPDCS1	3.105
	NPDCS2	3.303
ProdLP	ProdLP1	3.033
	ProdLP2	4.397
	ProdLP3	3.645
FirmLP	FirmLP1	3.395
	FirmLP2	3.096
	FirmLP3	2.911

5.5.2.3. Significance and Relevance of Items Weights (p Value and β)

Finally yet importantly, to complete the validation of the formative constructs items, they should be checked against their specific contributions to forming their associated constructs by evaluating their standardised path weights (β) and their significance ($p < .05$). Formative items "compete" with one another to be explanatory of their targeted construct, therefore, beside its significance, the most important statistic for evaluating a formative item is its *weight* (i.e., partial effect on, or contribution in, forming its intended construct controlling for the effects/contributions of all other items forming the same construct). In relation to significance, if the item weight is statistically significant ($p < .05$), the item is typically retained. With reference to relevance, item weights are standardised to values between – 1 and + 1, with weights closer to + 1 representing strong positive relationships and weights closer to – 1 indicating strong negative relationships. However, it should be noted that the weight is a function of the number of items used to measure a construct, whereby the higher the number of items, the lower the average weights (Cenfetelli & Bassellier, 2009; Hair *et al.*, 2014a, b; Lee *et al.*, 2011; Petter *et al.*, 2007; Sarstedt *et al.*, 2014).

In line with the above recommendations, the formative measurement model was finally evaluated in terms of the *significance and relevance of items weights*. As displayed next in Table 5.19, these analyses have revealed that all the formative items had significant ($p < .001$) positive standardised outer weights (β) that ranged between: .185 (TFit2) and .241 (MFit2) for *PFit*; .343 (CrosFI3) and .367 (CrosFI2) for *CrosFI*; .351 (TMS2) and .356 (TMS3) for *TMS*; .144 (MAProf3) and .175 (MAProf4) for *PEProf*; .170 (NPQS2) and .204 (NPDCS2) for *OperLP*; .358 (ProdLP1) and .372 (ProdLP2) for *ProdLP*; .362 (FirmLP3) and .369 (FirmLP2) for *FirmLP*. Therefore, all the formative items were retained as they deemed significant and relevant by actually contributing to forming their associated constructs.

Table 5.19. Significance and relevance of items weights

Formative Constructs	Rank	Formative Items	*P*	Outer Weights β
PFit	1	MFit2	<0.001	0.241
	2	MFit3	<0.001	0.235
	3	MFit1	<0.001	0.223
	4	TFit1	<0.001	0.214
	5	TFit2	<0.001	0.185
CrosFI	1	CrosFI2	<0.001	0.367
	2	CrosFI1	<0.001	0.364
	3	CrosFI3	<0.001	0.343
TMS	1	TMS3	<0.001	0.356
	2	TMS1	<0.001	0.352
	3	TMS2	<0.001	0.351
PEProf	1	MAProf4	<0.001	0.175
	2	TAProf2	<0.001	0.175
	3	MAProf1	<0.001	0.172
	4	MAProf2	<0.001	0.164
	5	TAProf1	<0.001	0.159
	6	TAProf3	<0.001	0.158
	7	MAProf3	<0.001	0.144
OperLP	1	NPDCS2	<0.001	0.204
	2	NPDCS1	<0.001	0.204
	3	NPQS1	<0.001	0.197
	4	NPDTS1	<0.001	0.188
	5	NPDTS2	<0.001	0.185
	6	NPQS2	<0.001	0.170
ProdLP	1	ProdLP2	<0.001	0.372
	2	ProdLP3	<0.001	0.367
	3	ProdLP1	<0.001	0.358
FirmLP	1	FirmLP2	<0.001	0.369
	2	FirmLP1	<0.001	0.366
	3	FirmLP3	<0.001	0.362

To sum up the formative measurement model's assessment, in addition to the previously established constructs face and content validities (section 4.9.3.1), the results of the formative measurement model's assessment (constructs validity) in terms of (1) *constructs convergent validity*, (2) *absence of substantial items multicollinearity issues*, and (3) *significance and relevance of items weights*, were verified and deemed well satisfactory, which in turn allowed for proceeding to this study's structural model's assessment, as detailed in the following sections.

5.5.3. Structural Model's Assessment

Relying on the established validity of this study's formative measurement model (section 5.5.2), this section and the following one (i.e., section 5.5.4 hypotheses testing: mediation analyses) detail the *"second stage"* in *PLS-SEM model's estimation and results evaluation* concerning the *assessment of the structural (inner) model's quality* (i.e., examining the model's explanatory/predictive capabilities and structural relationships among its latent/unobserved constructs/concepts). As the structural (inner) model represents the underlying theory/concept of the path model, assessing the structural (inner) model's results can allow researchers to find out how well the empirical data support their models underlying theories/concepts, hence, allow researchers to examine if their models underlying theories/concepts have been empirically confirmed (Hair *et al.*, 2014a).

With reference to the assessment of the structural (inner) model's quality, the CB-SEM's focus is on determining how well a proposed theoretical model is able to estimate the covariance matrix for a sample dataset (i.e., CB-SEM estimates parameters that minimise the difference between the observed sample covariance matrix and the covariance matrix estimated by the model), while the focus of the PLS-SEM is on explaining the variance in the dependant/target/endogenous constructs (i.e., PLS-SEM uses the sample data to obtain parameters that best explain/predict the target constructs). Consequently, the CB-SEM's (parametric-based) standard goodness-of-fit statistics and indices (e.g., χ^2 and its related measures), and even Tenenhaus *et al.*'s (2005) PLS-SEM-based global criterion of Goodness-of-Fit (*GoF*) *index*, were deemed irrelevant to PLS-SEM in general, and especially those PLS-SEM's models that are based on formative measurement models. Instead, the assessment of the PLS-SEM model's quality should be based on its ability to predict its target constructs by utilising non-parametric-based explanatory/predictive criteria, such as: the target constructs R^2 (coefficient of determination as a gauge of the model's explanatory/predictive power) and Stone-Geisser's Q^2 (cross-validated redundancy-based blindfolding as a proxy of the model's predictive validity/relevance), as well as utilising non-parametric-based resampling methods (e.g., jackknifing) to estimate the structural relationships significance, sign, and magnitude/relevance (p Value, β, Cohen's f^2, and predictor constructs contributions % to target constructs R^2) (Chin, 1998, 2010; Falk & Miller, 1992; Götz *et al.*, 2010; Hair *et al.*, 2011, 2014a, b; Henseler & Sarstedt, 2013; Henseler *et al.*, 2009; Hulland, 1999; Lee *et al.*, 2011; Peng & Lai, 2012; Ringle *et al.*, 2012; Sarstedt *et al.*, 2014; Sosik *et al.*, 2009; sections 5.5.3.3, 5.5.3.4, 5.5.3.5, and 5.5.4). However, these assessment criteria should be preceded by an verification of the absence of substantial multicollinearity issues among predictor constructs (Hair *et al.*, 2014a, b; Sarstedt & Mooi, 2014; Sarstedt *et al.*, 2014; section 5.5.3.1), and complemented by a verification of the model's statistical power/robustness ($1 - \beta$ error probability) (Cohen *et al.*, 2003; Ellis, 2010; Hair *et al.*, 2014a; Keith, 2015; Marcoulides & Chin, 2013; Marcoulides & Saunders, 2006; Mayr *et al.*, 2007; Peng & Lai, 2012; section 5.5.3.2).

Accordingly, in keeping with the above relevant literature's guidelines, the researcher has assessed the quality of the structural (inner) model of this study (in this section) based on the: (1) *absence of substantial multicollinearity issues among predictor constructs* (VIFs: Variance Inflation Factors); (2) *model's statistical power/robustness* ($1 - \beta$ error probability); (3) *model's explanatory/predictive power* (R^2: coefficient of determination); (4) *model's predictive validity/relevance* (Stone-Geisser's Q^2: cross-validated redundancy-based blindfolding); and (5) *direct structural relationships significance, sign, and magnitude/relevance* (p Value, β, Cohen's f^2, and predictor constructs contributions % to target constructs R^2), as detailed next in sections 5.5.3.1 to 5.5.3.5. Additionally, the researcher has completed this assessment of the current study's structural (inner) model by *hypotheses testing* based on conducting comprehensive *mediation analyses* explicating the total, direct, total indirect, specific indirect, and sequential indirect effects, as detailed latter in section 5.5.4.

5.5.3.1. Predictor Constructs Multicollinearity Assessment: Variance Inflation Factors (VIFs)

"While the Fornell-Larcker criterion usually discloses collinearity problems in the inner model earlier in the model evaluation process, this is not the case when formatively measured constructs are involved. The reason is that the AVE – which forms the basis for the Fornell-Larcker assessment – is not a meaningful measure for formative indicators. Therefore, collinearity assessment in the inner model is of pivotal importance when the model includes formatively measured constructs" (Hair *et al.*, 2014b, p. 113). As all the model's constructs of this study were operationalised as formative constructs, the assessment of the structural (inner) model's quality *initially* necessitates an examination of the potential high multicollinearity issues among each set of predictor constructs associated with their respective target construct.

As the model's constructs are supposed to measure different phenomena/concepts, they should not be redundant/repetitive. Typically caused by the existence of redundant/repetitive constructs (i.e., constructs that have/cover the same meaning/information), the presence of substantial levels of multicollinearity (overlap: nearly perfect correlations) among model's constructs can be problematic as it can have a threatening bias influence on the multiple regression analysiss estimations and results (i.e., relationships significance, sign, and magnitude). To detect the level of multicollinearity among each set of predictor constructs associated with their respective target construct, the VIF value for each predictor construct should be calculated based on running a multiple regression analysis for each predictor construct of this set on all the other predictor constructs of the same set. As a rule of thumb, VIF values exceeding 5 (or 10: a more relaxed, yet commonly acceptable threshold) indicate a potential multicollinearity problem (Hair *et al.*, 2014a, b; Sarstedt & Mooi, 2014; Sarstedt *et al.*, 2014).

In keeping with the aforementioned guidelines, the structural model's quality was initially assessed in terms of the absence of substantial multicollinearity issues among each set of predictor constructs associated with their respective target construct by calculating the VIF value for each predictor construct of these sets.

As displayed below in Table 5.20, the conducted multicollinearity assessments by means of the VIF for all the predictor constructs sets, yielded VIF values that ranged between: 2.924 (PFit) and 4.227 (TMS) for predicting *PEProf*; 3.176 (PFit) and 4.577 (TMS) for predicting *OperLP*; 2.989 (OperLP) and 4.620 (PEProf) for predicting *ProdLP*; 3.057 (PEProf) and 4.024 (OperLP) for predicting *FirmLP*, which were not exceeding the common cut-off threshold of 5 to 10, hence, confirming that the structural model results were not negatively affected by the predictor constructs multicollinearity.

Table 5.20. Predictor constructs multicollinearity assessment: Variance Inflation Factors (VIFs)

Target Constructs	Predictor Constructs	VIFs
PEProf	PFit	2.924
	CrosFI	3.718
	TMS	4.227
OperLP	PFit	3.176
	CrosFI	4.115
	TMS	4.577
	PEProf	3.579
ProdLP	PFit	3.188
	CrosFI	4.140
	TMS	4.617
	PEProf	4.620
	OperLP	2.989
FirmLP	PEProf	3.057
	OperLP	4.024
	ProdLP	3.229

5.5.3.2. Model's Statistical Power/Robustness (1 – β error probability)

"*Statistical power reflects the degree to which differences in sample data in a statistical test can be detected. A high power is required to reduce the probability of failing to detect an effect when it is present*" (Verma & Goodale, 1995, p. 139). In other words, the statistical power represents the probability of correctly rejecting a false null hypothesis of no/zero effect in the population. Therefore, the chances of making a correct decision in hypothesis testing increase with higher statistical power.

In an attempt to examine the achieved statistical robustness/faithfulness level of this study's findings/statistical inferences, the researcher has followed Cohen's (1992) recommendations for multiple OLS regression analysis coincided by running a power analysis using the statistical power software program, namely *G*Power v. 3.1.9.2* as the most convenient, rigor and highly regarded way for such an examination (Cohen *et al.*, 2003; Ellis, 2010; Hair *et al.*, 2014a; Keith, 2015; Marcoulides & Chin, 2013; Marcoulides & Saunders, 2006; Mayr *et al.*, 2007; Peng & Lai, 2012). By utilising *G*Power v. 3.1.9.2* (Faul *et al.*, 2007, 2009), the model's achieved level of statistical power/robustness (1 – β error probability) was examined, alongside the model's four dependant variables (i.e., PEProf, OperLP, ProdLP, and FirmLP), based on the following sequential steps for each dependant variable:

1) Identifying the effect size (f^2) value for each dependant variable, by converting the R^2 value of each dependant variable into its equivalent effect size (f^2) value (i.e., converting the: PEProf's R^2 value [0.72] to f^2 value of 2.57; OperLP's R^2 value [0.67] to f^2 value of 2.03; ProdLP's R^2 value [0.76] to f^2 value of 3.17; and FirmLP's R^2 value [0.75] to f^2 value of 3).
2) Determining the statistical significance (α error probability) level at 0.001.
3) Inputting this study's actual total sample size (i.e., 386).

4) Inputting the number of predictors (the independent variables/arrowheads pointing at a dependant variable) for each dependent variable in the structural model (i.e., three main constructs and three control variables predicting PEProf; four main constructs and three control variables predicting OperLP; five main constructs and three control variables predicting ProdLP; and three main constructs and three control variables predicting FirmLP).
5) After clicking "Calculate" button, the model's achieved level of statistical power/robustness (1 – β error probability) alongside its four dependant variables (i.e., PEProf, OperLP, ProdLP, and FirmLP) was one (100%).

Accordingly, this study model's findings and statistical inferences have a statistical power/robustness (1 – β error probability) level that represent a 100% chance of correctly rejecting a false null hypothesis of no/zero effect in the population.

5.5.3.3. Model's Explanatory/Predictive Power: Coefficient of Determination (R^2)

Following the conducted multicollinearity and statistical power assessments (in the preceding sections), the next step in assessing the structural (inner) model's quality involves reviewing the R^2 values of all its target constructs. The R^2 (or coefficient of determination) is a non-parametric measure of the variance explained in each of the structural model's target construct(s) by its predictor construct(s) and is thus a measure of the model's explanatory/predictive power in terms of "in-sample" prediction. In other words, R^2 value represents the independent/predictor/exogenous variable(s) explanatory/predictive effect(s) on the dependant/target/endogenous variable(s). The R^2 values normally range from 0 to 1, with higher levels indicting a greater degree of model's explanatory/predictive power (Hair *et al.*, 2014a; Sarstedt *et al.*, 2014).

In this respect, the acceptable level of R^2 value differs from one discipline to another and from one author to another. While Falk and Miller (1992) suggested an R^2 value of ≥ 0.10 as an acceptable and practically relevant R^2, Chin (1998) stated that R^2 values of 0.19, 0.33, and 0.67, are gauges of weak, moderate, and substantial R^2, respectively.

Moreover, Hair *et al.* (2011) indicated that the judgment of what R^2 level is high depends on the specific research discipline. While an R^2 value of 0.20 is considered high in consumer behaviour discipline, an R^2 value of 0.75 would be perceived as high in success driver studies. As a rough rule of thumb in marketing research studies, R^2 values of 0.25, 0.50, or 0.75 for target constructs in the structural model can reflect a weak, moderate, or substantial R^2, respectively.

As displayed below in Table 5.21, the examination of the model's explanatory/predictive power (based on its target constructs R^2 values) has revealed that all the models target constructs had substantial R^2 values that ranged from 0.67 (OperLP) to 0.76 (ProdLP), with an average R^2 value of 0.73 ($p < .001$) for the overall model, hence, it can be confirmed that this study's model (CFEMOs) had a substantial explanatory/predictive power.

Table 5.21. Model's explanatory/predictive power: Coefficient of determination (R^2)

Target Constructs	R^2
PEProf	0.72
OperLP	0.67
ProdLP	0.76
FirmLP	0.75

5.5.3.4. Model's Predictive Validity/Relevance: Cross-Validated Redundancy-Based Blindfolding (Stone-Geisser's Q^2)

After the examination and establishment of the model's explanatory/predictive power (i.e., target constructs R^2 values), the next related step in assessing the structural (inner) model's quality comprises reviewing the Stone-Geisser's Q^2 values of all its target constructs. Typically calculated via a cross-validated redundancy-based blindfolding, the Stone-Geisser's Q^2 (Geisser, 1975; Stone, 1974) is a non-parametric measure of the model's predictive validity/relevance in terms of "out-of-sample" prediction. As a rule of thumb, a target construct with Q^2 value higher than zero reveals the path model's predictive validity/relevance for this particular construct (Hair *et al.*, 2014b; Sarstedt *et al.*, 2014).

As presented below in Table 5.22, the investigation of the model's predictive validity/relevance based on its target constructs Q^2 values indicated that all the models target constructs had Q^2 values above zero, thus, it can be concluded that this study's model had a predictive validity/relevance.

Table 5.22. Model's predictive validity/relevance: Cross-validated redundancy-based blindfolding (Stone-Geisser's Q^2)

Target Constructs	Q^2
PEProf	0.72
OperLP	0.67
ProdLP	0.71
FirmLP	0.74

5.5.3.5. Direct Structural Relationships Significance, Sign, and Magnitude/Relevance (*p* Value, *β*, Cohen's f^2, and Predictor Constructs Contributions % to Target Constructs R^2)

For the sake of clarity, the present section is focused on investigating the direct structural relationships, and followed by section 5.5.4 that details the current study's *hypotheses testing* based on conducting comprehensive *mediation analyses* explicating the total, direct, total indirect, specific indirect, and sequential indirect effects.

To complete the assessment of the structural model, both this section and the following one (i.e., section 5.5.4 hypotheses testing: mediation analyses) aim to estimate and verify the structural relationships significance ($p < .05$), sign (+/–), and magnitude/relevance by utilising a PLS-SEM analysis based on a non-parametric resampling method (i.e., jackknifing).

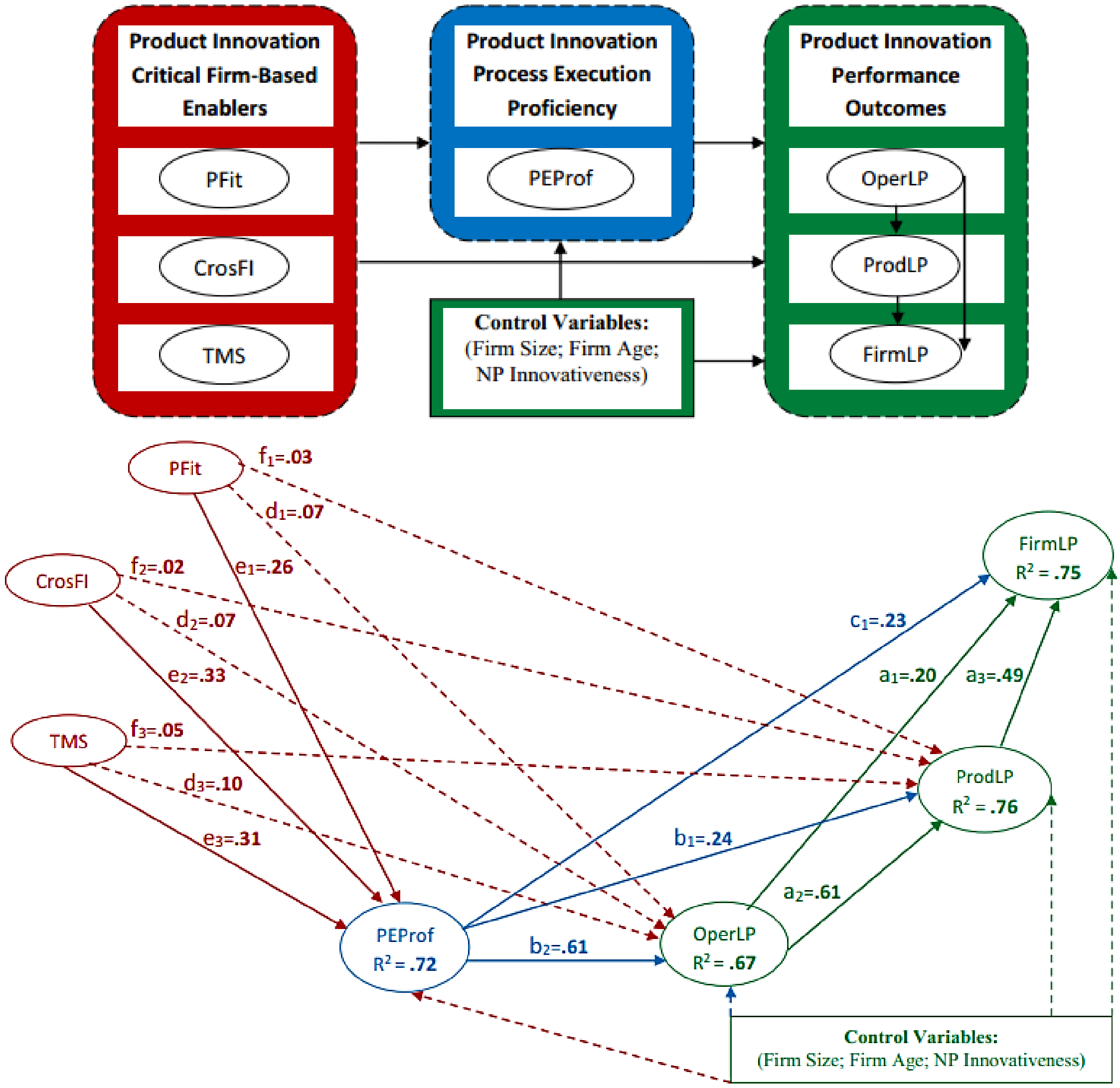
Regarding the structural relationships magnitude/relevance, *firstly*, the standardised path coefficients (β) values normally range between – 1 and + 1, with β values closer to + 1 representing strong positive relationships and β values closer to – 1 indicating strong negative relationships (Hair *et al.*, 2014a, b; Sarstedt *et al.*, 2014).

Secondly, especially for target constructs that are predicted by two or more predictor constructs, evaluating Cohen's (1988) f^2 (effect size) allows for identifying the relative weight of the standardised path coefficients (β) of these predictor constructs by calculating each predictor construct's incremental explanation/prediction of its respective target construct based on the following formula: $f^2 = (R^2_{\text{included}} - R^2_{\text{excluded}}) / (1 - R^2_{\text{included}})$, whereby R^2_{included} (R^2_{excluded}) represents the R^2 of the target construct when the predictor construct is included (omitted) in the model. If a predictor construct strongly contributes to explaining/predicting its respective target construct, the difference between R^2_{included} and R^2_{excluded} will be high, leading to a high f^2 value. Generally, f^2 values of (< .02), .02, .15, and .35 for a predictor construct indicate (negligible), small, medium, and large/substantial effect sizes, respectively (Chin, 1998; Cohen, 1988; Lee *et al.*, 2011; Peng & Lai, 2012; Ringle *et al.*, 2012).

Thirdly, Falk and Miller (1992) recommended calculating and reporting each predictor construct's contribution to its respective target construct's R^2, based on multiplying the standardised path coefficient (β) by the corresponding correlation coefficient (r) between the predictor construct and its target construct. Fortunately, the utilised PLS-SEM analysis software in this study (WarpPLS v. 4) automatically calculates and reports all the predictor constructs contributions to their respective target constructs R^2.

Based on conducting a PLS-SEM analysis utilising WarpPLS v. 4 (Kock, 2013), Fig. 5.12 depicts the derived simultaneous estimates of the full structural (inner) model (including all the main constructs and control variables) of this study, while Tables 5.23 to 5.26 display the yielded direct structural relationships significance, sign, and magnitude/relevance for FirmLP's, ProdLP's, OperLP's, and PEProf's predictors (i.e., main constructs and control variables), respectively.

It is noteworthy that, regardless of whether the control variables (i.e., firm size, firm age, and NP innovativeness) were included or not, the conducted PLS-SEM analysis yielded almost similar structural relationships significance, sign, and magnitude/relevance, hence, confirming the robustness/applicability of this study's results regardless of control variables variations.



Stage 1:

H1: OperLP→FirmLP; **H2:** OperLP→ProdLP→FirmLP;

Stage 2:

H3: PEProf→ProdLP; **H4:** PEProf→OperLP→ProdLP; **H5:** PEProf→FirmLP; **H6:**PEProf→OperLP→FirmLP; **H7:** PEProf→ProdLP→FirmLP; **H8:**PEProf→OperLP→ProdLP→FirmLP;

Stage 3:

H9a: PFit→OperLP; **H9b:** CrosFI→OperLP; **H9c:** TMS→OperLP; **H10a:**PFit→PEProf→OperLP; **H10b:** CrosFI→PEProf→OperLP; **H10c:** TMS→PEProf→OperLP; **H11a:** PFit→ProdLP; **H11b:**CrosFI→ProdLP; **H11c:** TMS→ProdLP; **H12a:** PFit→PEProf→ProdLP; **H12b:**CrosFI→PEProf→ProdLP; **H12c:** TMS→PEProf→ProdLP; **H13a:** PFit→OperLP→ProdLP; **H13b:** CrosFI→OperLP→ProdLP; **H13c:** TMS→OperLP→ProdLP; **H14a:**PFit→PEProf→OperLP→ProdLP; **H14b:** CrosFI→PEProf→OperLP→ProdLP; **H14c:**TMS→PEProf→OperLP→ProdLP.

Fig. 5.12. Derived simultaneous estimates of the full structural model

Note: All relationships were hypothesised to be positive and significant. Solid arrows indicate the standardised paths coefficients for relationships that are positive and significant at $p < .001$. Dashed arrows indicate the standardised paths coefficients for relationships that are positive but insignificant; $p > .05$. PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product; $N = 386$.

5.5.3.5.1. Direct Structural Relationships Significance, Sign, and Magnitude/Relevance for FirmLP's Predictors

Initially, as presented below in Table 5.23, the investigation of the FirmLP as the ultimate outcome construct of this study's model indicated that out of the FirmLP's six-predictors (i.e., three main constructs and three control variables), ProdLP had the highest significant positive and substantial direct effect (p < .001; β = .49; f^2 = .41), by accounting for 54.67% of the FirmLP's R^2 value (0.75), followed by PEProf with significant positive and medium direct effect (p < .001; β = .23; f^2 = .18), by accounting for 24% of the FirmLP's R^2 value (0.75), and then OperLP with significant positive and medium direct effect (p < .001; β = .20; f^2 = .16), by accounting for 21.33% of the FirmLP's R^2 value (0.75), while all the three control variables (i.e., firm size, firm age, and NP innovativeness) had insignificant and negligible direct effects.

Table 5.23. Direct structural relationships significance, sign, and magnitude/relevance for FirmLP's predictors

	Target Construct	***Path***	***P***	***β***	**Cohen's f^2**		***Predictor Constructs' Contributions % to FirmLP' R^2***	***R^2***
Predictor Constructs	***FirmLP***							***0.75***
ProdLP		a_3	< .001	0.49	0.41	Large	54.67	
PEProf		c_1	< .001	0.23	0.18	Medium	24	
OperLP		a_1	< .001	0.20	0.16	Medium	21.33	
Control Variables								
Firm Size			0.41	-0.01	< .02	Negligible		
Firm Age			0.13	-0.05	< .02	Negligible		
NP Innovativeness			0.24	0.02	< .02	Negligible		

Note: PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product; β, standardised paths coefficient; N = 386.

5.5.3.5.2. Direct Structural Relationships Significance, Sign, and Magnitude/Relevance for ProdLP's Predictors

Moving to ProdLP (i.e., the second/last intermediary outcome construct of this study's model), Table 5.24 reveals that out of the ProdLP's eight-predictors (i.e., five main constructs and three control variables), OperLP had the highest significant positive and substantial direct effect ($p < .001$; $\beta = .61$; $f^2 = .51$), by accounting for 67.11% of the ProdLP's R^2 value (0.76), followed by PEProf with significant positive and medium direct effect ($p < .001$; $\beta = .24$; $f^2 = .19$), by accounting for 25% of the ProdLP's R^2 value (0.76), while TMS and PFit had insignificant positive and small direct effects, and NP innovativeness as a control variable had a significant positive yet negligible direct effect ($p = .01$; $\beta = .08$; $f^2 < .02$), and finally CrosFI together with the remaining two control variables (i.e., firm size and firm age) had insignificant and negligible direct effects.

Table 5.24. Direct structural relationships significance, sign, and magnitude/relevance for ProdLP's predictors

	Target Construct	*Path*	*P*	*β*	Cohen's f^2		*Predictor Constructs' Contributions % to ProdLP' R^2*	*R^2*
Predictor Constructs								
OperLP		a_2	< .001	0.61	0.51	Large	67.11	
PEProf		b_1	< .001	0.24	0.19	Medium	25	
TMS		f_3	0.27	0.05	0.03	Small	3.95	
PFit	***ProdLP***	f_1	0.43	0.03	0.02	Small	2.63	***0.76***
CrosFI		f_2	0.38	0.02	0.01	Negligible	1.31	
Control Variables								
Firm Size			0.47	0.00	< .02	Negligible		
Firm Age			0.49	0.00	< .02	Negligible		
NP Innovativeness			0.01	0.08	< .02	Negligible		

Note: PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; NP, New Product. β, standardised paths coefficient. $N = 386$.

5.5.3.5.3. Direct Structural Relationships Significance, Sign, and Magnitude/Relevance for OperLP's Predictors

Regarding OperLP (i.e., the first intermediary outcome construct of this study's model), Table 5.25 shows that out of the OperLP's seven-predictors (i.e., four main constructs and three control variables), PEProf had a highly significant positive and substantial direct effect ($p < .001$; $\beta = .61$; $f^2 = .50$), by accounting for 74.63% of the OperLP's R^2 value (0.67), while the remaining three main constructs (i.e., TMS, PFit, and CrosFI) had insignificant positive and small direct effects, and all the three control variables (i.e., firm size, firm age, and NP innovativeness) had insignificant and negligible direct effects.

Table 5.25. Direct structural relationships significance, sign, and magnitude/relevance for OperLP's predictors

	Target Construct	*Path*	*P*	*β*	Cohen's f^2		*Predictor Constructs' Contributions % to OperLP' R^2*	R^2
Predictor Constructs	***OperLP***							***0.67***
PEProf		b_2	< .001	0.61	0.50	Large	74.63	
TMS		d_3	0.09	0.10	0.07	Small	10.45	
PFit		d_1	0.13	0.07	0.05	Small	7.46	
CrosFI		d_2	0.17	0.07	0.05	Small	7.46	
Control Variables								
Firm Size			0.31	0.02	< .02	Negligible		
Firm Age			0.16	-0.03	< .02	Negligible		
NP Innovativeness			0.42	-0.01	< .02	Negligible		

Note: PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; NP, New Product. *β*, standardised paths coefficient. *N* = 386.

5.5.3.5.4. *Direct Structural Relationships Significance, Sign, and Magnitude/Relevance for PEProf's Predictors*

Finally yet importantly, as displayed below in Table 5.26, the examination of the PEProf as the key process (mediator) construct of this study's model has revealed that out of the PEProf's six-predictors (i.e., three main constructs and three control variables), CrosFI had the highest significant positive and medium direct effect ($p < .001$; $\beta = .33$; $f^2 = .26$), by accounting for 36.11% of the PEProf's R^2 value (0.72), followed by TMS with significant positive and medium direct effect ($p < .001$; $\beta = .31$; $f^2 = .25$), by accounting for 34.72% of the PEProf's R^2 value (0.72), and then PFit with significant positive and medium direct effect ($p < .001$; $\beta = .26$; $f^2 = .20$), by accounting for 27.78% of the PEProf's R^2 value (0.72), while all the three control variables (i.e., firm size, firm age, and NP innovativeness) had insignificant and negligible direct effects.

Table 5.26. Direct structural relationships significance, sign, and magnitude/relevance for PEProf's predictors

	Target Construct	***Path***	***P***	***β***	**Cohen's f^2**		***Predictor Constructs' Contributions % to PEProf' R^2***	***R^2***
Predictor Constructs								
CrosFI		e_2	< .001	0.33	0.26	Medium	36.11	
TMS		e_3	< .001	0.31	0.25	Medium	34.72	
PFit	***PEProf***	e_1	< .001	0.26	0.20	Medium	27.78	***0.72***
Control Variables								
Firm Size			0.26	0.02	< .02	Negligible		
Firm Age			0.12	-0.04	< .02	Negligible		
NP Innovativeness			0.21	-0.03	< .02	Negligible		

Note: PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; NP, New Product. β, standardised paths coefficient. $N = 386$.

5.5.4. Hypotheses Testing: Mediation Analyses (Total, Direct, Total Indirect, Specific Indirect, and Sequential Indirect Effects)

Relying on the derived simultaneous estimates of the full structural model of this study (detailed in section 5.5.3.5 and depicted in Fig. 5.12), and in an endeavour to provide a detailed picture of this study's results and comprehensively test its theoretical model (i.e., CFEMOs, detailed in section 3.2.10 and presented in Fig. 3.1) and hypotheses (i.e., H1 to H14c, section 3.3), this section, by conducting comprehensive *mediation analyses*, explicates the total, direct, total indirect, specific indirect, and sequential indirect effects among the investigated variables. This conducted PLS-SEM mediation analyses adhered to the guidelines of the most relevant and influential literature regarding conducting mediation analyses in general (e.g., Baron & Kenny, 1986; Hayes, 2009, 2013; MacKinnon, 2008; Mathieu & Taylor, 2006; Preacher & Hayes, 2008; Taylor *et al.*, 2008; Van Jaarsveld *et al.*, 2010), and specifically PLS-SEM (e.g., Chin, 2010; Eberl, 2010; Hair *et al.*, 2014a; Helm *et al.*, 2010; Klarner *et al.*, 2013; Liang *et al.*, 2007; Sattler *et al.*, 2010; Streukens *et al.*, 2010).

In the rest of this section, and drawing from the above literature, an instructive background about mediation analysis is offered first, followed by providing the derived results from conducting the comprehensive mediation analyses of this study regarding its hypotheses testing: (1) H1 and H2 (i.e., the effect of OperLP on FirmLP, and the role of ProdLP in mediating this effect, section 5.5.4.1); (2) H3 and H4 (i.e., the effect of PEProf on ProdLP, and the role of OperLP in mediating this effect, section 5.5.4.2); (3) H5 to H8 (i.e., the effect of PEProf on FirmLP, and the roles of OperLP and ProdLP in mediating this effect, section 5.5.4.3); (4) H9a to H10c (i.e., the effects of PFit, CrosFI, and TMS on OperLP, and the roles of PEProf in mediating these effects, section 5.5.4.4); and (5) H11a to H14c (i.e., the effects of PFit, CrosFI, and TMS on ProdLP, and the roles of PEProf and OperLP in mediating these effects, section 5.5.4.5).

Initially, to avoid over and/or under estimated relationships and erroneous conclusions, including a relevant mediating variable in the structural model's PLS-SEM analysis may absorb a direct cause-effect relationship to some extent, and yield more precise and true relationship between two variables. Therefore, instead of limiting the focus on just the direct relationships, investigating both the direct and indirect (mediating) relationships via the potential relevant mediating variables (mediators) would provide better, more accurate and comprehensive understanding regarding the relevance of the different possible pathways (mechanism) through which the causal relationship(s) between the predictor (or independent, exogenous) variable(s) and the target (or dependant, endogenous) variable(s) might occur. To do so, the corresponding conditions for conducting a simple and multiple/advanced mediation analyses are provided below.

Firstly, conducting a simple mediation analysis to ascertain the extent to which (if any) a potential mediating variable M (mediator) is mediating the relationship between a predictor variable X and a target variable Y (X→M→Y) necessitates answering the following *three* questions:

1. *Is the direct effect (X→Y) significant before including the mediator M in the PLS-SEM model analysis?* As an interpretatively meaningful but not a must condition.
2. *Is the indirect effect via M (X→M→Y) significant after including the mediator M in the PLS-SEM model analysis?* A necessary (but not sufficient) condition for its significance is that both (X→M) and (M→Y) are significant. Therefore, if both of them are significant, then the significance of their product (X→M × M→Y) should be estimated and verified based on a non-parametric resampling technique, such as jackknifing. If any one of these three effects: (X→M), (M→Y), or their product (X→M × M→Y) is not significant, this indicates no mediating effect, but if all of them are significant, then a mediating effect via the mediator M is realised.

3. Provided that (X→M), (M→Y), and their product (X→M × M→Y) are significant, knowing whether M has a full or partial mediating effect requires identifying *“how much of the direct effect does the indirect effect (via the mediator M) absorb?”* by investigating the change (Δ) in the direct effect (X→Y) before and after including the mediator M in the PLS-SEM model analysis. If the previously significant direct effect (X→Y) before including M became insignificant (is still significant) after including M, then a full (partial) mediating effect via the mediator M is realised. Identifying the magnitude of M’s partial mediating effect requires determining the size of X’s specific indirect effect on Y via M (X→M→Y) in relation to its total effect (direct effect + specific indirect effect) by calculating its Variance Accounted For (VAF) value, whereby VAF = (specific indirect effect) / (total effect).

Secondly, conducting a multiple/advanced mediation analysis to ascertain the extent to which (if any) two potential mediating variables M1 and M2 are mediating the relationship between a predictor variable X and a target variable Y can explicate the: direct effect (X→Y); specific indirect effects via M1 (X→M1→Y) and M2 (X→M2→Y); sequential indirect effect via M1→M2 (X→M1→M2→Y); total indirect effect (specific indirect effects + sequential indirect effect); and total effect (direct effect + total indirect effect) among these four variables (X, M1, M2, and Y). While the same aforementioned steps for identifying the simple mediation analysis are applicable for identifying the specific indirect effects (X→M1→Y and X→M2→Y), and given that the total indirect effect = specific indirect effects + sequential indirect effect, identifying the sequential indirect effect (X→M1→M2→Y) necessitates answering the following *three* questions:

1. *Is the direct effect (X→Y) significant before including the two sequential mediators M1→M2 in the PLS-SEM model analysis?* As an interpretatively meaningful but not a must condition.

2. *Is the sequential indirect effect via M1→M2 (X→M1→M2→Y) significant after including M1→M2 in the PLS-SEM model analysis?* A necessary (but not sufficient) condition for its significance is that (X→M1), (M1→M2), and (M2→Y) are significant. Therefore, if all of them are significant, then the significance of their product (X→M1 × M1→M2 × M2→Y) should be estimated and verified based on a non-parametric resampling technique, such as jackknifing. If any one of these four effects: (X→M1), (M1→M2), (M2→Y), or their product (X→M1 × M1→M2 × M2→Y) is not significant, this indicates no sequential mediating effect, but if all of them are significant, then a sequential mediating effect via M1→M2 is realised.
3. Provided that all the above four effects are significant, knowing whether M1→M2 have a full (partial) and sequential mediating effect requires identifying *"how much of the direct effect does the sequential indirect effect (via M1→M2) absorb?"* by investigating the change (Δ) in the direct effect (X→Y) before and after including the two sequential mediators M1→M2 in the PLS-SEM model analysis. If the previously significant direct effect (X→Y) before including M1→M2 became insignificant (is still significant) after including M1→M2, then a full (partial) and sequential mediating effect via M1→M2 is realised. Identifying the magnitude of M1→M2's partial and sequential mediating effect requires determining the size of X's sequential indirect effect on Y via M1→M2 (X→M1→M2→Y) in relation to its total effect (direct effect + total indirect effect) by calculating its VAF value, whereby VAF = (sequential indirect effect) / (total effect). The same rule is applicable for calculating the VAF values for the specific indirect effects via M1 (X→M1→Y) and M2 (X→M2→Y), as well as for the total indirect effect via M1 + M2 (X→M1→Y + X→M2→Y + X→M1→M2→Y). In addition to calculating their VAF values, the magnitudes of the specific and sequential partial mediating effects can be interpreted based on their % of X's total indirect effect on Y.

Relying on the aforementioned instructive background about mediation analysis, the following sections (5.5.4.1 to 5.5.4.5) provide the derived results from the conducted comprehensive mediation analyses of this study regarding its hypotheses testing: H1 and H2; H3 and H4; H5 to H8; H9a to H10c; and H11a to H14c, respectively. It is noteworthy that the PLS jackknifing as a resampling method (with 386 resamples) was adopted for estimating the significance (*p* values) and relevance (β) of all the direct, indirect (mediated), and total structural relationships among the investigated variables.

5.5.4.1. H1 and H2: The Effect of OperLP on FirmLP, and the Role of ProdLP in Mediating this Effect

Initially, it was hypothesised that OperLP has a positive and significant direct effect on FirmLP (H1: OperLP→FirmLP = a_1), and that ProdLP mediates the effect of OperLP on FirmLP (H2: OperLP→ProdLP→FirmLP = $a_2 \times a_3$). Both H1 and H2 were empirically substantiated (Fig. 5.12; Table 5.27). Specifically, regarding H1, it was found that OperLP had a positive and significant direct effect on FirmLP (β = .20, $p < .001$). Referring to H2, because (OperLP→ProdLP: β = .61), (ProdLP→FirmLP: β = .49), and their product (OperLP→ProdLP × ProdLP→FirmLP: β = .30) were established as significant ($p < .001$), as well as OperLP→FirmLP was reduced from (β = .52, $p < .001$; before including the suggested mediator ProdLP; Fig. 5.13) to (β = .20, $p < .001$; after including ProdLP) with (Δ = – .32), it was concluded that the suggested mediator ProdLP had partially mediated the effect of OperLP on FirmLP (OperLP→ProdLP→FirmLP: β = .30, $p < .001$). To identify the magnitude of ProdLP's partial mediating effect, the size of OperLP's specific indirect effect on FirmLP via ProdLP (OperLP→ProdLP→FirmLP: .30) in relation to its total effect (direct effect: .20 + specific indirect effect: .30 = .50) was calculated in terms of its VAF value, whereby VAF = (specific indirect effect: .30) / (total effect: .50) = .60. Hence, OperLP→ProdLP→FirmLP accounted for 60% of OperLP's total effect on FirmLP (β = .50), compared with 40% by OperLP→FirmLP.

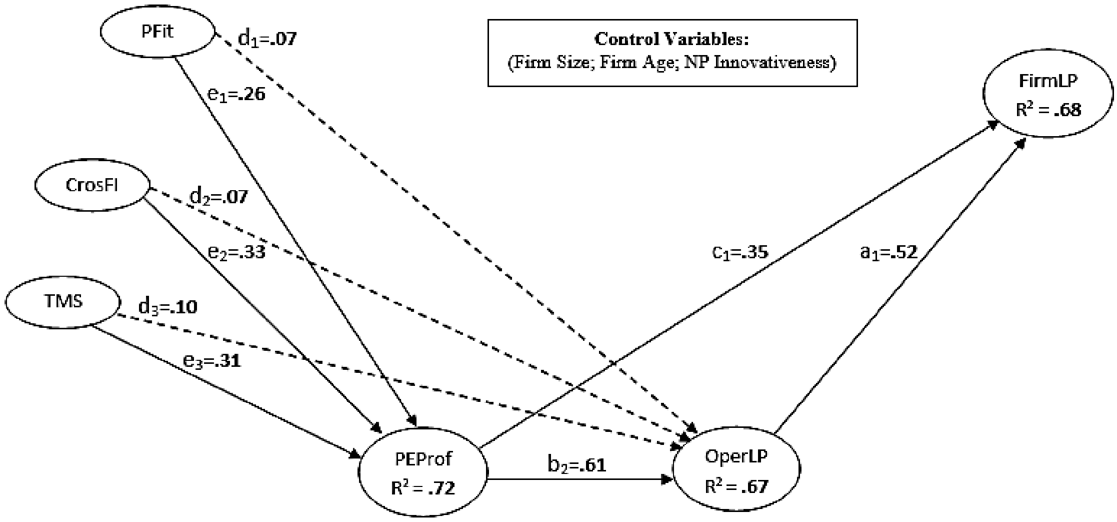


Fig. 5.13. Derived simultaneous estimates of the structural model without ProdLP

Note: Solid arrows indicate the standardised paths coefficients for relationships that are positive and significant at $p < .001$. Dashed arrows indicate the standardised paths coefficients for relationships that are positive but insignificant; $p > .05$. PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; FirmLP, Firm-Level Performance; NP, New Product; N = 386.

Table 5.27. H1 and H2: The effect of OperLP on FirmLP, and the role of ProdLP in mediating this effect

Investigated relationships	***β***	**% of the total effect (% of the total indirect effect: *Mediation magnitude*)**	***H***	**Support?**
OperLP→FirmLP				
Total effect	0.50***	100%		
Direct effect before including ProdLP	0.52***	100%		
Direct effect after including ProdLP	0.20*** (Δ: – 0.32)	40%	1	Yes
Specific indirect effect via ProdLP (OperLP→ProdLP→FirmLP)	0.30***	VAF: 60% (100%: *Partial*)	2	Yes

Note: OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; β, standardised paths coefficient; Δ, value change; ***, $p < .001$; VAF, Variance Accounted For; H, hypothesis; N = 386.

5.5.4.2. H3 and H4: The Effect of PEProf on ProdLP, and the Role of OperLP in Mediating this Effect

Moving to H3 and H4, it was hypothesised that PEProf has a positive and significant direct effect on ProdLP (H3: PEProf→ProdLP = b_1), and that OperLP mediates the effect of PEProf on ProdLP (H4: PEProf→OperLP→ProdLP = $b_2 \times a_2$). The results supported H3 and H4 (Fig. 5.12; Table 5.28). Precisely, concerning H3, it was revealed that PEProf had a positive and significant direct effect on ProdLP ($\beta = .24$, $p < .001$).

Respecting H4, because (PEProf→OperLP: $\beta = .612$), (OperLP→ProdLP: $\beta = .614$), and their product (PEProf→OperLP × OperLP→ProdLP: $\beta = .38$) were confirmed as significant ($p < .001$), as well as PEProf→ProdLP was reduced from ($\beta = .62$, $p < .001$; before including the suggested mediator OperLP; Fig. 5.14) to ($\beta = .24$, $p < .001$; after including OperLP) with ($\Delta = -.38$), it was concluded that the suggested mediator OperLP had partially mediated the effect of PEProf on ProdLP (PEProf→OperLP→ProdLP: $\beta = .38$, $p < .001$).

To identify the magnitude of OperLP's partial mediating effect, the size of PEProf's specific indirect effect on ProdLP via OperLP (PEProf→OperLP→ProdLP: .38) in relation to its total effect (direct effect: .24 + specific indirect effect: .38 = .62) was calculated in terms of its VAF value, whereby VAF = (specific indirect effect: .38) / (total effect: .62) = .61. Hence, PEProf→OperLP→ProdLP accounted for 61% of PEProf's total effect on ProdLP ($\beta = .62$), compared with 39% by PEProf→ProdLP.

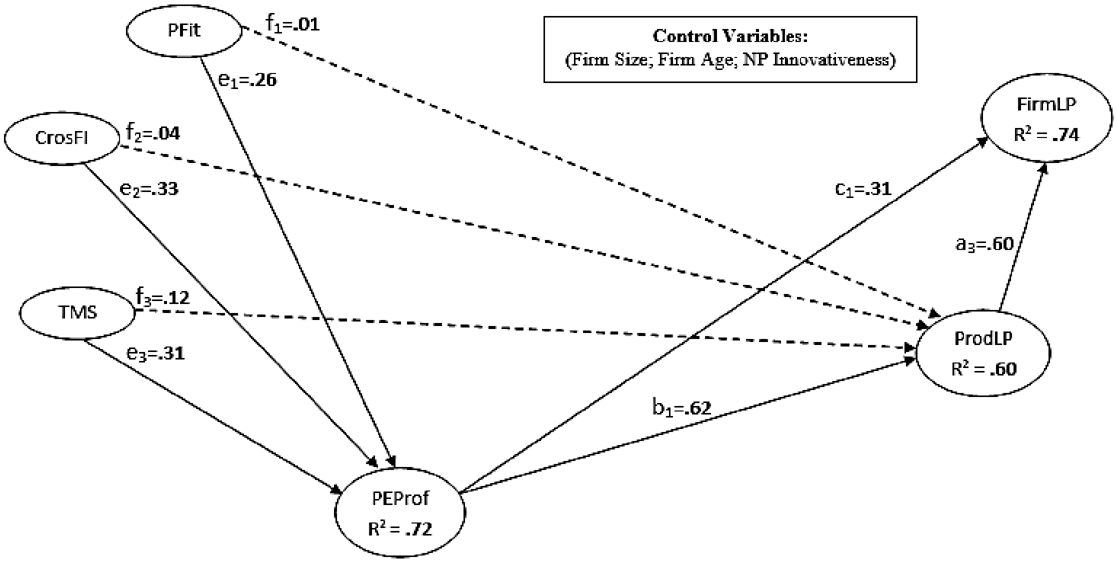


Fig. 5.14. Derived simultaneous estimates of the structural model without OperLP

Note: Solid arrows indicate the standardised paths coefficients for relationships that are positive and significant at $p < .001$. Dashed arrows indicate the standardised paths coefficients for relationships that are positive but insignificant; $p > .05$. PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product; N = 386.

Table 5.28. H3 and H4: The effect of PEProf on ProdLP, and the role of OperLP in mediating this effect

Investigated relationships	β	% of the total effect (% of the total indirect effect: *Mediation magnitude*)	H	Support?
PEProf→ProdLP				
Total effect	0.62***	100%		
Direct effect before including OperLP	0.62***	100%		
Direct effect after including OperLP	0.24*** (Δ: – 0.38)	39%	3	Yes
Specific indirect effect via OperLP (PEProf→OperLP→ProdLP)	0.38***	VAF: 61% (100%: *Partial*)	4	Yes

Note: PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; β, standardised paths coefficient; Δ, value change; ***, $p < .001$; VAF, Variance Accounted For; H, hypothesis; N = 386.

5.5.4.3. H5 to H8: The Effect of PEProf on FirmLP, and the Roles of OperLP and ProdLP in Mediating this Effect

Proceeding to H5 to H8, it was hypothesised that: PEProf has a positive and significant direct effect on FirmLP (H5: PEProf→FirmLP = c_1); OperLP mediates the effect of PEProf on FirmLP (H6: PEProf→OperLP→FirmLP = $b_2 \times a_1$); ProdLP mediates the effect of PEProf on FirmLP (H7: PEProf→ProdLP→FirmLP = $b_1 \times a_3$); and that OperLP and ProdLP sequentially mediate the effect of PEProf on FirmLP (H8: PEProf→OperLP→ProdLP→FirmLP = $b_2 \times a_2 \times a_3$). All these hypotheses were empirically proven (Fig. 5.12; Table 5.29). Specifically, referring to H5, it was found that PEProf had a positive and significant direct effect on FirmLP ($\beta = .23$, $p < .001$).

Regarding H6, because (PEProf→OperLP: $\beta = .61$), (OperLP→FirmLP: $\beta = .20$), and their product (PEProf→OperLP × OperLP→FirmLP: $\beta = .12$) were established as significant ($p < .001$), as well as PEProf→FirmLP was reduced from ($\beta = .77$, $p < .001$; before the simultaneous inclusion of the suggested two sequential mediators M1: OperLP and M2: ProdLP; Fig. 5.15) to ($\beta = .23$, $p < .001$; after their simultaneous inclusion) with ($\Delta = -.54$), it was concluded that the suggested mediator M1: OperLP (controlling for M2: ProdLP's simultaneous existence) had partially mediated the effect of PEProf on FirmLP (PEProf→OperLP→FirmLP: $\beta = .12$, $p < .001$). Similarly, respecting H7, because (PEProf→ProdLP: $\beta = .24$), (ProdLP→FirmLP: $\beta = .49$), and their product (PEProf→ProdLP × ProdLP→FirmLP: $\beta = .12$) were confirmed as significant ($p < .001$), as well as PEProf→FirmLP was reduced from ($\beta = .77$, $p < .001$; before the simultaneous inclusion of the suggested two sequential mediators M1: OperLP and M2: ProdLP; Fig. 5.15) to ($\beta = .23$, $p < .001$; after their simultaneous inclusion) with ($\Delta = -.54$), it was concluded that the suggested mediator M2: ProdLP (controlling for M1: OperLP's simultaneous existence) had partially mediated the effect of PEProf on FirmLP (PEProf→ProdLP→FirmLP: $\beta = .12$, $p < .001$).

With reference to H8, because (PEProf→OperLP: β = .612), (OperLP→ProdLP: β = .614), (ProdLP→FirmLP: β = .494), and their product (PEProf→OperLP × OperLP→ProdLP × ProdLP→FirmLP: β = .19) were established as significant (p < .001), as well as PEProf→FirmLP was reduced from (β = .77, p < .001; before the simultaneous inclusion of the suggested two sequential mediators M1: OperLP and M2: ProdLP; Fig. 5.15) to (β = .23, p < .001; after their simultaneous inclusion) with (Δ = –.54), it was concluded that the suggested two sequential mediators M1: OperLP and M2: ProdLP (OperLP→ProdLP) had partially and sequentially mediated the effect of PEProf on FirmLP (PEProf→OperLP→ProdLP→FirmLP: β = .19, p < .001).

Although it was not formally hypothesised, it is worth mentioning that the two suggested mediators (M1: OperLP + M2: ProdLP, collectively) had partially mediated the effect of PEProf on FirmLP (β = .43). In other words, PEProf had a positive and significant total indirect effect (β = .43, p < .001) on FirmLP via OperLP + ProdLP. Specifically, PEProf's total indirect effect on FirmLP via OperLP + ProdLP = PEProf's specific indirect effect on FirmLP via OperLP (PEProf→OperLP→FirmLP: .12) + PEProf's specific indirect effect on FirmLP via ProdLP (PEProf→ProdLP→FirmLP: .12) + PEProf's sequential indirect effect on FirmLP via OperLP→ProdLP (PEProf→OperLP→ProdLP→FirmLP: .19) = (β = .43). To identify the magnitude of OperLP + ProdLP's partial mediating effect, the size of PEProf's total indirect effect on FirmLP via OperLP + ProdLP (.43) in relation to its total effect (direct effect: .23 + total indirect effect: .43 = .66) was calculated in terms of its VAF value, whereby VAF = (total indirect effect: .43) / (total effect: .66) = .65. Hence, PEProf's total indirect effect on FirmLP via OperLP + ProdLP accounted for 65% of PEProf's total effect on FirmLP (β = .66), compared with 35% by PEProf→FirmLP. The magnitudes of: OperLP's, ProdLP's, and OperLP→ProdLP's partial mediating effects in terms of their VAF values, and their % of PEProf's total indirect effect on FirmLP are explained next.

Firstly, to identify the magnitude of OperLP's partial mediating effect, the size of PEProf's specific indirect effect on FirmLP via OperLP (PEProf→OperLP→FirmLP: .12) in relation to its total effect (direct effect: .23 + total indirect effect: .43 = .66) was calculated in terms of its VAF value, whereby VAF = (specific indirect effect: .12) / (total effect: .66) = .18. Hence, PEProf→OperLP→FirmLP accounted for 18% of PEProf's total effect on FirmLP (β = .66), compared with 35% by PEProf→FirmLP. Additionally, PEProf→OperLP→FirmLP accounted for 28% of PEProf's total indirect effect on FirmLP (β = .43).

Secondly, to identify the magnitude of ProdLP's partial mediating effect, the size of PEProf's specific indirect effect on FirmLP via ProdLP (PEProf→ProdLP→FirmLP: .12) in relation to its total effect (direct effect: .23 + total indirect effect: .43 = .66) was calculated in terms of its VAF value, whereby VAF = (specific indirect effect: .12) / (total effect: .66) = .18. Hence, PEProf→ProdLP→FirmLP accounted for 18% of PEProf's total effect on FirmLP (β = .66), compared with 35% by PEProf→FirmLP. Additionally, PEProf→ProdLP→FirmLP accounted for 28% of PEProf's total indirect effect on FirmLP (β = .43).

Thirdly, to identify the magnitude of OperLP→ProdLP's partial and sequential mediating effect, the size of PEProf's sequential indirect effect on FirmLP via OperLP→ProdLP (PEProf→OperLP→ProdLP→FirmLP: .19) in relation to its total effect (direct effect: .23 + total indirect effect: .43 = .66) was calculated in terms of its VAF value, whereby VAF = (sequential indirect effect: .19) / (total effect: .66) = .29. Hence, PEProf→OperLP→ProdLP→FirmLP accounted for 29% of PEProf's total effect on FirmLP (β = .66), compared with 35% by PEProf→FirmLP. Additionally, PEProf→OperLP→ProdLP→FirmLP accounted for 44% of PEProf's total indirect effect on FirmLP (β = .43).

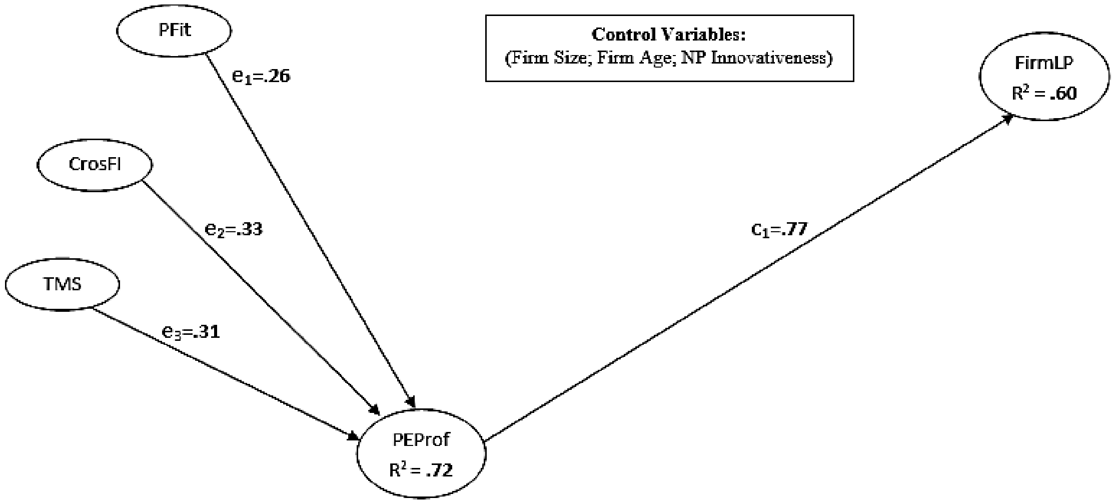


Fig. 5.15. Derived simultaneous estimates of the structural model without OperLP and ProdLP

Note: The standardised paths coefficients for all relationships are positive and significant at p < .001. PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; FirmLP, Firm-Level Performance; NP, New Product. N = 386.

Table 5.29. H5 to H8: The effect of PEProf on FirmLP, and the roles of OperLP and ProdLP in mediating this effect

Investigated relationships	β	% of the total effect (% of the total indirect effect: *Mediation magnitude*)	*H*	Support?
PEProf→FirmLP				
Total effect	0.66***	100%		
Direct effect before including OperLP and ProdLP	0.77***	100%		
Direct effect after including OperLP and ProdLP	0.23*** (Δ: – 0.54)	35%	5	Yes
Total indirect effect via OperLP + ProdLP	0.43***	VAF: 65% (100%: *Partial*)		
Specific indirect effect via OperLP (PEProf→OperLP→FirmLP)	0.12***	VAF: 18% (28%: *Partial*)	6	Yes
Specific indirect effect via ProdLP (PEProf→ProdLP→FirmLP)	0.12***	VAF: 18% (28%: *Partial*)	7	Yes
Sequential indirect effect via OperLP→ProdLP (PEProf→OperLP→ProdLP→FirmLP)	0.19***	VAF: 29% (44%: *Partial*)	8	Yes

Note: PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; β, standardised paths coefficient; Δ, value change; ***, p < .001; VAF, Variance Accounted For; *H*, hypothesis; N = 386.

5.5.4.4. H9a to H10c: The Effects of PFit, CrosFI, and TMS on OperLP, and the Roles of PEProf in Mediating these Effects

Turning to H9a to H10c, it was hypothesised that PFit, CrosFI, and TMS have positive and significant direct effects on OperLP (H9a: PFit→OperLP = d_1; H9b: CrosFI→OperLP = d_2; H9c: TMS→OperLP = d_3), and that PEProf mediates the effects of PFit, CrosFI, and TMS on OperLP (H10a: PFit→PEProf→OperLP = $e_1 \times b_2$; H10b: CrosFI→PEProf→OperLP = $e_2 \times b_2$; H10c: TMS→PEProf→OperLP = $e_3 \times b_2$). While H9a, H9b, and H9c were not supported, the results reinforced H10a, H10b, and H10c (Fig. 5.12; Table 5.30). Concerning PFit's, CrosFI's, and TMSs direct effects on OperLP, H9a, H9b, and H9c were not supported as it was revealed that PFit, CrosFI, and TMS had positive yet insignificant direct effects on OperLP (β = .07, p = .125; β = .07, p = .174; and β = .10, p = .092, respectively). Moving to the roles of PEProf in mediating the effects of PFit, CrosFI, and TMS on OperLP, H10a, H10b, and H10c were acknowledged as detailed below.

Referring to H10a, because (PFit→PEProf: β = .26), (PEProf→OperLP: β = .61), and their product (PFit→PEProf × PEProf→OperLP: β = .16) were confirmed as significant (p < .001), as well as PFit→OperLP was reduced from (β = .23, p < .001; before including the suggested mediator PEProf; Fig. 5.16) to (β = .07, p = .125; after including PEProf) with (Δ = – .16), it was concluded that the suggested mediator PEProf had fully mediated the effect of PFit on OperLP (PFit→PEProf→OperLP: β = .16, p < .001). Regarding H10b, because (CrosFI→PEProf: β = .33), (PEProf→OperLP: β = .61), and their product (CrosFI→PEProf × PEProf→OperLP: β = .20) were confirmed as significant (p < .001), as well as CrosFI→OperLP was reduced from (β = .28, p < .001; before including the suggested mediator PEProf; Fig. 5.16) to (β = .07, p = .174; after including PEProf) with (Δ = – .21), it was concluded that the suggested mediator PEProf had fully mediated the effect of CrosFI on OperLP (CrosFI→PEProf→OperLP: β = .20, p < .001).

Respecting H10c, because (TMS→PEProf: β = .31), (PEProf→OperLP: β = .61), and their product (TMS→PEProf × PEProf→OperLP: β = .19) were confirmed as significant (p < .001), as well as TMS→OperLP was reduced from (β = .29, p < .001; before including the suggested mediator PEProf; Fig. 5.16) to (β = .10, p = .092; after including PEProf) with (Δ = – .19), it was concluded that the suggested mediator PEProf had fully mediated the effect of TMS on OperLP (TMS→PEProf→OperLP: β = .19, p < .001).

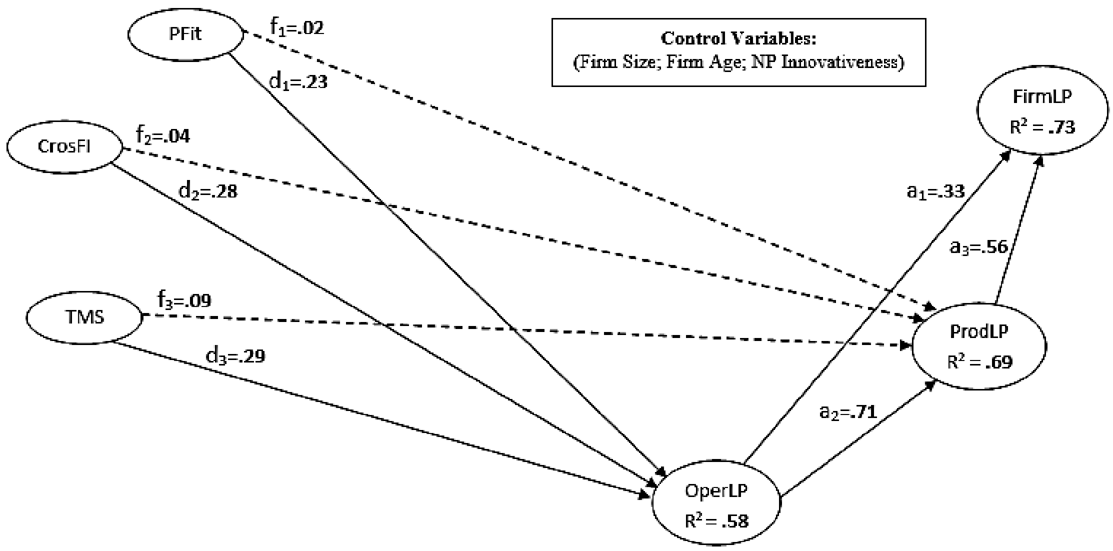


Fig. 5.16. Derived simultaneous estimates of the structural model without PEProf

Note: Solid arrows indicate the standardised paths coefficients for relationships that are positive and significant at p < .001. Dashed arrows indicate the standardised paths coefficients for relationships that are positive but insignificant; p > .05. PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product. N = 386.

Table 5.30. H9a to H10c: The effects of PFit, CrosFI, and TMS on OperLP, and the roles of PEProf in mediating these effects

Investigated relationships	β	% of the total effect (% of the total indirect effect: *Mediation magnitude*)	*H*	Support?
PFit→OperLP				
Total effect	0.23***	100%		
Direct effect before including PEProf	0.23***	100%		
Direct effect after including PEProf	0.07^{NS} (Δ: – 0.16)	30%	9a	No
Specific indirect effect via PEProf (PFit→PEProf→OperLP)	0.16***	70% (100%: *Full*)	10a	Yes
CrosFI→OperLP				
Total effect	0.27***	100%		
Direct effect before including PEProf	0.28***	100%		
Direct effect after including PEProf	0.07^{NS} (Δ:– 0.21)	26%	9b	No
Specific indirect effect via PEProf (CrosFI→PEProf→OperLP)	0.20***	74% (100%: *Full*)	10b	Yes
TMS→OperLP				
Total effect	0.29***	100%		
Direct effect before including PEProf	0.29***	100%		
Direct effect after including PEProf	0.10^{NS} (Δ: – 0.19)	34%	9c	No
Specific indirect effect via PEProf (TMS→PEProf→OperLP)	0.19***	66% (100%: *Full*)	10c	Yes

Note: PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; β, standardised paths coefficient; Δ, value change; ***, $p < .001$; NS, insignificant $p > .05$; VAF, Variance Accounted For; *H*, hypothesis; $N = 386$.

5.5.4.5. H11a to H14c: The Effects of PFit, CrosFI, and TMS on ProdLP, and the Roles of PEProf and OperLP in Mediating these Effects

Finally, to address the effects of PFit, CrosFI, and TMS on ProdLP, and the roles of PEProf and OperLP in mediating these effects, it was hypothesised that:

- PFit, CrosFI, and TMS have positive and significant direct effects on ProdLP:
  (H11a: PFit→ProdLP = f_1; H11b: CrosFI→ProdLP = f_2; H11c: TMS→ProdLP = f_3);
- PEProf mediates the effects of PFit, CrosFI, and TMS on ProdLP:
  (H12a: PFit→PEProf→ProdLP = $e_1 \times b_1$; H12b: CrosFI→PEProf→ProdLP = $e_2 \times b_1$; H12c: TMS→PEProf→ProdLP = $e_3 \times b_1$);

- OperLP mediates the effects of PFit, CrosFI, and TMS on ProdLP:
  (H13a: PFit→OperLP→ProdLP = $d_1 \times a_2$; H13b: CrosFI→OperLP→ProdLP = $d_2 \times a_2$; H13c: TMS→OperLP→ProdLP = $d_3 \times a_2$); and
- PEProf and OperLP sequentially mediate the effects of PFit, CrosFI, and TMS on ProdLP:
  (H14a: PFit→PEProf→OperLP→ProdLP = $e_1 \times b_2 \times a_2$; H14b: CrosFI→PEProf→OperLP→ProdLP = $e_2 \times b_2 \times a_2$; H14c: TMS→PEProf→OperLP→ProdLP = $e_3 \times b_2 \times a_2$).

While H11a to H11c and H13a to H13c were not supported, H12a to H12c and H14a to H14c were empirically substantiated (Fig. 5.12; Table 5.31). With reference to PFit's, CrosFI's, and TMSs direct effects on ProdLP, H11a, H11b, and H11c were not supported as it was found that PFit, CrosFI, and TMS had positive yet insignificant direct effects on ProdLP (β = .03, p = .431; β = .02, p = .384; and β = .05, p = .273, respectively). Concerning PEProf's roles in mediating the effects of PFit, CrosFI, and TMS on ProdLP, H12a, H12b, and H12c were accepted as detailed below.

Firstly, regarding H12a, because (PFit→PEProf: β = .26), (PEProf→ProdLP: β = .24), and their product (PFit→PEProf × PEProf→ProdLP: β = .06) were confirmed as significant (p < .001), as well as PFit→ProdLP was reduced from (β = .17, p < .001; before the simultaneous inclusion of the suggested two sequential mediators M1: PEProf and M2: OperLP; Fig. 5.17) to (β = .03, p = .431; after their simultaneous inclusion) with (Δ = – .14), it was concluded that the suggested mediator M1: PEProf (controlling for M2: OperLP's simultaneous existence) had fully mediated the effect of PFit on ProdLP (PFit→PEProf→ProdLP: β = .06, p < .001).

Secondly, referring to H12b, because (CrosFI→PEProf: $\beta = .33$), (PEProf→ProdLP: $\beta = .24$), and their product (CrosFI→PEProf × PEProf→ProdLP: $\beta = .08$) were confirmed as significant ($p < .001$), as well as CrosFI→ProdLP was reduced from ($\beta = .26$, $p < .001$; before the simultaneous inclusion of the suggested two sequential mediators M1: PEProf and M2: OperLP; Fig. 5.17) to ($\beta = .02$, $p = .384$; after their simultaneous inclusion) with ($\Delta = -.24$), it was concluded that the suggested mediator M1: PEProf (controlling for M2: OperLP's simultaneous existence) had fully mediated the effect of CrosFI on ProdLP (CrosFI→PEProf→ProdLP: $\beta = .08$, $p < .001$).

Thirdly, respecting H12c, because (TMS→PEProf: $\beta = .31$), (PEProf→ProdLP: $\beta = .24$), and their product (TMS→PEProf × PEProf→ProdLP: $\beta = .07$) were confirmed as significant ($p < .001$), as well as TMS→ProdLP was reduced from ($\beta = .31$, $p < .001$; before the simultaneous inclusion of the suggested two sequential mediators M1: PEProf and M2: OperLP; Fig. 5.17) to ($\beta = .05$, $p = .273$; after their simultaneous inclusion) with ($\Delta = -.26$), it was concluded that the suggested mediator M1: PEProf (controlling for M2: OperLP's simultaneous existence) had fully mediated the effect of TMS on ProdLP (TMS→PEProf→ProdLP: $\beta = .07$, $p < .001$).

Contrary to the aforementioned PEProf's full mediating roles, the OperLP's roles in mediating the effects of PFit, CrosFI, and TMS on ProdLP (H13a: PFit→OperLP→ProdLP; H13b: CrosFI→OperLP→ProdLP; and H13c: TMS→OperLP→ProdLP) were not realised because of PFit's, CrosFI's, and TMSs insignificant direct effects on OperLP ($\beta = .07$, $p = .125$; $\beta = .07$, $p = .174$; and $\beta = .10$, $p = .092$, respectively). However, an empirical support was found for PEProf→OperLP's full and sequential mediating roles for the effects of PFit, CrosFI, and TMS on ProdLP (H14a: PFit→PEProf→OperLP→ProdLP; H14b: CrosFI→PEProf→OperLP→ProdLP; and H14c: TMS→PEProf→OperLP→ProdLP), as detailed next.

Firstly, regarding H14a, because (PFit→PEProf: β = .26), (PEProf→OperLP: β = .61), (OperLP→ProdLP: β = .61), and their product (PFit→PEProf × PEProf→OperLP × OperLP→ProdLP: β = .10) were established as significant (p < .001), as well as PFit→ProdLP was reduced from (β = .17, p < .001; before the simultaneous inclusion of the suggested two sequential mediators M1: PEProf and M2: OperLP; Fig. 5.17) to (β = .03, p = .431; after their simultaneous inclusion) with (Δ = – .14), it was concluded that PEProf→OperLP had fully and sequentially mediated the effect of PFit on ProdLP (PFit→PEProf→OperLP→ProdLP: β = .10, p < .001).

Secondly, referring to H14b, because (CrosFI→PEProf: β = .33), (PEProf→OperLP: β = .61), (OperLP→ProdLP: β = .61), and their product (CrosFI→PEProf × PEProf→OperLP × OperLP→ProdLP: β = .12) were established as significant (p < .001), as well as CrosFI→ProdLP was reduced from (β = .26, p < .001; before the simultaneous inclusion of the suggested two sequential mediators M1: PEProf and M2: OperLP; Fig. 5.17) to (β = .02, p = .384; after their simultaneous inclusion) with (Δ = – .24), it was concluded that PEProf→OperLP had fully and sequentially mediated the effect of CrosFI on ProdLP (CrosFI→PEProf→OperLP→ProdLP: β = .12, p < .001).

Thirdly, respecting H14c, because (TMS→PEProf: β = .31), (PEProf→OperLP: β = .61), (OperLP→ProdLP: β = .61), and their product (TMS→PEProf × PEProf→OperLP × OperLP→ProdLP: β = .12) were established as significant (p < .001), as well as TMS→ProdLP was reduced from (β = .31, p < .001; before the simultaneous inclusion of the suggested two sequential mediators M1: PEProf and M2: OperLP; Fig. 5.17) to (β = .05, p = .273; after their simultaneous inclusion) with (Δ = – .26), it was concluded that PEProf→OperLP had fully and sequentially mediated the effect of TMS on ProdLP (TMS→PEProf→OperLP→ProdLP: β = .12, p < .001).

Finally, although it was not formally hypothesised, it is worth mentioning that the two suggested mediators (M1: PEProf + M2: OperLP, collectively) had fully mediated the effects of PFit, CrosFI, and TMS on ProdLP (β = .20; β = .24; and β = .25, respectively). In other words, PFit, CrosFI, and TMS had positive and significant total indirect effects (β = .20, p < .001; β = .24, p < .001; and β = .25, p < .001, respectively) on ProdLP via PEProf + OperLP. These three total indirect effects are detailed below.

Firstly, PFit's total indirect effect on ProdLP via PEProf + OperLP = PFit's specific indirect effect on ProdLP via PEProf (PFit→PEProf→ProdLP: .06) + PFit's specific indirect effect on ProdLP via OperLP (PFit→OperLP→ProdLP: .04) + PFit's sequential indirect effect on ProdLP via PEProf→OperLP (PFit→PEProf→OperLP→ProdLP: .10) = (β = .20).

Regarding the components of PFit's total indirect effect, PFit→PEProf→ProdLP, PFit→OperLP→ProdLP, and PFit→PEProf→OperLP→ProdLP accounted for (30%, 20%, and 50%, respectively) of PFit's total indirect effect on ProdLP (β = .20).

Secondly, CrosFI's total indirect effect on ProdLP via PEProf + OperLP = CrosFI's specific indirect effect on ProdLP via PEProf (CrosFI→PEProf→ProdLP: .08) + CrosFI's specific indirect effect on ProdLP via OperLP (CrosFI→OperLP→ProdLP: .04) + CrosFI's sequential indirect effect on ProdLP via PEProf→OperLP (CrosFI→PEProf→OperLP→ProdLP: .12) = (β = .24).

Concerning the components of CrosFI's total indirect effect, CrosFI→PEProf→ProdLP, CrosFI→OperLP→ProdLP, and CrosFI→PEProf→OperLP→ProdLP accounted for (33%, 17%, and 50%, respectively) of CrosFI's total indirect effect on ProdLP (β = .24).

Thirdly, TMSs total indirect effect on ProdLP via PEProf + OperLP = TMSs specific indirect effect on ProdLP via PEProf (TMS→PEProf→ProdLP: .07) + TMSs specific indirect effect on ProdLP via OperLP (TMS→OperLP→ProdLP: .06) + TMSs sequential indirect effect on ProdLP via PEProf→OperLP (TMS→PEProf→OperLP→ProdLP: .12) = (β = .25).

Respecting the components of TMSs total indirect effect, TMS→PEProf→ProdLP, TMS→OperLP→ProdLP, and TMS→PEProf→OperLP→ProdLP accounted for (28%, 24%, and 48%, respectively) of TMSs total indirect effect on ProdLP (β = .25).

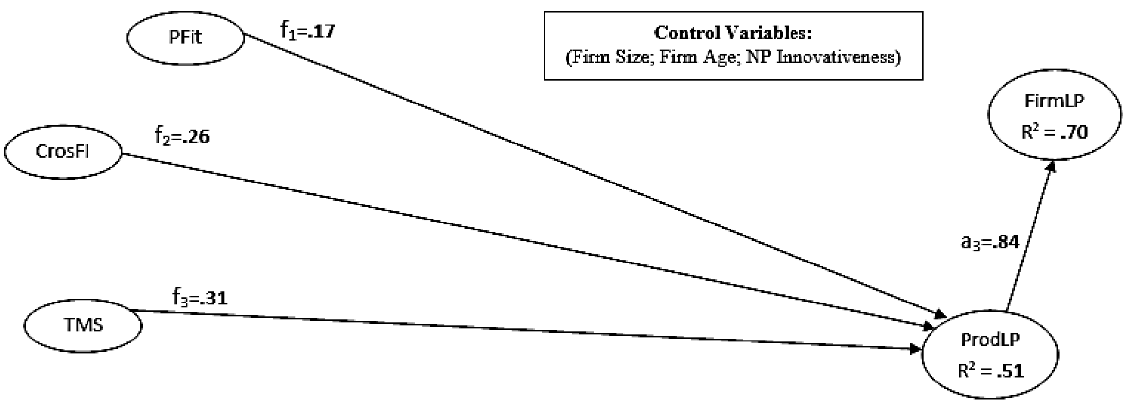


Fig. 5.17. Derived simultaneous estimates of the structural model without PEProf and OperLP

Note: The standardised paths coefficients for all relationships are positive and significant at p < .001. PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product. N = 386.

Table 5.31. H11a to H14c: The effects of PFit, CrosFI, and TMS on ProdLP, and the roles of PEProf and OperLP in mediating these effects

Investigated relationships	β	% of the total effect (% of the total indirect effect: *Mediation magnitude*)	*H*	Support?
PFit→ProdLP				
Total effect	0.23***	100%		
Direct effect before including PEProf and OperLP	0.17***	100%		
Direct effect after including PEProf and OperLP	0.03^{NS} (Δ: – 0.14)	13%	11a	No
Total indirect effect via PEProf + OperLP	0.20***	87% (100%: *Full*)		
Specific indirect effect via PEProf (PFit→PEProf→ProdLP)	0.06***	(30%: *Full*)	12a	Yes
Specific indirect effect via OperLP (PFit→OperLP→ProdLP)	0.04^{NS}	(20%: *No*)	13a	No
Sequential indirect effect via PEProf→OperLP (PFit→PEProf→OperLP→ProdLP)	0.10***	(50%: *Full*)	14a	Yes
CrosFI→ProdLP				
Total effect	0.26***	100%		
Direct effect before including PEProf and OperLP	0.26***	100%		
Direct effect after including PEProf and OperLP	0.02^{NS} (Δ: – 0.24)	8%	11b	No
Total indirect effect via PEProf + OperLP	0.24***	92% (100%: *Full*)		
Specific indirect effect via PEProf (CrosFI→PEProf→ProdLP)	0.08***	(33%: *Full*)	12b	Yes
Specific indirect effect via OperLP (CrosFI→OperLP→ProdLP)	0.04^{NS}	(17%: *No*)	13b	No
Sequential indirect effect via PEProf→OperLP (CrosFI→PEProf→OperLP→ProdLP)	0.12***	(50%: *Full*)	14b	Yes
TMS→ProdLP				
Total effect	0.30***	100%		
Direct effect before including PEProf and OperLP	0.31***	100%		
Direct effect after including PEProf and OperLP	0.05^{NS} (Δ: – 0.26)	17%	11c	No
Total indirect effect via PEProf + OperLP	0.25***	83% (100%: *Full*)		
Specific indirect effect via PEProf (TMS→PEProf→ProdLP)	0.07***	(28%: *Full*)	12c	Yes
Specific indirect effect via OperLP (TMS→OperLP→ProdLP)	0.06^{NS}	(24%: *No*)	13c	No
Sequential indirect effect via PEProf→OperLP (TMS→PEProf→OperLP→ProdLP)	0.12***	(48%: *Full*)	14c	Yes

Note: PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; β, standardised paths coefficient; Δ, value change; ***, $p < .001$; NS, insignificant $p > .05$; VAF, Variance Accounted For; *H*, hypothesis; $N = 386$.

5.5.5. Further Analysis: Importance-Performance Matrix Analysis (IPMA)

This section aims to extend and complement the aforementioned main findings of the current study and make them clearer and more applicable to product innovation managers, especially who have limited available resources, yet pursue prioritised, effective and efficient improvements in their product innovation practices (e.g., PFit, CrosFI, and TMS), process (e.g., PEProf), and performance outcomes (e.g., OperLP, ProdLP, and FirmLP). To this end, the researcher has conducted PLS-SEM-based IPMA (priority mappings) for this study's: (1) seven formative constructs by their items (at the measurement model level, section 5.5.5.1); (2) four target constructs by their predictor constructs (at the structural model level, section 5.5.5.2); and (3) four target constructs by their predictor constructs items (across the measurement and structural models levels, section 5.5.5.3). These conducted PLS-SEM-based IPMA adhered to the guidelines of the most relevant and influential literature regarding conducting IPMA in general (e.g., Kristensen *et al.*, 2000; Martilla & James, 1977; Slack, 1994), and specifically PLS-SEM (e.g., Albers, 2010; Boßow-Thies & Albers, 2010; Eberl, 2010; Hair *et al.*, 2014a; Höck *et al.*, 2010; Rigdon *et al.*, 2011; Völckner *et al.*, 2010). Before explaining the conducted PLS-SEM-based IPMA (priority mappings), and drawing from this relevant literature, an instructive background about PLS-SEM-based IPMA is provided first.

Initially, an IPMA can be conducted along three levels: (1) at the measurement model level (between formative constructs and their respective items); (2) at the structural model level (between target constructs and their respective predictor constructs); and/or (3) across the measurement and structural models levels (between target constructs and their respective predictor constructs items). An IPMA (priority mapping) is typically depicted along two dimensions/axis of a grid, namely importance dimension/axis and performance dimension/axis.

While *performance dimension* (i.e., along the “Y” axis) is derived from an index value (rescaled average score on a scale of 0 to 100) for an item and/or construct, *importance dimension* (i.e., along the “X” axis) is obtained from: (1) an item weight on its respective formative construct (at the measurement model level); (2) a predictor constructs total effect (= direct effect + indirect effect/s) on its respective target construct (at the structural model level); or (3) a predictor construct item total effect (= predictor construct item weight × predictor construct’s total effect) on its respective target construct (across the measurement and structural models levels).

For a formative construct and/or target construct’s explanation/prediction, IPMA makes contrasting along the relative importance and performance dimensions, whereby a formative item and/or predictor construct (compared with its associated formative items and/or predictor constructs) can hold a position within one of four broad categories/mixes: (1) high importance/high performance; (2) high importance/low performance; (3) low importance/high performance; and (4) low importance/low performance. Following IPMA (priority mapping), *managers have to*: maintain their good work for the first category ones; put their first priority for improving the second category ones; reallocate their excess resources/efforts from the third category to the second category ones; and put their last priority for improving the fourth category ones.

In this sense, product innovation managers (especially who have a limited-resources availability) can have access to fine-grained and actionable information about their product innovation practices (e.g., PFit, CrosFI, and TMS), process (e.g., PEProf), and performance outcomes (e.g., OperLP, ProdLP, and FirmLP), along two dimensions (i.e., importance and performance), and at three interrelated levels (i.e., the measurement model level, the structural model level, and across the measurement and structural model levels), which in turn can allow for prioritised, effective and efficient improvement actions.

Relying on the aforementioned instructive background about IPMA, the following sections (5.5.5.1, 5.5.5.2, and 5.5.5.3, respectively) explain the derived results from the conducted PLS-SEM-based IPMA (priority mappings) for this study's: (1) seven formative constructs by their items (at the measurement model level); (2) four target constructs by their predictor constructs (at the structural model level); and (3) four target constructs by their predictor constructs items (across the measurement and structural models levels).

5.5.5.1. IPMA (Priority Mappings) for the Formative Constructs by their Items (at the Measurement Model Level)

This section explains the derived results from the conducted PLS-SEM-based IPMA (priority mappings) for forming this study's seven formative constructs (i.e., PFit, CrosFI, TMS, PEProf, OperLP, ProdLP, and FirmLP) by their respective items (at the measurement model level).

5.5.5.1.1. IPMA for PFit by its Items

Initially, regarding PFit, the resulted IPMA (priority map) for PFit's formation by its respective items (Table 5.32 and Fig. 5.18) showed that MFit2 was ranked first from an importance perspective (item weight: 0.241), while ranked fourth from a performance perspective (item index value: 71.04%). In contrast, TFit2 was ranked fifth and last from an importance perspective (item weight: 0.185), while ranked first from a performance perspective (item index value: 72.90%).

Table 5.32. IPMA for PFit by its items

Formative Construct	Formative Items	Importance (Item Weight)		Performance (Rescaled Average Item Score)	
		Rank	β	%	Rank
PFit	MFit2	1	0.241	71.04	4
	MFit3	2	0.235	72.02	3
	MFit1	3	0.223	70.62	5
	TFit1	4	0.214	72.12	2
	TFit2	5	0.185	72.90	1
	Average	0.220		71.74	

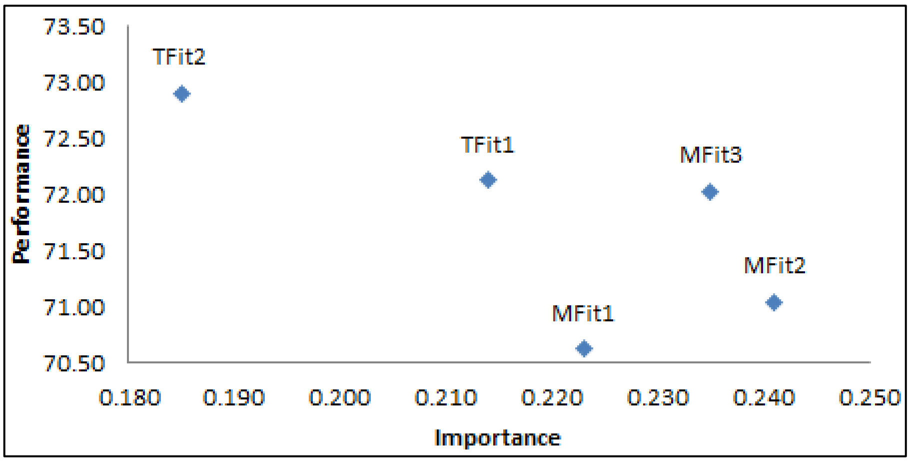


Fig. 5.18. IPMA (priority map) for PFit by its items

5.5.5.1.2. IPMA for CrosFI by its Items

Concerning CrosFI, the obtained IPMA (priority map) for CrosFI's formation by its associated items (Table 5.33 and Fig. 5.19) has revealed that CrosFI's items were characterised by a perfect match/fit between their performance and importance levels.

Table 5.33. IPMA for CrosFI by its items

Formative Construct	Formative Items	Importance (Item Weight)		Performance (Rescaled Average Item Score)	
		Rank	β	%	Rank
CrosFI	CrosFI2	1	0.367	75.85	1
	CrosFI1	2	0.364	75.49	2
	CrosFI3	3	0.343	73.21	3
	Average	0.358		74.85	

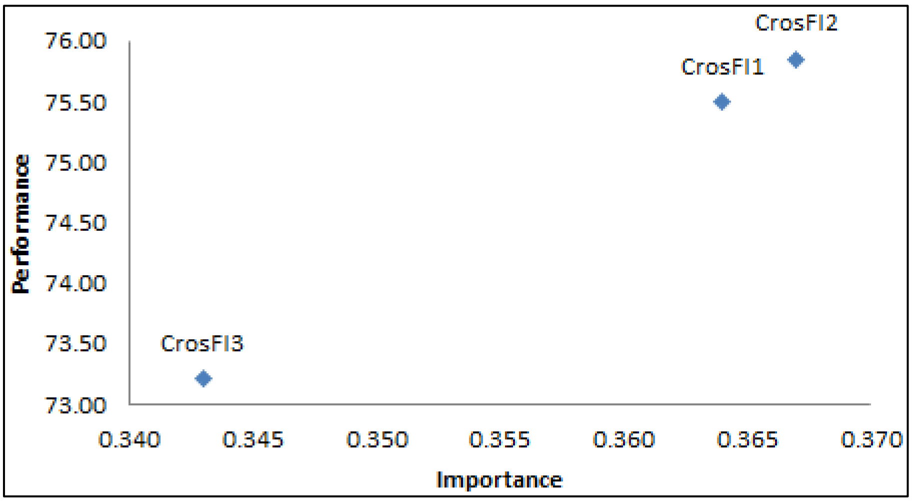


Fig. 5.19. IPMA (priority map) for CrosFI by its items

5.5.5.1.3. IPMA for TMS by its Items

With reference to TMS, the resulted IPMA (priority map) for TMSs formation by its respective items (Table 5.34 and Fig. 5.20) indicated that TMS3 was ranked first from an importance perspective (item weight: 0.356), while ranked second from a performance perspective (item index value: 73.42%). On the other hand, TMS2 was ranked third and last from an importance perspective (item weight: 0.351), while ranked first from a performance perspective (item index value: 74.15%).

Table 5.34. IPMA for TMS by its items

Formative Construct	Formative Items	Importance (Item Weight)		Performance (Rescaled Average Item Score)	
		Rank	*β*	%	Rank
TMS	TMS3	1	0.356	73.42	2
	TMS1	2	0.352	73.32	3
	TMS2	3	0.351	74.15	1
	Average	0.353		73.63	

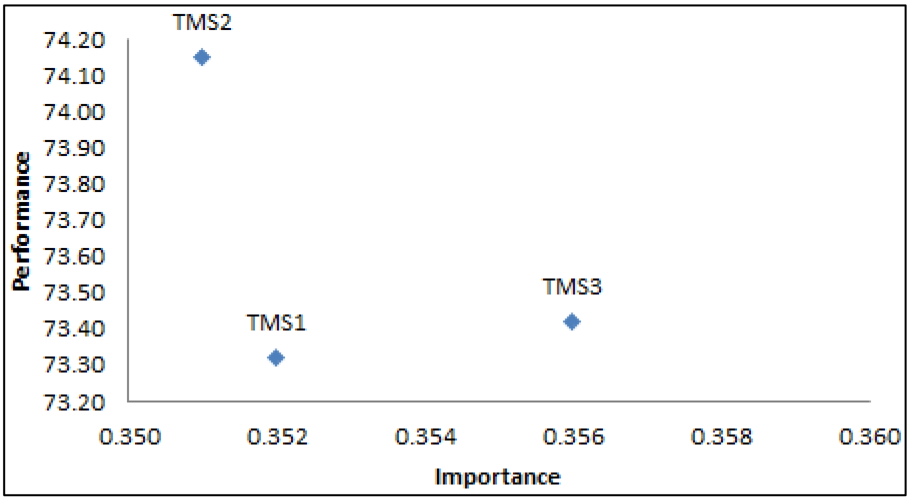


Fig. 5.20. IPMA (priority map) for TMS by its items

5.5.5.1.4. IPMA for PEProf by its Items

Respecting PEProf, the obtained IPMA (priority map) for PEProf's formation by its associated items (Table 5.35 and Fig. 5.21) showed that both MAProf4 and TAProf1 were characterised by a perfect match/fit between their performance and importance levels. Additionally, TAProf2 was ranked second from an importance perspective (item weight: 0.175), while ranked fourth from a performance perspective (item index value: 76.48%). In contrast, MAProf3 was ranked seventh and last from an importance perspective (item weight: 0.144), while ranked second from a performance perspective (item index value: 77.25%).

Table 5.35. IPMA for PEProf by its items

Formative Construct	Formative Items	Importance (Item Weight)		Performance (Rescaled Average Item Score)	
		Rank	β	%	Rank
PEProf	MAProf4	1	0.175	77.41	1
	TAProf2	2	0.175	76.48	4
	MAProf1	3	0.172	73.73	7
	MAProf2	4	0.164	74.92	6
	TAProf1	5	0.159	75.03	5
	TAProf3	6	0.158	77.15	3
	MAProf3	7	0.144	77.25	2
	Average	0.164		76.00	

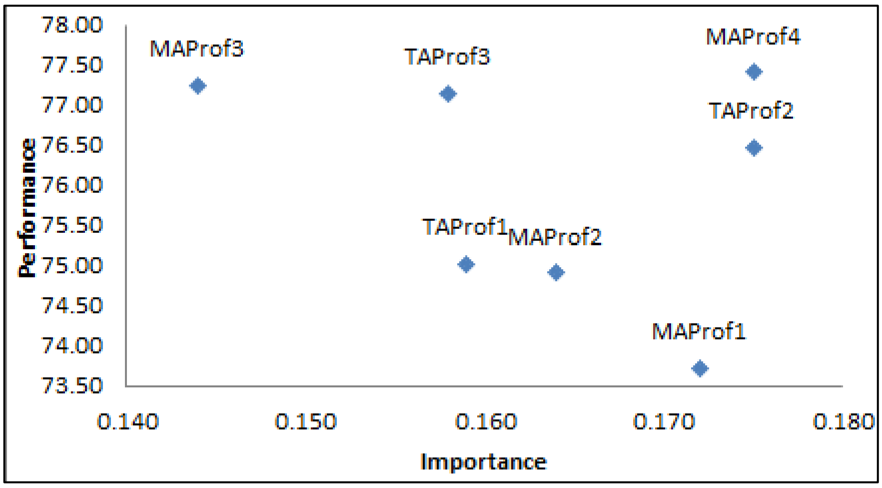


Fig. 5.21. IPMA (priority map) for PEProf by its items

5.5.5.1.5. IPMA for OperLP by its Items

In relation to OperLP, the resulted IPMA (priority map) for OperLP's formation by its respective items (Table 5.36 and Fig. 5.22) has revealed that NPDTS2 was characterised by a perfect match/fit between its performance and importance levels. Additionally, NPDCS2 was ranked first from an importance perspective (item weight: 0.204), while ranked sixth and last from a performance perspective (item index value: 77.67%). Oppositely, NPQS2 was ranked sixth and last from an importance perspective (item weight: 0.170), while ranked first from a performance perspective (item index value: 80.93%).

Table 5.36. IPMA for OperLP by its items

Formative Construct	Formative Items	Importance (Item Weight)		Performance (Rescaled Average Item Score)	
		Rank	β	%	Rank
OperLP	NPDCS2	1	0.204	77.67	6
	NPDCS1	2	0.204	79.07	4
	NPQS1	3	0.197	80.31	2
	NPDTS1	4	0.188	79.84	3
	NPDTS2	5	0.185	77.77	5
	NPQS2	6	0.170	80.93	1
	Average	0.191		79.27	

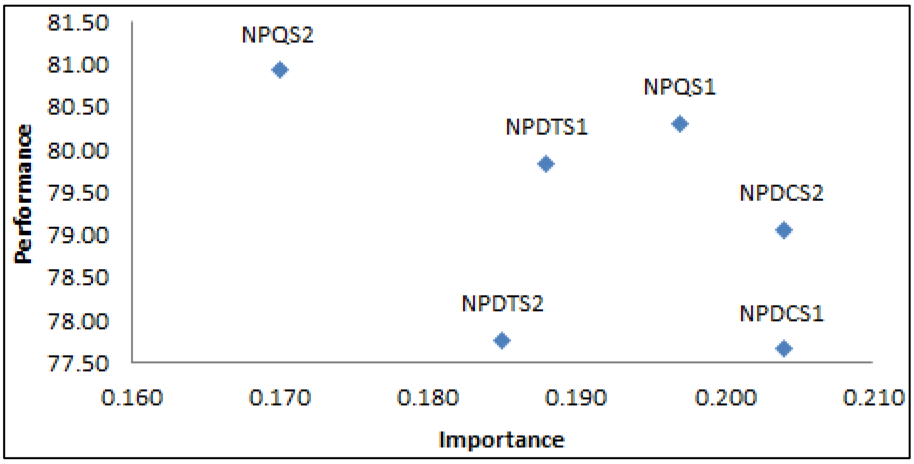


Fig. 5.22. IPMA (priority map) for OperLP by its items

5.5.5.1.6. IPMA for ProdLP by its Items

Concerning ProdLP, the obtained IPMA (priority map) for ProdLP's formation by its associated items (Table 5.37 and Fig. 5.23) indicated that ProdLP2 was ranked first from an importance perspective (item weight: 0.372), while ranked second from a performance perspective (item index value: 80.62%). Oppositely, ProdLP1 was ranked third and last from an importance perspective (item weight: 0.358), while ranked first from a performance perspective (item index value: 81.66%).

Table 5.37. IPMA for ProdLP by its items

Formative Construct	Formative Items	Importance (Item Weight)		Performance (Rescaled Average Item Score)	
		Rank	β	%	Rank
ProdLP	ProdLP2	1	0.372	80.62	2
	ProdLP3	2	0.367	80.26	3
	ProdLP1	3	0.358	81.66	1
	Average	0.366		80.85	

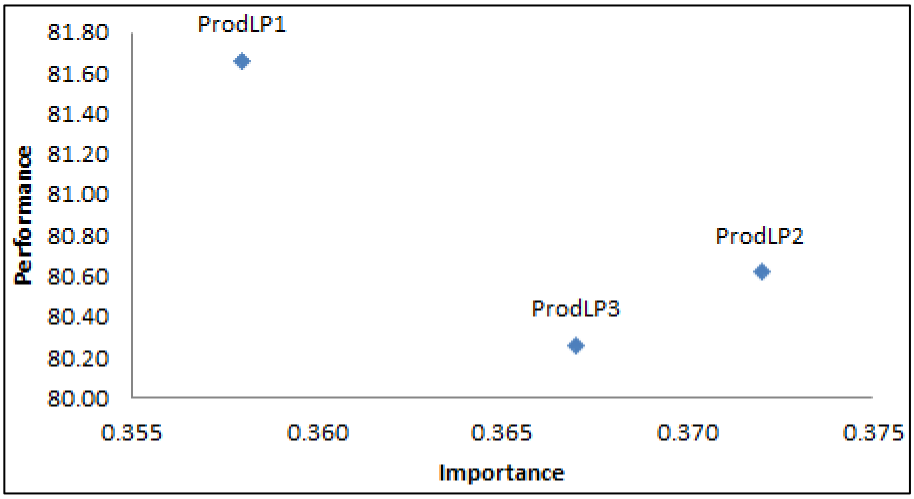


Fig. 5.23. IPMA (priority map) for ProdLP by its items

5.5.5.1.7. IPMA for FirmLP by its Items

Finally, referring to FirmLP, the resulted IPMA (priority map) for FirmLP's formation by its respective items (Table 5.38 and Fig. 5.24) showed that FirmLP1 was characterised by a perfect match/fit between its performance and importance levels. Additionally, FirmLP2 was ranked first from an importance perspective (item weight: 0.369), while ranked third and last from a performance perspective (item index value: 82.02%). Oppositely, FirmLP3 was ranked third and last from an importance perspective (item weight: 0.362), while ranked first from a performance perspective (item index value: 82.54%).

Table 5.38. IPMA for FirmLP by its items

Formative Construct	Formative Items	Importance (Item Weight)		Performance (Rescaled Average Item Score)	
		Rank	β	%	Rank
FirmLP	FirmLP2	1	0.369	82.02	3
	FirmLP1	2	0.366	82.23	2
	FirmLP3	3	0.362	82.54	1
	Average	0.366		82.26	

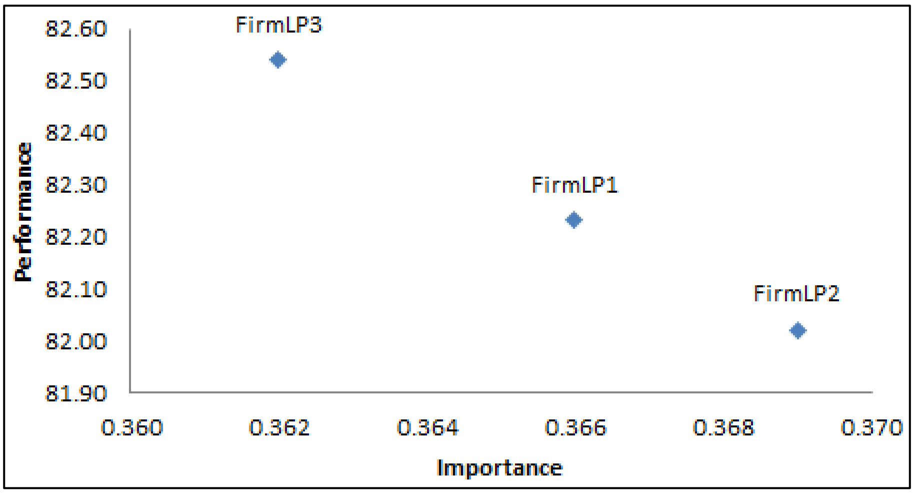


Fig. 5.24. IPMA (priority map) for FirmLP by its items

5.5.5.2. IPMA (Priority Mappings) for the Target Constructs by their Predictor Constructs (at the Structural Model Level)

This section explains the derived results from the conducted PLS-SEM-based IPMA (priority mappings) for explaining/predicting this study's four target constructs (i.e., PEProf, OperLP, ProdLP, and FirmLP) by their respective predictor constructs (at the structural model level).

5.5.5.2.1. IPMA for PEProf by its Predictor Constructs

Initially, respecting PEProf, the obtained IPMA (priority map) for PEProf's explanation/prediction by its associated predictor constructs (Table 5.39 and Fig. 5.25) showed that PEProf's predictor constructs were characterised by a perfect match/fit between their performance and importance levels.

Table 5.39. IPMA for PEProf by its predictor constructs

Target Construct	Predictor Constructs	Importance (Total Effect)		Performance (Rescaled Average Construct Score)	
		Rank	β	%	Rank
PEProf	CrosFI	1	0.33	74.85	1
	TMS	2	0.31	73.63	2
	PFit	3	0.26	71.74	3
	Average	0.30		73.41	

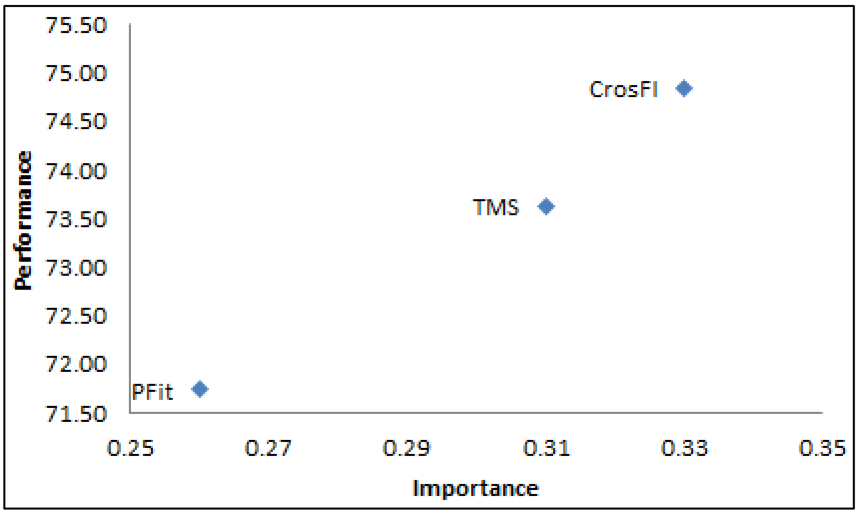


Fig. 5.25. IPMA (priority map) for PEProf by its predictor constructs

5.5.5.2.2. IPMA for OperLP by its Predictor Constructs

In relation to OperLP, the resulted IPMA (priority map) for OperLP's explanation/prediction by its respective predictor constructs (Table 5.40 and Fig. 5.26) has revealed that both PEProf and PFit were characterised by a perfect match/fit between their performance and importance levels. Additionally, TMS was ranked second from an importance perspective (predictor construct's total effect: 0.29), while ranked third from a performance perspective (predictor construct's index value: 73.63%). Oppositely, CrosFI was ranked third from an importance perspective (predictor construct's total effect: 0.27), while ranked second from a performance perspective (predictor construct's index value: 74.85%).

Table 5.40. IPMA for OperLP by its predictor constructs

Target Construct	Predictor Constructs	Importance (Total Effect)		Performance (Rescaled Average Construct Score)	
		Rank	β	%	Rank
OperLP	PEProf	1	0.61	76.00	1
	TMS	2	0.29	73.63	3
	CrosFI	3	0.27	74.85	2
	PFit	4	0.23	71.74	4
	Average	0.35		74.06	

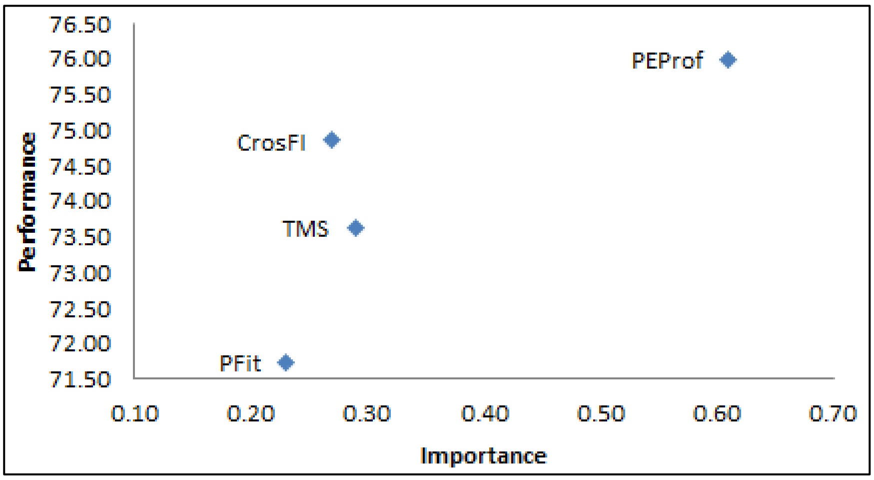


Fig. 5.26. IPMA (priority map) for OperLP by its predictor constructs

5.5.5.2.3. IPMA for ProdLP by its Predictor Constructs

Concerning ProdLP, the obtained IPMA (priority map) for ProdLP's explanation/prediction by its associated predictor constructs (Table 5.41 and Fig. 5.27) indicated that PFit was characterised by a perfect match/fit between its performance and importance levels. Additionally, PEProf was ranked first from an importance perspective (predictor construct's total effect: 0.62), while ranked second from a performance perspective (predictor construct's index value: 76.00%). On the other hand, CrosFI was ranked fourth from an importance perspective (predictor construct's total effect: 0.26), while ranked third from a performance perspective (predictor construct's index value: 74.85%).

Table 5.41. IPMA for ProdLP by its predictor constructs

Target Construct	Predictor Constructs	Importance (Total Effect)		Performance (Rescaled Average Construct Score)	
		Rank	β	%	Rank
ProdLP	PEProf	1	0.62	76.00	2
	OperLP	2	0.61	79.27	1
	TMS	3	0.30	73.63	4
	CrosFI	4	0.26	74.85	3
	PFit	5	0.23	71.74	5
	Average	0.40		75.10	

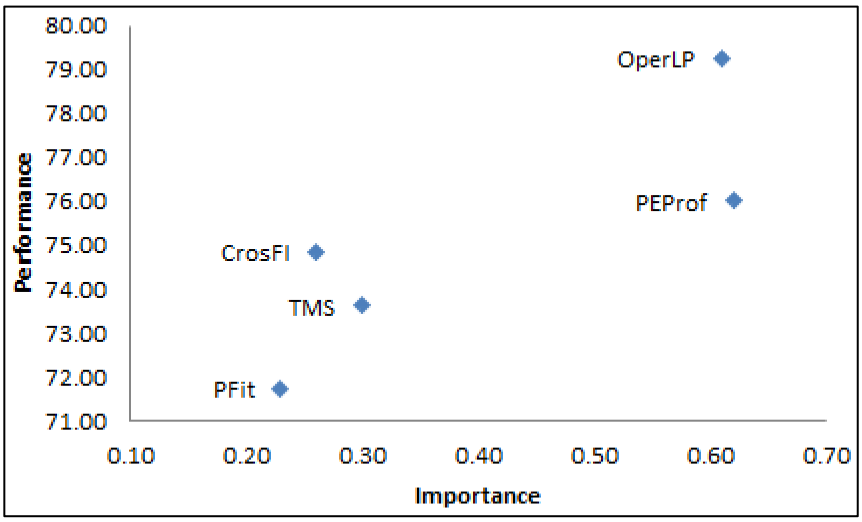


Fig. 5.27. IPMA (priority map) for ProdLP by its predictor constructs

5.5.5.2.4. IPMA for FirmLP by its Predictor Constructs

Finally, referring to FirmLP, the resulted IPMA (priority map) for FirmLP's explanation/prediction by its respective predictor constructs (Table 5.42 and Fig. 5.28) showed that both OperLP and PFit were characterised by a perfect match/fit between their performance and importance levels. Additionally, PEProf was ranked first from an importance perspective (predictor construct's total effect: 0.66), while ranked third from a performance perspective (predictor construct's index value: 76.00%). On the other hand, CrosFI was ranked fifth from an importance perspective (predictor construct's total effect: 0.26), while ranked fourth from a performance perspective (predictor construct's index value: 74.85%).

Table 5.42. IPMA for FirmLP by its predictor constructs

Target Construct	Predictor Constructs	Importance (Total Effect)		Performance (Rescaled Average Construct Score)	
		Rank	β	%	Rank
FirmLP	PEProf	1	0.66	76.00	3
	OperLP	2	0.50	79.27	2
	ProdLP	3	0.49	80.85	1
	TMS	4	0.28	73.63	5
	CrosFI	5	0.26	74.85	4
	PFit	6	0.22	71.74	6
	Average	0.40		76.06	

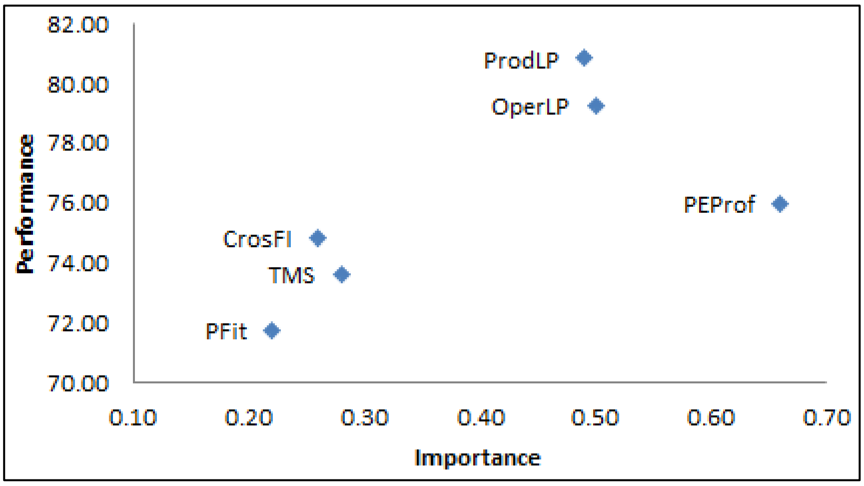


Fig. 5.28. IPMA (priority map) for FirmLP by its predictor constructs

5.5.5.3. IPMA (Priority Mappings) for the Target Constructs by their Predictor Constructs Items (across the Measurement and Structural Models Levels)

This section explains the derived results from the conducted PLS-SEM-based IPMA (priority mappings) for explaining/predicting this study's four target constructs (i.e., PEProf, OperLP, ProdLP, and FirmLP) by their respective predictor constructs items (across the measurement and structural models levels).

5.5.5.3.1. IPMA for PEProf by its Predictor Constructs Items

Initially, respecting PEProf, the obtained IPMA (priority map) for PEProf's explanation/prediction by its associated predictor constructs items (Table 5.43 and Fig. 5.29) showed that CrosFI2, CrosFI1, TMS3, and TMS1 were characterised by a perfect match/fit between their performance and importance levels. Additionally, CrosFI3 was ranked third from an importance perspective (predictor construct item total effect: 0.113), while ranked sixth from a performance perspective (predictor construct item index value: 73.21%). On the other hand, TFit2 was ranked 11th and last from an importance perspective (predictor construct's total effect: 0.048), while ranked seventh from a performance perspective (predictor construct's index value: 72.90%).

Table 5.43. IPMA for PEProf by its predictor constructs items

Target Construct	Predictor Constructs' Items		Importance (Item Total Effect)		Performance (Rescaled Average Item Score)	
	Constructs	Items	Rank	β	%	Rank
PEProf	CrosFI	CrosFI2	1	0.121	75.85	1
		CrosFI1	2	0.120	75.49	2
		CrosFI3	3	0.113	73.21	6
	TMS	TMS3	4	0.110	73.42	4
		TMS1	5	0.109	73.32	5
		TMS2	6	0.109	74.15	3
	PFit	MFit2	7	0.063	71.04	10
		MFit3	8	0.061	72.02	9
		MFit1	9	0.058	70.62	11
		TFit1	10	0.056	72.12	8
		TFit2	11	0.048	72.90	7
	Average		0.088		73.10	

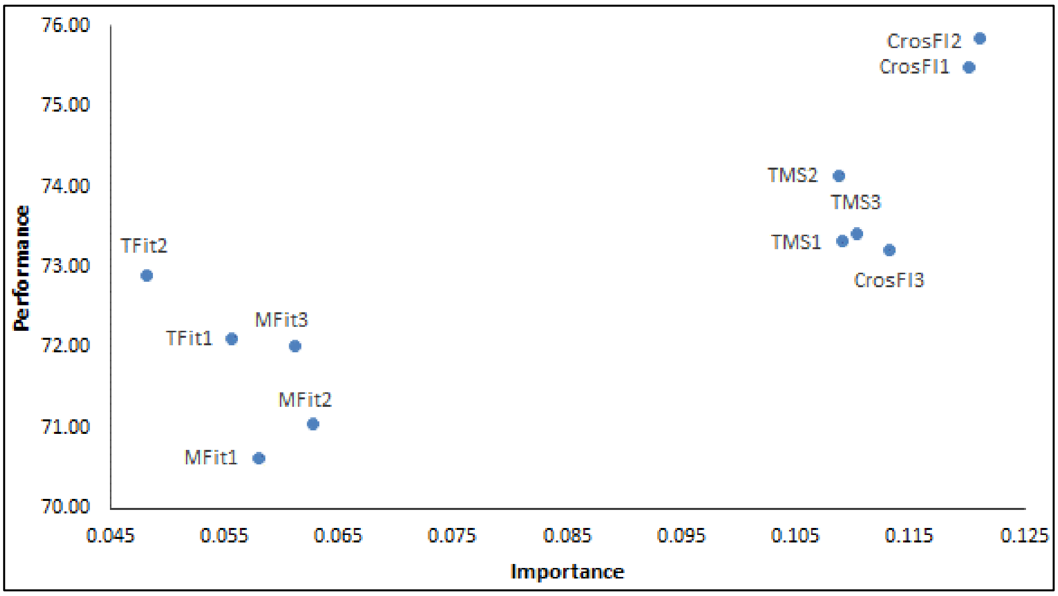


Fig. 5.29. IPMA (priority map) for PEProf by its predictor constructs items

5.5.5.3.2. IPMA for OperLP by its Predictor Constructs Items

In relation to OperLP, the resulted IPMA (priority map) for OperLP's explanation/prediction by its respective predictor constructs items (Table 5.44 and Fig. 5.30) has revealed that MAProf4 was characterised by a perfect match/fit between its performance and importance levels. Additionally, TAProf2 was ranked second from an importance perspective (predictor construct item total effect: 0.107), while ranked fourth from a performance perspective (predictor construct item index value: 76.48%). On the other hand, TFit2 was ranked 18th and last from an importance perspective (predictor construct's total effect: 0.043), while ranked 14th from a performance perspective (predictor construct's index value: 72.90%).

Table 5.44. IPMA for OperLP by its predictor constructs items

Target Construct	Predictor Constructs' Items		Importance (Item Total Effect)		Performance (Rescaled Average Item Score)	
	Constructs	Items	Rank	β	%	Rank
OperLP	PEProf	MAProf4	1	0.107	77.41	1
		TAProf2	2	0.107	76.48	4
		MAProf1	3	0.105	73.73	10
	TMS	TMS3	4	0.103	73.42	11
		TMS1	5	0.102	73.32	12
		TMS2	6	0.102	74.15	9
	PEProf	MAProf2	7	0.100	74.92	8
	CrosFI	CrosFI2	8	0.099	75.85	5
		CrosFI1	9	0.098	75.49	6
	PEProf	TAProf1	10	0.097	75.03	7
		TAProf3	11	0.096	77.15	3
	CrosFI	CrosFI3	12	0.093	73.21	13
	PEProf	MAProf3	13	0.088	77.25	2
	PFit	MFit2	14	0.055	71.04	17
		MFit3	15	0.054	72.02	16
		MFit1	16	0.051	70.62	18
		TFit1	17	0.049	72.12	15
		TFit2	18	0.043	72.90	14
	Average		0.086		74.23	

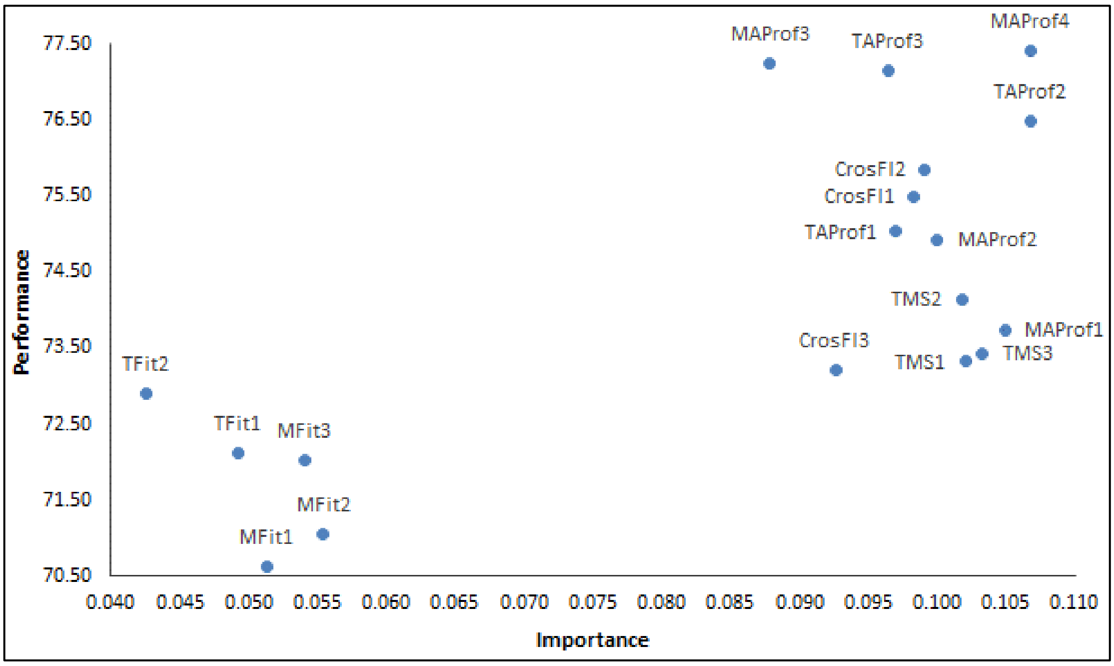


Fig. 5.30. IPMA (priority map) for OperLP by its predictor constructs items

5.5.5.3.3. IPMA for ProdLP by its Predictor Constructs Items

Concerning ProdLP, the obtained IPMA (priority map) for ProdLP's explanation/prediction by its associated predictor constructs items (Table 5.45 and Fig. 5.31) indicated that both NPDTS2 and CrosFI3 were characterised by a perfect match/fit between their performance and importance levels. Additionally, NPDCS2 was ranked first from an importance perspective (predictor construct item total effect: 0.124), while ranked sixth from a performance perspective (predictor construct item index value: 77.67%). On the other hand, TFit2 was ranked 24th and last from an importance perspective (predictor construct's total effect: 0.043), while ranked 20th from a performance perspective (predictor construct's index value: 72.90%).

Table 5.45. IPMA for ProdLP by its predictor constructs items

Target Construct	Predictor Constructs' Items		Importance (Item Total Effect)		Performance (Rescaled Average Item Score)	
	Constructs	Items	Rank	β	%	Rank
ProdLP	OperLP	NPDCS2	1	0.124	77.67	6
		NPDCS1	2	0.124	79.07	4
		NPQS1	3	0.120	80.31	2
		NPDTS1	4	0.115	79.84	3
		NPDTS2	5	0.113	77.77	5
	PEProf	MAProf4	6	0.109	77.41	7
		TAProf2	7	0.109	76.48	10
	TMS	TMS3	8	0.107	73.42	17
	PEProf	MAProf1	9	0.107	73.73	16
	TMS	TMS1	10	0.106	73.32	18
		TMS2	11	0.105	74.15	15
	OperLP	NPQS2	12	0.104	80.93	1
	PEProf	MAProf2	13	0.102	74.92	14
	PEProf	TAProf1	14	0.099	75.03	13
		TAProf3	15	0.098	77.15	9
	CrosFI	CrosFI2	16	0.095	75.85	11
		CrosFI1	17	0.095	75.49	12
	PEProf	MAProf3	18	0.089	77.25	8
	CrosFI	CrosFI3	19	0.089	73.21	19
	PFit	MFit2	20	0.055	71.04	23
		MFit3	21	0.054	72.02	22
		MFit1	22	0.051	70.62	24
		TFit1	23	0.049	72.12	21
		TFit2	24	0.043	72.90	20
	Average		0.094		75.49	

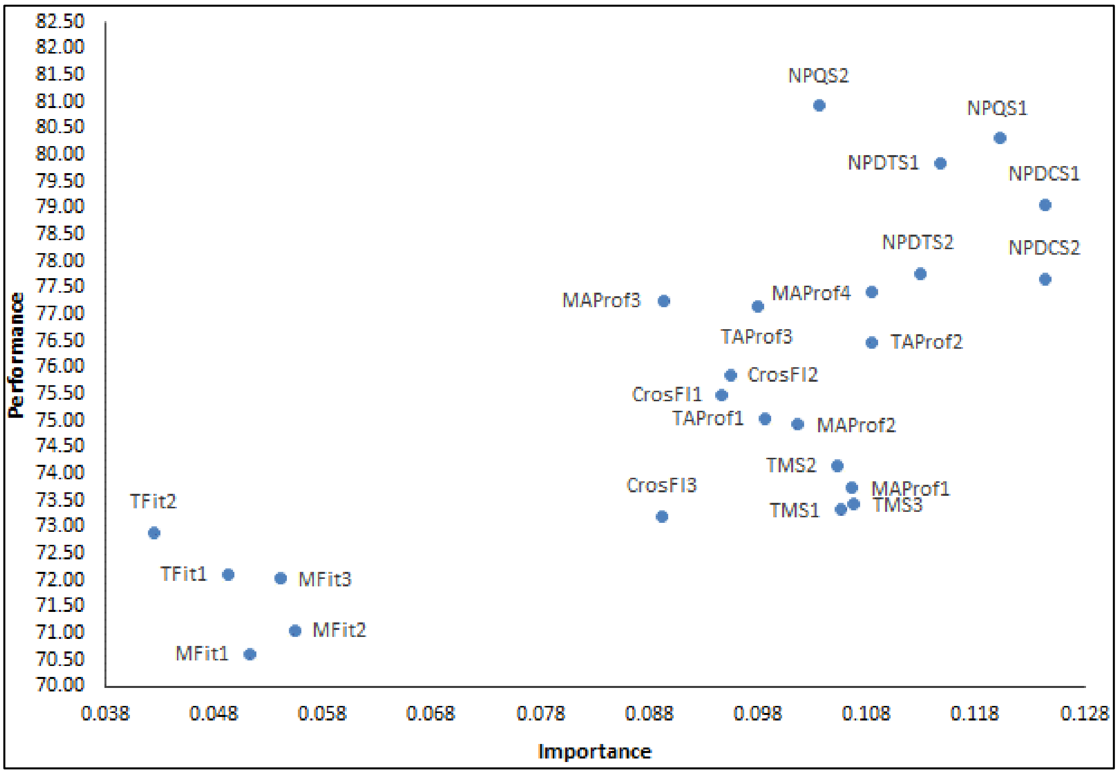


Fig. 5.31. IPMA (priority map) for ProdLP by its predictor constructs items

5.5.5.3.4. IPMA for FirmLP by its Predictor Constructs Items

Finally, referring to FirmLP, the resulted IPMA (priority map) for FirmLP's explanation/prediction by its respective predictor constructs items (Table 5.46 and Fig. 5.32) showed that ProdLP2 was ranked first from an importance perspective (predictor construct item total effect: 0.182), while ranked third from a performance perspective (predictor construct item index value: 80.62%). On the other hand, TFit2 was ranked 27th and last from an importance perspective (predictor construct's total effect: 0.041), while ranked 23rd from a performance perspective (predictor construct's index value: 72.90%).

Table 5.46. IPMA for FirmLP by its predictor constructs items

Target Construct	Predictor Constructs' Items		Importance (Item Total Effect)		Performance (Rescaled Average Item Score)	
	Constructs	Items	Rank	β	%	Rank
FirmLP	ProdLP	ProdLP2	1	0.182	80.62	3
		ProdLP3	2	0.180	80.26	5
		ProdLP1	3	0.175	81.66	1
	PEProf	MAProf4	4	0.116	77.41	10
		TAProf2	5	0.116	76.48	13
		MAProf1	6	0.114	73.73	19
		MAProf2	7	0.108	74.92	17
		TAProf1	8	0.105	75.03	16
		TAProf3	9	0.104	77.15	12
	OperLP	NPDCS2	10	0.102	77.67	9
		NPDCS1	11	0.102	79.07	7
	TMS	TMS3	12	0.100	73.42	20
		TMS1	13	0.099	73.32	21
	OperLP	NPQS1	14	0.099	80.31	4
	TMS	TMS2	15	0.098	74.15	18
	CrosFI	CrosFI2	16	0.095	75.85	14
	PEProf	MAProf3	17	0.095	77.25	11
	CrosFI	CrosFI1	18	0.095	75.49	15
	OperLP	NPDTS1	19	0.094	79.84	6
		NPDTS2	20	0.093	77.77	8
	CrosFI	CrosFI3	21	0.089	73.21	22
	OperLP	NPQS2	22	0.085	80.93	2
	PFit	MFit2	23	0.053	71.04	26
		MFit3	24	0.052	72.02	25
		MFit1	25	0.049	70.62	27
		TFit1	26	0.047	72.12	24
		TFit2	27	0.041	72.90	23
	Average		0.099		76.08	

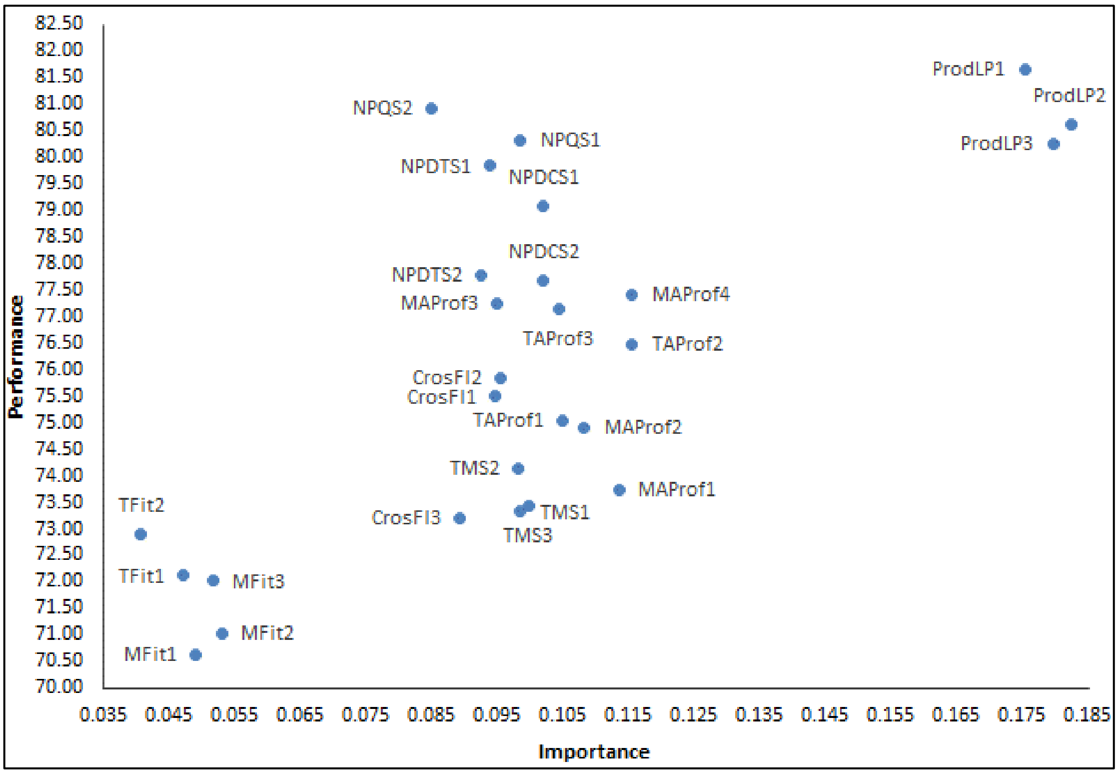
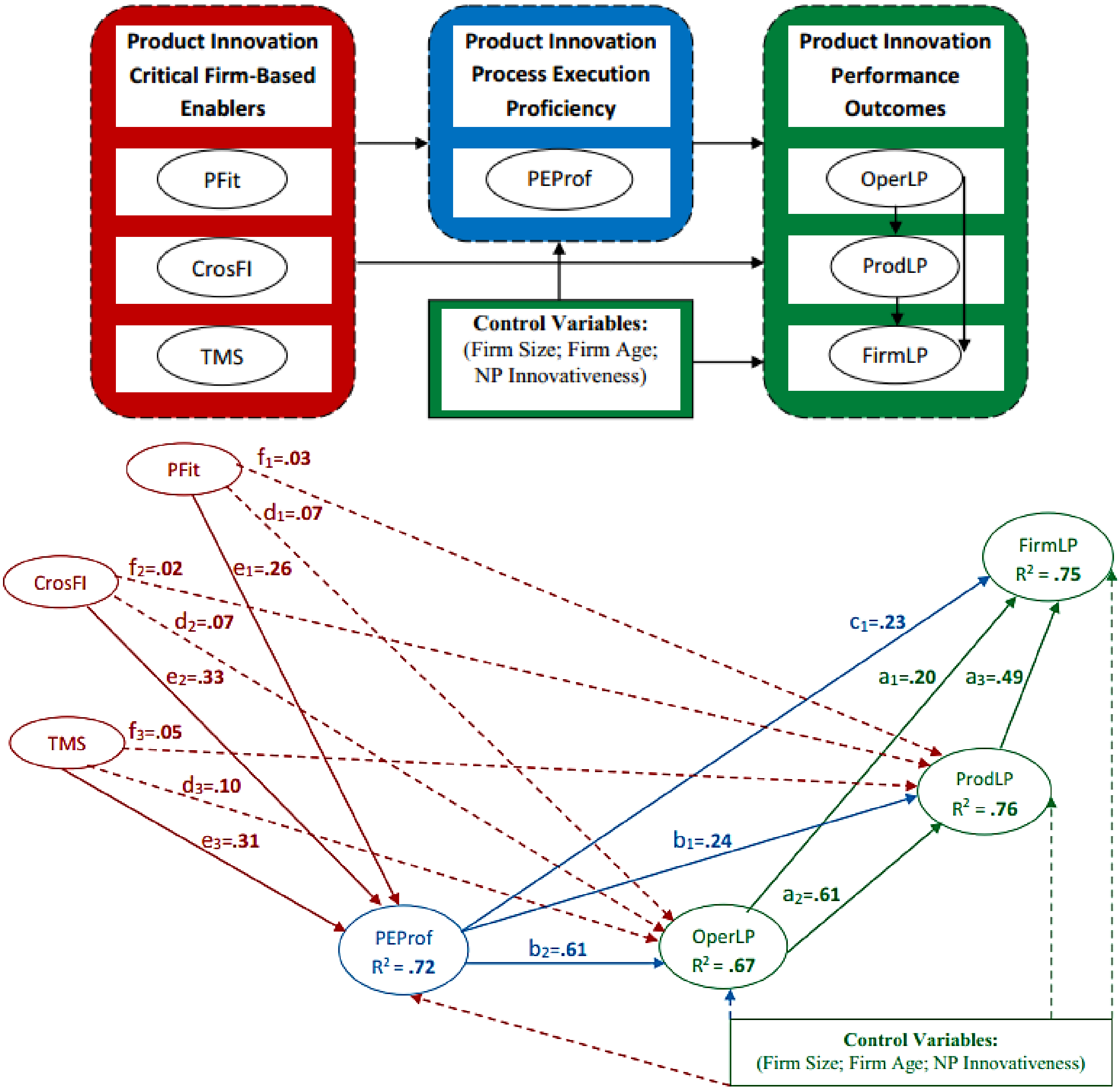


Fig. 5.32. IPMA (priority map) for FirmLP by its predictor constructs items

5.6. Summary

Following the completion of data collection (section 4.10.2), this chapter has verified the quality of these collected data (missing data and irrelevant respondents, outliers, data distribution, non-response bias, common method bias, and confounders; section 5.2). Next, it has described the sample characteristics (restaurants, new menu-items, and respondents; section 5.3). Then, it has presented this study's constructs and items scores (mean and standard deviation), and the significance, sign, and magnitude of its constructs intercorrelations (section 5.4). Additionally, it has provided the selected PLS-SEM algorithmic options and parameters estimates settings (section 5.5.1). Furthermore, it has explained and validated this study's formative measurement model (section 5.5.2) and structural model (section 5.5.3). Moreover, regarding the hypotheses testing, and based on conducting comprehensive mediation analyses, it has explicated the total, direct, total indirect, specific indirect, and sequential indirect effects among the investigated constructs of this study (section 5.5.4). This chapter has ended with further analysis, by conducting an Importance-Performance Matrix Analysis (IPMA) for the formative constructs by their items; target constructs by their predictor constructs; and target constructs by their predictor constructs items (section 5.5.5).

An illustrative summary of this study's main findings is displayed next in terms of: (1) summary of the derived simultaneous estimates of this study's full structural model (Fig. 5.33); (2) summary of the direct structural relationships significance, sign, and magnitude/relevance among this study's investigated variables (Table 5.47); and (3) summary of this study's hypotheses testing (mediation analyses: H1 to H14c, Table 5.48).



Stage 1:
H1: OperLP→FirmLP; **H2:** OperLP→ProdLP→FirmLP;

Stage 2:
H3: PEProf→ProdLP; **H4:** PEProf→OperLP→ProdLP; **H5:** PEProf→FirmLP;
H6:PEProf→OperLP→FirmLP; **H7:** PEProf→ProdLP→FirmLP;
H8:PEProf→OperLP→ProdLP→FirmLP;

Stage 3:
H9a: PFit→OperLP; **H9b:** CrosFI→OperLP; **H9c:** TMS→OperLP; **H10a:**PFit→PEProf→OperLP;
H10b: CrosFI→PEProf→OperLP; **H10c:** TMS→PEProf→OperLP; **H11a:** PFit→ProdLP;
H11b: CrosFI→ProdLP; **H11c:** TMS→ProdLP; **H12a:** PFit→PEProf→ProdLP;
H12b: CrosFI→PEProf→ProdLP; **H12c:** TMS→PEProf→ProdLP; **H13a:** PFit→OperLP→ProdLP;
H13b: CrosFI→OperLP→ProdLP; **H13c:** TMS→OperLP→ProdLP;
H14a:PFit→PEProf→OperLP→ProdLP; **H14b:** CrosFI→PEProf→OperLP→ProdLP;
H14c:TMS→PEProf→OperLP→ProdLP.

Fig. 5.33. Summary of the derived simultaneous estimates of this study's full structural model

Note: All relationships were hypothesised to be positive and significant. Solid arrows indicate the standardised paths coefficients for relationships that are positive and significant at p < .001. Dashed arrows indicate the standardised paths coefficients for relationships that are positive but insignificant; p > .05. PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product; N = 386.

Table 5.47. Summary of the direct structural relationships significance, sign, and magnitude/relevance among this study's investigated variables

	Target Constructs	*Path*	*P*	*β*	Cohen's f^2		*Predictor Constructs' Contributions % to Target Constructs' R^2*	R^2
Predictor Constructs	***PEProf***							***0.72***
CrosFI		e_2	< .001	0.33	0.26	Medium	36.11	
TMS		e_3	< .001	0.31	0.25	Medium	34.72	
PFit		e_1	< .001	0.26	0.20	Medium	27.78	
Control Variables								
Firm Size			0.26	0.02	< .02	Negligible		
Firm Age			0.12	-0.04	< .02	Negligible		
NP Innovativeness			0.21	-0.03	< .02	Negligible		
Predictor Constructs	***OperLP***							***0.67***
PEProf		b_2	< .001	0.61	0.50	Large	74.63	
TMS		d_3	0.09	0.10	0.07	Small	10.45	
PFit		d_1	0.13	0.07	0.05	Small	7.46	
CrosFI		d_2	0.17	0.07	0.05	Small	7.46	
Control Variables								
Firm Size			0.31	0.02	< .02	Negligible		
Firm Age			0.16	-0.03	< .02	Negligible		
NP Innovativeness			0.42	-0.01	< .02	Negligible		
Predictor Constructs	***ProdLP***							***0.76***
OperLP		a_2	< .001	0.61	0.51	Large	67.11	
PEProf		b_1	< .001	0.24	0.19	Medium	25	
TMS		f_3	0.27	0.05	0.03	Small	3.95	
PFit		f_1	0.43	0.03	0.02	Small	2.63	
CrosFI		f_2	0.38	0.02	0.01	Negligible	1.31	
Control Variables								
Firm Size			0.47	0.00	< .02	Negligible		
Firm Age			0.49	0.00	< .02	Negligible		
NP Innovativeness			0.01	0.08	< .02	Negligible		
Predictor Constructs	***FirmLP***							***0.75***
ProdLP		a_3	< .001	0.49	0.41	Large	54.67	
PEProf		c_1	< .001	0.23	0.18	Medium	24	
OperLP		a_1	< .001	0.20	0.16	Medium	21.33	
Control Variables								
Firm Size			0.41	-0.01	< .02	Negligible		
Firm Age			0.13	-0.05	< .02	Negligible		
NP Innovativeness			0.24	0.02	< .02	Negligible		

Note: PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product; β, standardised paths coefficient; N = 386.

Table 5.48. Summary of this study's hypotheses testing
(mediation analyses: H1 to H14c)

Investigated relationships	*β*	% of the total effect (% of the total indirect effect: *Mediation magnitude*)	*H*	Support?
OperLP→FirmLP				
Total effect	0.50***	100%		
Direct effect before including ProdLP	0.52***	100%		
Direct effect after including ProdLP	0.20*** (Δ: – 0.32)	40%	1	Yes
Specific indirect effect via ProdLP (OperLP→ProdLP→FirmLP)	0.30***	VAF: 60% (100%: *Partial*)	2	Yes
PEProf→ProdLP				
Total effect	0.62***	100%		
Direct effect before including OperLP	0.62***	100%		
Direct effect after including OperLP	0.24*** (Δ: – 0.38)	39%	3	Yes
Specific indirect effect via OperLP (PEProf→OperLP→ProdLP)	0.38***	VAF: 61% (100%: *Partial*)	4	Yes
PEProf→FirmLP				
Total effect	0.66***	100%		
Direct effect before including OperLP and ProdLP	0.77***	100%		
Direct effect after including OperLP and ProdLP	0.23*** (Δ: – 0.54)	35%	5	Yes
Total indirect effect via OperLP + ProdLP	0.43***	VAF: 65% (100%: *Partial*)		
Specific indirect effect via OperLP (PEProf→OperLP→FirmLP)	0.12***	VAF: 18% (28%: *Partial*)	6	Yes
Specific indirect effect via ProdLP (PEProf→ProdLP→FirmLP)	0.12***	VAF: 18% (28%: *Partial*)	7	Yes
Sequential indirect effect via OperLP→ProdLP (PEProf→OperLP→ProdLP→FirmLP)	0.19***	VAF: 29% (44%: *Partial*)	8	Yes
PFit→OperLP				
Total effect	0.23***	100%		
Direct effect before including PEProf	0.23***	100%		
Direct effect after including PEProf	0.07^{NS} (Δ: – 0.16)	30%	9a	No
Specific indirect effect via PEProf (PFit→PEProf→OperLP)	0.16***	70% (100%: *Full*)	10a	Yes
CrosFI→OperLP				
Total effect	0.27***	100%		
Direct effect before including PEProf	0.28***	100%		
Direct effect after including PEProf	0.07^{NS} (Δ:– 0.21)	26%	9b	No
Specific indirect effect via PEProf (CrosFI→PEProf→OperLP)	0.20***	74% (100%: *Full*)	10b	Yes
TMS→OperLP				
Total effect	0.29***	100%		
Direct effect before including PEProf	0.29***	100%		
Direct effect after including PEProf	0.10^{NS} (Δ: – 0.19)	34%	9c	No
Specific indirect effect via PEProf (TMS→PEProf→OperLP)	0.19***	66% (100%: *Full*)	10c	Yes

Table 5.48. Summary of this study's hypotheses testing (mediation analyses: H1 to H14c) (*Continued*)

Investigated relationships	***β***	**% of the total effect (% of the total indirect effect: *Mediation magnitude*)**	***H***	**Support?**
PFit→ProdLP				
Total effect	0.23***	100%		
Direct effect before including PEProf and OperLP	0.17***	100%		
Direct effect after including PEProf and OperLP	0.03^{NS} (Δ: – 0.14)	13%	11a	No
Total indirect effect via PEProf + OperLP	0.20***	87% (100%: *Full*)		
Specific indirect effect via PEProf (PFit→PEProf→ProdLP)	0.06***	(30%: *Full*)	12a	Yes
Specific indirect effect via OperLP (PFit→OperLP→ProdLP)	0.04^{NS}	(20%: *No*)	13a	No
Sequential indirect effect via PEProf→OperLP (PFit→PEProf→OperLP→ProdLP)	0.10***	(50%: *Full*)	14a	Yes
CrosFI→ProdLP				
Total effect	0.26***	100%		
Direct effect before including PEProf and OperLP	0.26***	100%		
Direct effect after including PEProf and OperLP	0.02^{NS} (Δ: – 0.24)	8%	11b	No
Total indirect effect via PEProf + OperLP	0.24***	92% (100%: *Full*)		
Specific indirect effect via PEProf (CrosFI→PEProf→ProdLP)	0.08***	(33%: *Full*)	12b	Yes
Specific indirect effect via OperLP (CrosFI→OperLP→ProdLP)	0.04^{NS}	(17%: *No*)	13b	No
Sequential indirect effect via PEProf→OperLP (CrosFI→PEProf→OperLP→ProdLP)	0.12***	(50%: *Full*)	14b	Yes
TMS→ProdLP				
Total effect	0.30***	100%		
Direct effect before including PEProf and OperLP	0.31***	100%		
Direct effect after including PEProf and OperLP	0.05^{NS} (Δ: – 0.26)	17%	11c	No
Total indirect effect via PEProf + OperLP	0.25***	83% (100%: *Full*)		
Specific indirect effect via PEProf (TMS→PEProf→ProdLP)	0.07***	(28%: *Full*)	12c	Yes
Specific indirect effect via OperLP (TMS→OperLP→ProdLP)	0.06^{NS}	(24%: *No*)	13c	No
Sequential indirect effect via PEProf→OperLP (TMS→PEProf→OperLP→ProdLP)	0.12***	(48%: *Full*)	14c	Yes

Note: PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; *β*, standardised paths coefficient; Δ, value change; ***, $p < .001$; NS, insignificant $p > .05$; VAF, Variance Accounted For; *H*, hypothesis; *N* = 386.

By taking the current study's *Research Questions* (RQ1 to RQ6, section 2.5) as an *outline,* the next chapter aims to discuss the answers to these research questions in light of this study's theoretical underpinnings and model (CFEMOs, section 3.2), research hypotheses (H1 to H14c, section 3.3), and empirical findings within U.S. restaurants context (sections 5.5.3.5, 5.5.4, and 5.5.5), as well as the (dis)similar findings of the previous, relevant empirical studies on product innovation literature within the manufacturing context (sections 2.3, 3.2, and 3.3).

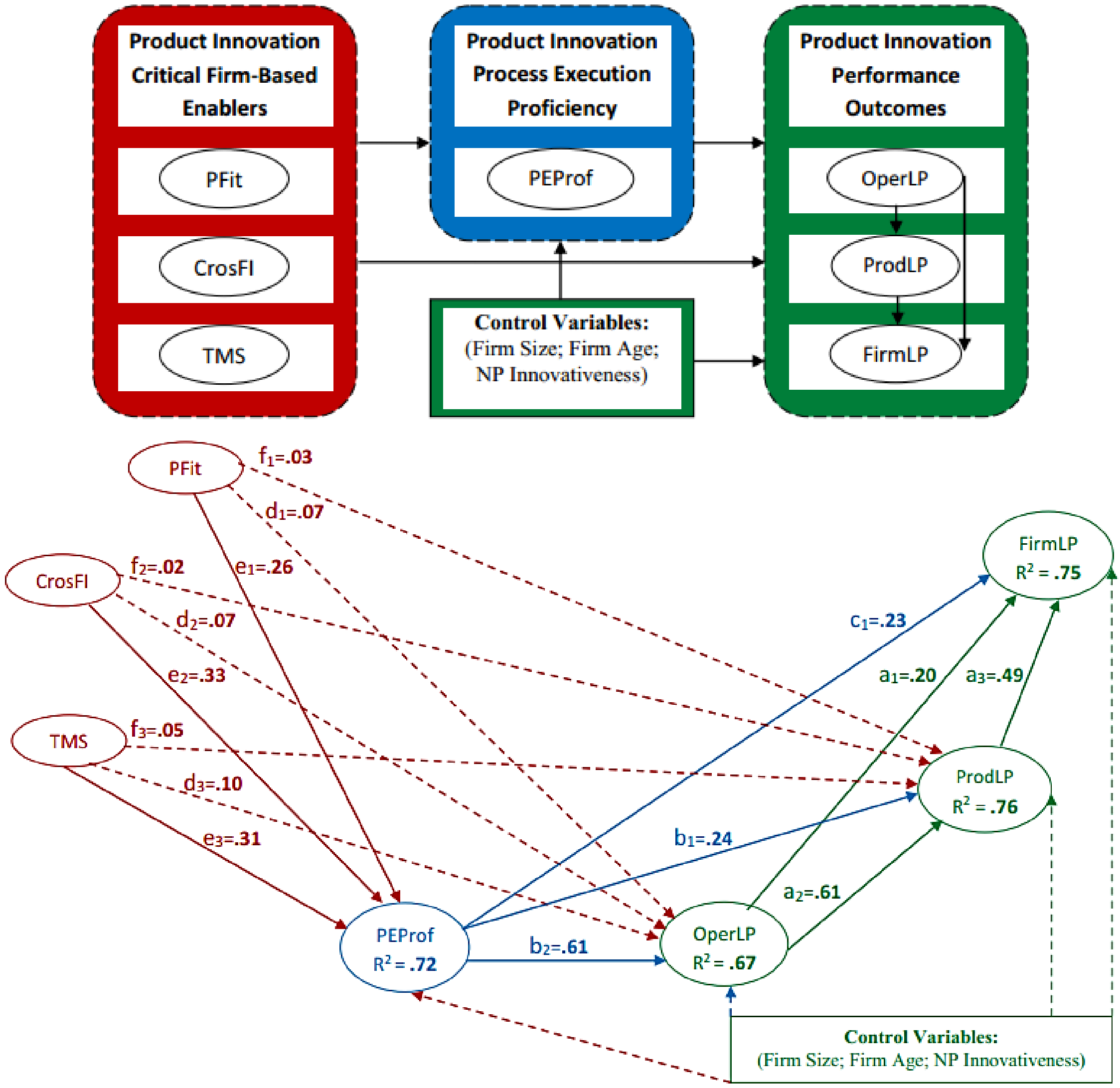
Chapter 6: Research Discussion

6.1. Introduction

By taking this study's *Research Questions* (RQ1 to RQ6, section 2.5) as an *outline*, this chapter aims to discuss the answers to these research questions in light of this study's theoretical underpinnings and model (CFEMOs, section 3.2), research hypotheses (H1 to H14c, section 3.3), and empirical findings within U.S. restaurants context (sections 5.5.3.5, 5.5.4, and 5.5.5), as depicted next in Fig. 6.1, as well as the (dis)similar findings of the previous, relevant empirical studies on product innovation literature within the manufacturing context (sections 2.3, 3.2, and 3.3). In this sense, the answers to RQ1 to RQ6, displayed below, are discussed throughout this chapter as follow.

Initially, *RQ1*, regarding the direct and indirect (mediated) interrelationships among the components of product innovation performance (OperLP, ProdLP, and FirmLP), is discussed in section 6.2. Then, based on RQ1's discussion (section 6.2), both *RQ2* and *RQ3*, concerning the direct and indirect (mediated) interrelationships between PEProf and the components of product innovation performance, are discussed in section 6.3. Next, building upon the discussions of RQ1 to RQ3 (sections 6.2 and 6.3), both *RQ4* and *RQ5*, respecting the direct and indirect (mediated) interrelationships among the product innovation's critical firm-based enablers (PFit, CrosFI, and TMS), PEProf, and the components of product innovation performance, are discussed in section 6.4. Finally, *RQ6*, about this study model's (CFEMOs) explanation/prediction of the variation of the PEProf, OperLP, ProdLP, and FirmLP, is discussed in section 6.5.

RQ1. What are the direct and indirect (mediated) interrelationships among the components of product innovation performance (OperLP, ProdLP, and FirmLP)?
RQ2. What is the effect of PEProf on ProdLP, and is it mediated by OperLP?
RQ3. What is the effect of PEProf on FirmLP, and is it mediated by OperLP and ProdLP?
RQ4. What are the effects of PFit, CrosFI, and TMS on OperLP, and are these effects mediated by PEProf?
RQ5. What are the effects of PFit, CrosFI, and TMS on ProdLP, and are these effects mediated by PEProf and OperLP?
RQ6. To what extent can a model, incorporating the aforesaid relationships, explain/predict the variation of the PEProf, OperLP, ProdLP, and FirmLP?



Stage 1:
H1: OperLP→FirmLP; **H2:** OperLP→ProdLP→FirmLP;

Stage 2:
H3: PEProf→ProdLP; **H4:** PEProf→OperLP→ProdLP; **H5:** PEProf→FirmLP;
H6:PEProf→OperLP→FirmLP; **H7:** PEProf→ProdLP→FirmLP;
H8:PEProf→OperLP→ProdLP→FirmLP;

Stage 3:
H9a: PFit→OperLP; **H9b:** CrosFI→OperLP; **H9c:** TMS→OperLP; **H10a:**PFit→PEProf→OperLP;
H10b: CrosFI→PEProf→OperLP; **H10c:** TMS→PEProf→OperLP; **H11a:** PFit→ProdLP;
H11b: CrosFI→ProdLP; **H11c:** TMS→ProdLP; **H12a:** PFit→PEProf→ProdLP;
H12b: CrosFI→PEProf→ProdLP; **H12c:** TMS→PEProf→ProdLP; **H13a:** PFit→OperLP→ProdLP;
H13b: CrosFI→OperLP→ProdLP; **H13c:** TMS→OperLP→ProdLP;
H14a:PFit→PEProf→OperLP→ProdLP; **H14b:** CrosFI→PEProf→OperLP→ProdLP;
H14c:TMS→PEProf→OperLP→ProdLP.

Fig. 6.1. This study's theoretical model (CFEMOs), research hypotheses (H1 to H14c), and empirical findings within the context of U.S. restaurants

Note: All relationships were hypothesised to be positive and significant. Solid arrows indicate the standardised paths coefficients for relationships that are positive and significant at p < .001. Dashed arrows indicate the standardised paths coefficients for relationships that are positive but insignificant; p > .05. CFEMOs, Critical Firm-based Enablers-Mediators-Outcomes; PFit, New-Product Fit-to-Firm's Skills and Resources; CrosFI, Internal Cross-Functional Integration; TMS, Top-Management Support; PEProf, Process Execution Proficiency; OperLP, Operational-Level Performance; ProdLP, Product-Level Performance; FirmLP, Firm-Level Performance; NP, New Product; N = 386.

6.2. The Direct and Indirect (Mediated) Interrelationships among the Components of Product Innovation Performance (OperLP, ProdLP, and FirmLP)

As hypothesised, those restauranteurs who have succeeded in innovating a new menu-item that is characterised by a superior overall Operational-Level Performance (OperLP), were both directly (H1) and indirectly (H2), via realising high overall Product-Level Performance (ProdLP), rewarded by significant improvements in their overall Firm-Level Performance (FirmLP), hence, both H1 and H2 were empirically confirmed by the current study (Fig. 5.12; Table 5.27).

Specifically, this study has provided empirical evidence that regardless of the variations in the restaurant's size, age, and the level of new menu-items innovativeness, those restaurants that manage to achieve one unit increase in innovating a superior new menu-item (i.e., characterised by high quality, speed-to-market, and cost efficiency), *ceteris paribus*, would be rewarded by a *50%* total significant enhancement in their overall restaurant performance (i.e., greater new menu-item contributions to the overall restaurants sales, profits, and market share), of *which*, 40% are directly achieved (H1), while 60% are indirectly accomplished (H2) through attaining a 61% boost in their overall new menu-item performance (i.e., higher new menu-item customer satisfaction, sales, and profits), which in turn would lead to realising a 49% increase in their overall restaurant performance.

In this regard, by empirically clarifying, for the first time, the coexisting, differential direct and indirect (mediated) effects among this study's suggested three sequential components of product innovation performance outcomes (i.e., *overall* OperLP, ProdLP, and FirmLP), the current study is generally *augmenting* the *collective* empirical findings of the relevant previous studies on product innovation literature:

1) Advocating the significant and positive *direct effect* of the *overall* ProdLP on the *overall* FirmLP (e.g., Langerak *et al.*, 2004b; Thoumrungroje & Racela, 2013), and

2) Supporting the significant and positive *direct impacts* of the OperLP's *three individual components* (i.e., NPQS, NPDTS, and NPDCS) on both the FirmLP's *measures* (e.g., Campbell & Cooper, 1999; Chryssochoidis & Wong, 1998; Cooper & Kleinschmidt, 1994; García *et al.*, 2008; Jayaram & Narasimhan, 2007; Song & Parry, 1997a), and the *overall* ProdLP (e.g., Chen *et al.*, 2005; Kim & Atuahene-Gima, 2010; Song & Parry, 1999), as discussed next.

Initially, there is a well-established finding from previous studies that NP success (e.g., NP's customer satisfaction, sales, and profits) allows for significant improvements, relative to competitors, in the overall firm performance (e.g., overall firm's sales, profits, and market share), as confirmed, for example, by the empirical investigations of the NPD projects for Dutch (Langerak *et al.*, 2004b) and Thai (Thoumrungroje & Racela, 2013) firms across various manufacturing industries.

In order to meet their sales and profit objectives, firms cannot depend on their current product offerings only; instead, firms should pursue the continuous development and launching of successful new products (Langerak & Hultink, 2005; Langerak *et al.*, 2004a, b).

In this sense, to achieve sustained competitive advantage and growth for their restaurants, *U.S. restaurateurs* have to seek continuous and successful new menu-items innovations as U.S. restaurants market: (1) is highly volatile, mature and competitive; (2) has many of its menu-items have reached the end of their life cycles; and (3) has numerous restaurants with similar structures, limited available-resources, offering similar menu-items at similar prices, in a low-margin environment, whereby consumers incur no switching costs when changing their foodservice providers (Feltenstein, 1986; Gubman & Russell, 2006; Hsu & Powers, 2002; Jones & Wan, 1992; MarketLine, 2015c; Miner, 1996).

Turning to the *NPQS direct impact* on the FirmLP's *measures*, Song and Parry's (1997a) study, of the NPD projects for the Japanese and U.S. high-tech manufacturing firms, revealed that those firms that develop and launch new products that are characterised by high NP's differentiation, relative to their competitors, realise enhancements in their firm's market share. Additionally, Campbell and Cooper's (1999) examination, of the partnerships-based and in-house-based NPD projects for firms operating across various manufacturing industries, showed that realising a distinguished NP's advantage improves the NP's financial impacts on the overall firm's sales and profits, as well as opens-up new market opportunities for a firm. Respecting the *NPQS direct influence* on the *overall* ProdLP, Song and Parry's (1999) study, of both successful and failed NPD projects for the Japanese high-tech manufacturing firms, substantiated that, regardless of the variation in the NP innovativeness level, a firm's realisation of an enhanced NP's success level (e.g., high NP's sales and profits), is primarily based on its ability to innovate a new product that has a high NP's perceived superiority, relative to competitive products (e.g., NP's quality and unique features).

In this respect, both current and potential restaurants customers typically purchase new menu-items that they perceive, relative to the competing menu-items, as unique, meet their requirements, and offer them a superior value-for-money. As underscored by Langerak *et al.* (2004a, p. 79), "*product benefits typically form the compelling reasons for customers to buy the new product*". There is also a high possibility for customers who perceive and purchase *a high quality new menu-item* to: (1) be satisfied with it (i.e., higher new menu-item customers satisfaction); (2) repurchase it at a premium price along with the other new menu-items provided by the same restaurant (i.e., greater sales and profits for the new menu-item and the overall restaurant); and (3) recommend it to their friends (i.e., positive word-of-mouth) and be loyal to the same restaurant (i.e., improved overall restaurant's loyalty, sales, market share, and profits). Check, for example, Anderson *et al.* (1994) and Kim *et al.* (2014) in manufacturing backgrounds.

Moving to the *direct influence* of the *NPDTS* on the FirmLP's *measures*, Cooper and Kleinschmidt's (1994) investigation, of the successful and failed NPD projects for the major U.S., Canadian, German, and UK multinational corporations operating in the chemical industry, demonstrated that realising superior NP's speed-to-market improves the NP's financial contributions to the overall firm's sales and profits. Additionally, in their study of the newly developed and launched's high-tech products for U.S., UK, Japanese, and Hong Kong multinational corporations across multiple European markets, Chryssochoidis and Wong (1998) stated that achieving timely NP's development and launching yields high Return On Investment (ROI). Concerning the *direct effect* of the *NPDTS* on the *overall* ProdLP, Chen *et al.*'s (2005) survey, of the NPD projects for various North-Eastern U.S.'s technology-based companies, revealed that, irrespective of the variation in the technological uncertainty's level, attaining a superior NP's speed-to-market (relative to the company's standards, pre-set schedules, and similar competitive products) improves the overall NP's success (e.g., high NP's sales and profits).

In this sense, being late to market increases the risk of market opportunities obsolescence (because of shifts in restaurants regulations, customers preferences, and/or competitors activities), while *achieving superior new menu-items innovation time* (i.e., developing and launching a new menu-item faster than competitors, and ahead of, or at least on, the original schedule) would allow restaurants to: (1) have a leading market position and positive image, (2) respond quickly to and better match the rapid changes in technology and their targeted customers requirements; (3) capture new customers; (4) prolong their ever shortening new menu-items lifetimes and windows of market opportunities; and (5) charge premium prices for their new menu-items, which, collectively, would boost the new menu-item customers satisfaction, sales, and profits, as well as the overall restaurant's sales, profits, and market share. Refer to, for instance, Lee and Wong (2012) and Stanko *et al.* (2012) across diverse manufacturing settings.

However, new menu-items innovation managers should be cautious by avoiding *an overemphasis of cycle-time reduction at all costs*, as *it* can lead to increases in development cost, a lower quality, and an eventual loss of market share. As emphasised by Cooper and Kleinschmidt (1994, pp. 395-396), "*cutting the wrong corners and doing projects in a rushed, hurried way will actually reduce project timeliness, not save time! Moreover some of these same actions also cut the success rate of projects: the overriding goal is a steady stream of successful and profitable new products, not a stable full of fast failures and on-time products with marginal profits!*".

In relation to the *direct impact* of the *NPDCS* on the FirmLP's *measures*, Jayaram and Narasimhan's (2007) survey, of the NPD projects for U.S. and Canadian firms operating in various manufacturing industries, reported that achieving the desired level of the NPD's cost performance is necessary for accomplishing the firm's efficiency and effectiveness strategies; materialised, for example, by significant improvements in the firm's profitability and break-even time (i.e., quick returns on project's investments). Additionally, in their study of the NPD projects for the innovative, medium and large-sized, Spanish firms, García *et al.* (2008) indicated that meeting the NPD's cost goals enhances the firm's market performance measures, such as market share's improvement and NP's contribution to strengthen the firm's relationships with its customers.

With reference to the *direct effect* of the *NPDCS* on the *overall* ProdLP, Kim and Atuahene-Gima's (2010) investigation, of the NPD projects for the Chinese (Shanghai and Beijing) firms operating in various manufacturing industries, showed that, in relation to the other competing products in the industry, those firms that accomplish high NP innovation cost efficiency are rewarded by greater chances of NP's success, exemplified by exceeding, or at least meeting, their pre-set objectives for NP's sales and profits.

In this regard, contrary to a restaurant's *achievement of a new menu-item innovation cost efficiency* (i.e., the costs of new menu-items development and launching are below or, at least, equal to the estimated budget relative to the restaurant's competitors and its similar new menu-items), *incurring high NPD costs* may limit the restaurant's abilities to: (1) position its new menu-item at a competitive price; and (2) free-up and efficiently utilise its existing limited resources (and/or acquire new ones) necessary for carrying out crucial innovation practices and activities to: (2a) innovate more new menu-items along this one, and/or (2b) improve/support the current menu-items, which in turn can lead to a restaurant's market failure; exemplified by lower customers satisfaction and sales, as well as significant declines in the restaurant's short- and long-term profitability. See, for example, Tatikonda and Montoya-Weiss (2001), García *et al.* (2008), and Kim and Atuahene-Gima (2010) in various manufacturing contexts.

Together, these previously mentioned findings provide compelling evidence that, regardless of the variations in the restaurant's size, age, and the level of new menu-items innovativeness, those restaurateurs who manage to achieve superior new menu-item quality, speed-to-market, and cost efficiency, would realise substantial enhancements in their overall new menu-item customer satisfaction, sales, and profits, which in turn would boost their overall restaurant's sales, profits, and market share.

6.3. The Direct and Indirect (Mediated) Interrelationships between PEProf and the Components of Product Innovation Performance (OperLP, ProdLP, and FirmLP)

As theorised, those restaurateurs who have proficiently executed their overall product innovation process activities (PEProf), reaped crucial enhancements in their overall:

1) Product-Level Performance (ProdLP), both directly (H3) and indirectly (H4) through attaining superior overall Operational-Level Performance (OperLP), thus, both H3 and H4 were empirically established by this study (Fig. 5.12; Table 5.28), and
2) Firm-Level Performance (FirmLP), both directly (H5) and indirectly (H6 to H8) via getting superior overall OperLP and/or ProdLP, accordingly, H5 to H8 were empirically substantiated by the present study (Fig. 5.12; Table 5.29).

Precisely, the current study has presented empirical evidence that, irrespective of the differences in the restaurant's size, age, and the level of new menu-items innovativeness, those restaurateurs who succeed in raising their proficient execution of the overall new menu-item innovation process activities (i.e., comprising the marketing and technical activities needed for innovating a new menu-item) by one unit, *ceteris paribus*, would be rewarded by:

1) A *62%* total significant improvement in their overall new menu-item performance (i.e., higher new menu-item customer satisfaction, sales, and profits), of *which*, 39% are directly achieved (H3), while 61% are indirectly accomplished (H4) via realising a 61.2% enhancement in their innovation of a superior new menu-item (i.e., characterised by high quality, speed-to-market, and cost efficiency), which in turn would lead to a 61.4% increase in their overall new menu-item performance, and

2) A *66%* total significant enhancement in their overall restaurant performance (i.e., greater new menu-item contributions to the overall restaurants sales, profits, and market share), of *which*, 35% are directly achieved (H5), while *65%* are indirectly accomplished through both the overall OperLP and ProdLP, of *which*:

   A) 28% are indirectly achieved (H6) via realising a 61% improvement in their innovation of a superior new menu-item, which in turn would lead to a 20% increase in their overall restaurant performance,

   B) 28% are indirectly realised (H7) through achieving a 24% enhancement in their overall new menu-item performance, which in turn would cause a 49% increase in their overall restaurant performance, and

   C) 44% are indirectly accomplished (H8) by attaining a 61.2% boost in their innovation of a superior new menu-item that enriches their overall new menu-item performance by 61.4%, which eventually would bring about a 49% enhancement in their overall restaurant performance.

In this sense, by empirically illuminating, for the first time, the simultaneous, differential direct and indirect (mediated) effects between the *overall* PEProf and the components of product innovation performance (i.e., the *overall* OperLP, ProdLP, and FirmLP), the present study is generally *expanding* the *collective* empirical findings of the pertinent extant research on product innovation literature:

1) Arguing for the significant and positive *direct influences* among the OperLP's *three individual components* (i.e., NPQS, NPDTS, and NPDCS), the *overall* ProdLP, and the FirmLP's *measures* (as previously discussed in section 6.2), and
2) Upholding the significant and positive *direct impacts* of the PEProf's *dimensions* (e.g., PreAProf, MAProf, and TAProf) on the FirmLP's *measures* (e.g., Cooper & Kleinschmidt, 1995b; Kleinschmidt *et al.*, 2007), the *overall* ProdLP (e.g., Calantone & di Benedetto, 2012; Calantone *et al.*, 1996; Lee & Wong, 2011; Song *et al.*, 1997c), and the OperLP's *three individual components* (e.g., Calantone & di Benedetto, 1988; Harmancioglu *et al.*, 2009; Lee & Wong, 2012; Verworn, 2009; Verworn *et al.*, 2008), as discussed next.

Initially, with reference to the *direct effects* of the PEProf's *dimensions* on the FirmLP's *measures*, Cooper and Kleinschmidt's (1995b) survey, of the NPD projects for a sample of the major multinational (U.S., Canadian, German, and UK) firms in the chemical industry, reported that the proficiencies in executing the predevelopment, technical, marketing, and launching activities, crucially enhance the firms overall sales and profits. Additionally, Kleinschmidt *et al.*'s (2007) study, of the NPD programs for a sample of the global (North American and European), business-to-business, manufacturing and service firms, found that the proficiency in executing predevelopment activities plays a vital role in opening windows of market opportunities for a firm.

Turning to the *direct influences* of the PEProf's *dimensions* on the *overall* ProdLP, Song *et al.*'s (1997c) examination, of the NPD projects for the Taiwanese and South Korean firms operating in the physical products industries, revealed that the proficient execution of the marketing activities is a key to the NP success. In a more recent survey of the new products for U.S. firms operating in the consumer and business-to-business goods and services, Calantone and di Benedetto (2012) confirmed this finding by reporting that the executions of high quality marketing effort and lean launch considerably enhance the NP performance. Additionally, Calantone *et al.*'s (1996) investigation, of the NPD projects for U.S. and Chinese firms operating in both the manufacturing and consumer-goods industries, showed that the proficient execution of the technical activities has a pivotal role in boosting the NP performance. In a more recent study of the NPD projects for the South Korean's manufacturers, Lee and Wong (2011) supported this finding by asserting that attaining a high proficiency level in executing the technical activities has a crucial positive effect on the NP performance.

Proceeding to the *direct impacts* of the PEProf's *dimensions* on the OperLP's *three individual components*, Calantone and di Benedetto's (1988) investigation, of the NPD projects for the South-Eastern U.S.'s manufacturing firms, revealed that attaining a high proficiency level in executing the technical activities considerably enhances the NP quality. Additionally, in their examination of the new products for the North American firms operating in the chemical, biochemical, and pharmaceutical's industries, Harmancioglu *et al.* (2009) found that the proficiency in executing marketing activities plays a vital role in realising an outstanding NP advantage. Furthermore, Lee and Wong's (2012) survey, of the NPD projects for the South Korean's manufacturers (with foreign subsidiaries), reported that the proficiencies in executing both the marketing and technical activities greatly facilitate the firm's ability to achieve a NPD's timeliness. Moreover, Verworn *et al.*'s (2008) and Verworn's (2009) studies, of the NPD projects for the Japanese and German manufacturing firms, respectively, confirmed that those firms that proficiently execute their predevelopment activities, needed for innovating a new product, realise a superior NP innovation cost efficiency.

From the outset, to be able to innovate (e.g., conceptualise, develop, and launch) their new menu-items, restaurateurs have to utilise a product innovation process (Jones & Wan, 1992) by executing the relevant marketing and technical activities along its various stages, such as idea-generation, screening, development, testing, and commercialisation (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b). However, *project execution* (Song & Montoya-Weiss, 2001; Song & Parry, 1999) is the element that holds the key to a firm's success with regard to, for example, NP's quality and speed-to-market (McNally *et al.*, 2011), as well as a firm's overall profitability, market share, and return on investment (Mishra & Shah, 2009).

A NP's failure (or success) typically results from several reasons related to the poor (or proficient) executions of the NP innovation's marketing and technical activities (Kotler & Armstrong, 2012). Initially, a restaurant's owner/senior-level manager may irrationally insist in developing his/her favourite new menu-item idea regardless of its poor marketing-research findings (Miner, 1996). A firm's innovation of successful new products necessitates an understanding of its customers, markets, and competitors, which yields profitable new products that deliver superior value to customers (Kotler & Armstrong, 2012).

A restaurateur's prospect to be a market leader in new menu-item innovation is contingent on its superior practiced ability, relative to competitors, to gauge and satisfy the food expectations for its current and potential customers. Although competitive assessment is an essential tool for strategic market positioning, the primary focus should be on customers needs and preferences because new menu-items cloning based exclusively on competitors menus may lead to traditional segments that lack the creative spark required for stimulating customers interests and purchasing decisions towards a specific new menu-item (Miner, 1996). Additionally, executing every stage/activity of product innovation process substantially and cumulatively adds to costs and time. Thus, execution proficiency aids product innovation efficiency and consequently can yield resource savings that can be utilised, for example, in competitive prices, greater profits, or larger investments in future innovations (Chandy *et al.*, 2006).

In this regard, a restaurateur ability to get the most out of his/her restaurant's limited and valuable resources (i.e., realising high efficiency in innovation time and costs by focusing on those new menu-item ideas with star potentials instead of those with low potentials) is subject to his/her level of proficiency in executing new menu-item screening and testing. Screening (i.e., evaluating, ranking, and selecting) a new menu-item idea should be based on its appeal to target market, its compatibility with restaurant's resources/skills (e.g., innovation, production, and marketing), as well as its potential benefits to restaurant's sales, profits, and market share. It is also crucial for restaurateurs to test new menu-items under real-life conditions (e.g., with customers and/or in restaurants) to be able to identify in advance their potential levels of market acceptance and areas for improvements before wasting excessive resources in the full production and commercialisation of new menu-items that are infeasible/inefficient or have an inferior quality. The insights gained from doing so would help new menu-items developers to ultimately provide customers with profitable new menu-items that closely meet their expectations by optimising and fine-tuning a new menu-item culinary aspects, recipe, packaging, food safety, name, and pricing, as well as its operational procedures in relation to supply, preparation, storing, selling, and serving (Feltenstein, 1986; Miner, 1996; Ottenbacher & Harrington, 2007, 2008, 2009a, b).

Furthermore, an innovated new menu-item might has an inferior quality and a higher (or longer) than planned innovation costs (or time) because of lacking an accurate and early identification of customers preferences and translating them, more effectively and efficiently than competitors, into materialised favourable and feasible new menu-item features. Commercialising a NP at an inappropriate (too early/late) time could lead to market opportunities obsolescence owing to misfit with market-demand volume, customers preferences, and/or competitors activities. If a NP improperly positioned, priced too high/low, poorly advertised, and/or resulted in a tougher than expected competitors fight back, this would bring about low levels of customers satisfaction, sales, market share, and profits. Consult, for example, Kotler and Armstrong (2012) within the general marketing context.

Moreover, as NP's relative advantage and compatibility (i.e., NP's superior benefits and fit with customers preferences relative to competitors) are key drivers for NP success (e.g., Song & Montoya-Weiss, 2001; Song & Parry, 1999), elevating customers perception of a NP's relative advantage and compatibility, via the proficient execution of its launch activities, can play a pivotal role in positively stimulating their purchasing decisions of that NP and maximising a firm's chances of profitably achieving NP's acceptance in a specific target market (Guiltinan, 1999; Langerak *et al.*, 2004a). Specifically, such a proficient launch comprises, among others, "sufficient inventory is available at the time of launch, the firm has set a price level that is perceived to be appropriate, sufficient investment has been made in promotional programs (including quantity discounts, trade shows, and events) and quality advertising, and on-time delivery and quick response to customer requests are assured" (Song *et al.*, 2011, p. 91).

Finally, the aforementioned primary benefits accrue from the firms proficiency in performing their marketing and technical activities (needed for developing and commercialising a new product) could be enriched by carrying out a post-launch audit. A post-launch audit comprises continuous monitoring of the various actual indicators of the NP's performance outcomes (e.g., operational, financial, market) along the NP's life-cycle and marketing-mix relative to previous expectations and competitors, as well as the NP's compatibility/synergy with the firm's other products. Such a monitoring is followed by executing a root-cause analysis and implementing any needed (immediate and/or future) corrective actions/changes (strategic and/or tactical adjustments) to close any highlighted gaps/deviations. Important lessons learned from such an audit can and should be used to improve future firm's NP innovations. By doing so, a firm can be in a better position, relative to competitors, to optimise its various NP's performance outcomes along its life-cycle and marketing-mix, as well as ensure high compatibility/synergy between its NP and the other existing products (Haines, 2013).

Therefore, the achievements of the desired product innovation performance outcomes are contingent on how well the aforementioned process activities are implemented rather than just having a process or a stage in place (Calantone & di Benedetto, 1988). The importance of the proficient execution of such process activities rests in its pivotal role in determining the extent to which a firm can implement its NPD strategies (Noble & Mokwa, 1999) and convert its promising NP's idea into a successful NP (Chandy *et al.*, 2006) by meeting and/or exceeding demand more efficiently and effectively relative to competitors and thus succeed (Harmancioglu *et al.*, 2007). Hence, execution proficiency enables firms to identify and exploit market opportunities for positional advantages, while reducing risks and needed costs/time (Harmancioglu *et al.*, 2009).

Overall, the aforesaid results, so far, present empirical evidence that, irrespective of the differences in the restaurant's size, age, and the level of new menu-items innovativeness, those restaurateurs who execute their overall new menu-item innovation process activities with high proficiency, would enjoy superior new menu-item quality, speed-to-market, and cost efficiency, which consequently would enrich their overall new menu-item customer satisfaction, sales, and profits, which ultimately would improve their overall restaurant's sales, profits, and market share.

6.4. The Direct and Indirect (Mediated) Interrelationships among the Product Innovation's Critical Firm-Based Enablers (PFit, CrosFI, and TMS), PEProf, and the Components of Product Innovation Performance (OperLP and ProdLP)

Generally, the present study has empirically established that those restaurateurs who have concurrently managed to: *(a)* adopt internal cross-functional integration (CrosFI), *(b)* provide top-management support (TMS), and *(c)* ensure that their new menu-items are fitting-well-with their available restaurants marketing and technical skills/resources (PFit), *descendingly ranked*, gained substantial improvements in their overall:

1) Operational-Level Performance (OperLP) only indirectly (inconsistent with H9a, b, and c) through realising high proficiency in their execution of the overall new menu-item innovation process activities (PEProf) affirming H10a, b, and c (Fig. 5.12; Table 5.30), and
2) Product-Level Performance (ProdLP) only indirectly (dismissing H11a, b, and c), not by attaining superior overall OperLP alone (refuting H13a, b, and c), but mediated, mainly, via accomplishing greater overall PEProf that yields superior overall OperLP (reinforcing H14a, b, and c) and, to a lesser extent, through enhancing their overall PEProf alone approving H12a, b, and c (Fig. 5.12; Table 5.31).

Specifically, this study has provided empirical evidence that, in spite of the variations in the restaurant's size, age, and the level of new menu-items innovativeness, those restaurateurs who simultaneously achieve one unit enhancement in their:

1) New menu-items fit with the available restaurants marketing (e.g., marketing research, sales force, advertising and promotion) and technical (e.g., R&D and production) skills/resources,
2) Adoption of internal cross-functional integration (i.e., joint goals achievement, open and frequent communications, as well as sharing of ideas, information and resources among the internal restaurant's functions/departments responsible for new menu-item innovation, such as R&D, production, and marketing), and

3) Provision of top-management support (i.e., top-management's resources dedication, commitment, and involvement), *ceteris paribus*, would respectively secure:

   A) 23%, 27%, and 29% total significant augmentations in their innovation of a superior new menu-item (i.e., characterised by high quality, speed-to-market, and cost efficiency) fully mediated (disproving H9a, b, and c) by, correspondingly, attaining 26%, 33%, and 31% increases in their execution proficiency of the overall new menu-item innovation process activities (i.e., comprising the marketing and technical activities needed for innovating a new menu-item), which in turn would boost their innovation of a superior new menu-item by 61.2% (confirming H10a, b, and c), and

   B) 23%, 26%, and 30% total significant improvements in their overall new menu-item performance (i.e., higher new menu-item customer satisfaction, sales, and profits) fully mediated (negating H11a, b, and c):

   - Not by merely innovating a superior new menu-item (rejecting H13a, b, and c), but, primarily,
   - Via, respectively, realising 26%, 33%, and 31% greater upturns in their proficient execution of the overall new menu-item innovation process activities that boost their innovation of a superior new menu-item by 61.2%, which consequently would bring about a 61.4% enhancement in their overall new menu-item performance (concurring H14a, b, and c), and, to a lesser extent (i.e., 0.60, 0.67, and 0.58 relatively less mediated),
   - Through, correspondingly, accomplishing 26%, 33%, and 31% improvements in their execution proficiency of the overall new menu-item innovation process activities that would (without passing through the realisation of a superior new menu-item) increase their overall new menu-item performance by 24% (supporting H12a, b, and c).

In this respect, by empirically explicating, for the first time, the concurrent, differential direct and indirect (mediated) effects among the product innovation's critical firm-based enablers (i.e., PFit, CrosFI, and TMS), the *overall* PEProf, and the components of product innovation performance (i.e., the *overall* OperLP and ProdLP), the current study is generally:

1) *Advancing* the *collective* empirical findings of the germane prior studies on product innovation literature maintaining the significant and positive *direct influences*:
    - Among the PEProf's *dimensions* (e.g., PreAProf, MAProf, and TAProf), the OperLP's *three individual components* (i.e., NPQS, NPDTS, and NPDCS), and the *overall* ProdLP (as previously discussed in sections 6.2 and 6.3), and
    - Of the PFit's *measures* (i.e., MFit and TFit; e.g., Calantone & di Benedetto, 1988, Song & Parry, 1999), *CrosFI* (e.g., Lee & Wong, 2011, Song & Montoya-Weiss, 2001), and *TMS* (e.g., Koen *et al.*, 2014, Song & Parry, 1997a, Song *et al.*, 1997a) on the PEProf's *dimensions* (as discussed next), as well as
2) *Clarifying* the seemingly *conflicting* empirical findings of the relevant existing works on product innovation literature arguing for the *insignificant versus significant direct impacts* of the PFit's *measures*, *CrosFI,* and *TMS* on the OperLP's *three individual components* and the *overall* ProdLP (as discussed next and outlined in Appendices 6, 7, and 8, respectively).

Initially, regarding the *direct effects* of the PFit's *measures* on the PEProf's *dimensions*, Calantone and di Benedetto's (1988) survey, of the NPD projects for the South-Eastern U.S.'s manufacturing firms, reported that both technical resources and skills have a significant positive effect on technical activities proficiency, and that both marketing resources and skills have a considerable positive influence on marketing activities proficiency. In a similar vein, Song and Parry's (1999) study, of both successful and failed NPD projects for the Japanese high-tech manufacturing firms, revealed that marketing (/technical) synergy significantly enhances the execution proficiency of marketing (/technical) activities needed for innovating a new product.

Turning to the *direct influences* of *CrosFI* on the PEProf's *dimensions*, Song and Montoya-Weiss's (2001) examination, of the NPD projects for the Japanese high-tech firms operating in various manufacturing industries, indicated that cross-functional integration greatly boosts the executions proficiencies of both marketing and technical activities. In a more recent investigation of the NPD projects for the South Korean's manufacturers, Lee and Wong (2011) supported these findings by asserting that attaining high proficiency levels in executing both the marketing and technical activities, needed for developing and launching a new product, are contingent on the firm's adoption of an internal cross-functional integration.

Proceeding to the *direct impacts* of *TMS* on the PEProf's *dimensions*, Song and Parry's (1997a) survey, of the NPD projects for a sample of U.S. and Japanese high-tech manufacturing firms, reported that the internal commitment (enclosing TMS) greatly augments the proficiencies in executing the idea development and screening, business and market-opportunity analysis, technical development, and product commercialisation's activities. Additionally, in their study of both successful and failed NPD projects for a sample of large, multi-divisional Japanese firms operating in various manufacturing industries, Song *et al.* (1997a) concluded that the project management's skills (involving TMS) strongly enhance the proficiency in executing marketing activities. Furthermore, Koen *et al.*'s (2014) longitudinal exploration, of the NPD practices for the business units of a sample of large U.S.-based companies across different industries, revealed that both senior-management involvement and resources commitment crucially boost the execution performance of the product innovation front-end activities.

Product innovation research provides conflicting empirical findings about the *direct influences* of PFit's *measures* on the OperLP's *three individual components* and the *overall* ProdLP (Appendix 6). *Firstly*, Huang and Tsai (2014) and O'Cass *et al.* (2014) indicated that *MFit's direct effect on NPQS* is insignificant; however, Song and Parry (1996) and Harmancioglu *et al.* (2009) proved *it* as pivotal. Similarly, while some studies have stated that *TFit's direct impact on NPQS* is negligible (e.g., O'Cass *et al.*, 2014; Sengupta, 1998), other works have reported *it* as crucial (e.g., Calantone *et al.*, 2006; Harmancioglu *et al.*, 2009). *Secondly*, Yang (2008) and Harmancioglu *et al.* (2009) confirmed that *MFit's direct influence on NPDTS* is immaterial; conversely, Lee and Wong (2010) and Ma *et al.* (2012) established *it* as central. In a similar vein, although some works have concluded that *TFit's direct effect on NPDTS* is trivial (e.g., Harmancioglu *et al.*, 2009; Lee & Wong, 2010), other studies have verified *it* as vital (e.g., Hong *et al.*, 2011; Rodríguez-Pinto *et al.*, 2012). *Thirdly*, Atuahene-Gima (1995, 1996b) revealed that the *direct impacts of both MFit and TFit on NPDCS* are insignificant; on the other hand, Hong *et al.* (2011) and O'Cass *et al.* (2014) substantiated *them* as decisive.

In relation to the *direct influences* of PFit's *measures* on the *overall* ProdLP, while some studies have indicated that *MFit's direct effect on the overall ProdLP* is negligible (e.g., Atuahene-Gima, 1996a; Bianchi *et al.*, 2014), other works have proved *it* as pivotal (e.g., Cooper & Kleinschmidt, 1987; Danneels & Kleinschmidt, 2001). Likewise, although some works have stated that *TFit's direct impact on the overall ProdLP* is insignificant (e.g., Atuahene-Gima, 1996b; Drechsler *et al.*, 2013), other studies have verified *it* as crucial (e.g., Atuahene-Gima, 1996a; Cooper & Kleinschmidt, 1987).

There is no agreement among scholars within the empirical product innovation literature regarding the *direct impacts* of *CrosFI* on the OperLP's *three individual components* and the *overall* ProdLP (Appendix 7). *Firstly*, Hauptman and Hirji (1996) and Gomes *et al.* (2003) indicated that *CrosFI's direct influence on NPQS* is insignificant; however, Keller (1986) and Song *et al.* (1997b) proved *it* as pivotal. *Secondly*, while some studies have stated that *CrosFI's direct effect on NPDTS* is negligible (e.g., Brettel *et al.*, 2011; Gomes *et al.*, 2003), other works have reported *it* as crucial (e.g., Bstieler, 2005; Chaudhuri, 2013). *Thirdly*, Hauptman and Hirji (1996) and Gomes *et al.* (2003) confirmed that *CrosFI's direct impact on NPDCS* is immaterial; conversely, other studies have established *it* as central (e.g., Chaudhuri, 2013; García *et al.*, 2008). While some studies have stated that *CrosFI's direct impact on the overall ProdLP* is trivial (e.g., Blindenbach-Driessen & Van den Ende, 2010; Brettel *et al.*, 2011), other works have substantiated *it* as vital (e.g., Ayers *et al.*, 1997; Barczak, 1995).

Existing empirical results of product innovation studies are inconsistent concerning the *direct effects* of *TMS* on the OperLP's *three individual components* and the *overall* ProdLP (Appendix 8). *Firstly*, Gomes *et al.* (2001) and Gemünden *et al.* (2007) revealed that the *direct impact of TMS on NPQS* is insignificant; on the other hand, Larson and Gobeli (1989) and Song and Parry (1996) substantiated *it* as decisive. *Secondly*, although some works have concluded that *TMSs direct influence on NPDTS* is trivial (e.g., Gemünden *et al.*, 2007; Islam *et al.*, 2009), other studies have verified *it* as vital (e.g., Belout & Gauvreau, 2004; Bstieler & Hemmert, 2010). *Thirdly*, Larson and Gobeli (1989) and Lewis *et al.* (2002) indicated that *TMSs direct effect on NPDCS* is insignificant; however, Gomes *et al.* (2001) and Belout and Gauvreau (2004) proved *it* as pivotal. Although the investigations of Cooper and Kleinschmidt (1995c) and Islam *et al.* (2009) have revealed that *TMSs direct effect on the overall ProdLP* is immaterial, other studies have verified *it* as substantial (e.g., Barczak, 1995; Blindenbach-Driessen & Van den Ende, 2010).

Some of the abovementioned findings are *inconsistent* with this study's theoretical expectations (i.e., H9a, b, and c; H11a, b, and c; H13a, b, and c) as the direct effects of PFit, CrosFI, and TMS on the overall OperLP and ProdLP are insignificant. An explanation for such an *inconsistency* and the aforementioned apparently *conflicting* empirical findings, of the relevant existing works on product innovation literature arguing for the *insignificant versus significant direct impacts* of the PFit's *measures*, *CrosFI*, and *TMS* on the OperLP's *three individual components* and the *overall* ProdLP, may be that this study's model, in contrast to previous studies, controls for the concurrent direct effects of the product innovation's critical firm-based enablers (i.e., PFit, CrosFI, and TMS) on the components of product innovation performance (i.e., the *overall* OperLP and ProdLP) alongside the simultaneous specific and sequential mediating roles of the overall PEProf and/or OperLP in such relationships.

This study's argument is that without controlling for such mediating roles, the yielded conclusions, regarding the importance of these product innovation's critical firm-based enablers to the components of product innovation performance, are likely to be flawed (i.e., either underestimated or overestimated). *Underestimated* by concluding that these *enablers* have trivial weights on the outcomes of product innovation performance because *their* direct effects are insignificant; despite their potential vital indirect impacts via the omitted mediating variables if such omitted mediators were included in the model. *Overestimated* by concluding that these enablers "in themselves" (i.e., directly; neglecting the key effects that might be achieved via the omitted mediating variables if such omitted mediators were included in the model) are crucial to the outcomes of product innovation performance.

In order to avoid such flawed conclusions, this study contends that if the *direct effects* of the product innovation's critical firm-based enablers (i.e., PFit, CrosFI, and TMS) on the components of product innovation performance (i.e., the *overall* OperLP and ProdLP) are *insignificant*, this does not necessarily suggest that these enablers are trivial for the following two main reasons. *Firstly*, these enablers have significant positive correlations with the overall OperLP and ProdLP (Table 5.16). *Secondly*, these enablers direct effects on the overall: (1) *OperLP* were reduced from significant positive (before including the suggested *mediator* – i.e., the *overall PEProf* – in the model; Fig. 5.16) to insignificant (after *its* inclusion because of *its* full mediation; Fig. 5.12; Table 5.30); and (2) *ProdLP* were reduced from significant positive (before the simultaneous inclusion of the suggested *two sequential mediators* – i.e., *the overall PEProf and OperLP* – in the model; Fig. 5.17) to insignificant (after *their* simultaneous inclusion because of *their* full mediation; Fig. 5.12; Table 5.31).

In other words, this study maintains that firms may simply ensure PFit, adopt CrosFI, and provide TMS, but if they have not utilised these practices/enablers in such a way as to generate a high PEProf that yields superior OperLP, the mere employment of such practices/enablers by firms may not lead to enhancements in their OperLP and/or ProdLP. Hence, in this sense, rather than considering PFit, CrosFI, and TMS as either *irrelevant* or *crucial "in themselves"* to boost the overall OperLP and/or ProdLP, it is better to consider *CrosFI*, *TMS* and *PFit*, *descendingly ranked*, as three key preconditions/enablers that have to be utilised in improving the overall PEProf, which in turn would enhance the overall OperLP, which consequently would augment the overall ProdLP, as explained next building upon the aforementioned discussions of RQ1 to RQ3 (sections 6.2 and 6.3).

Firstly, a new menu-item innovation process primarily consists of marketing and technical activities. Thus, to execute such activities proficiently, a restaurant must possess adequate resources and skills in both areas. Specifically, a restaurant possessing strong marketing resources/skills will be in a better position to, adequately, perform the required marketing activities for a new menu-item innovation. Many of the restaurant's existing marketing or testing skills could be transferable to the new menu-item innovation activities. Previous experience with market research and intelligence could be helpful in guiding the restaurant to the appropriate selection of research activities to be undertake. It is even possible that much of the market assessment (e.g., market potential, consumer behaviour studies) already carried out by the restaurant will be relevant to the new menu-item innovation as well. In this sense, drawing on the restaurant's existing marketing resources/skills simplifies the execution of the marketing activities, needed for new menu-item innovation, by reducing the need for significant reinterpretation/restructuring of existing marketing knowledge/expertise, hence permitting the efficient use of marketing resources and enhancing the restaurant's ability to differentiate the new menu-item from competitive offerings. Likewise, if the restaurant is in a particularly strong position regarding R&D and production resources, the chances of being able to carry out the required technical activities proficiently increase. A fit between a new menu-item and a restaurant's technical resources/skills could lead to further proficiency enhancement by enhancing the innovation team absorption of information and usage of practices related to existing technical competencies through the very same experience-based structures. Such an increase in technical proficiency can efficiently boost the new menu-item competitive advantage by augmenting the actual (quality, time, and cost) performance of the new menu-item relative to competitors. However, lacking such technical resources, a restaurant may have no choice but to bypass key technical activities and rush its new menu-item to market without adequate assessments. Check, for example, Calantone and di Benedetto (1988), Calantone *et al.* (1996), Song *et al.* (1997c), Song and Parry (1997a, b, 1999), and Harmancioglu *et al.* (2009) in several manufacturing backgrounds.

Secondly, new menu-items innovation activities have a multidisciplinary/interdependent (yet distinctive) nature. Therefore, to realise high execution proficiency of such activities, restaurateurs have to integrate their functionally diverse staff across all new menu-item innovation activities. Doing so creates a common-value-based focus instead of a function-oriented focus, which in turn facilitates accessing, leveraging, and melding their distinct but complementary resources, skills, efforts, and perspectives, as well as increases the amount, variety, and quality of information available to innovation's team members regarding competitors and target market. Furthermore, it increases the creativity, quality, speed, and cost-efficiency of information processing, problem solving, and decision-making for the innovation team by: *(1)* reducing misunderstanding and conflicts among team members; *(2)* reducing uncertainties, reworks, redesigns, and respecifications; *(3)* overlapping and compressing the development phases; *(4)* advancing mutual support, communication, and cooperation; *(5)* encouraging the cross-fertilisation of ideas and reaching optimal solutions; and *(6)* allowing team members to contribute their knowledge, skills, and resources to their full potential. Realising such benefits results in higher, timely, and cost-effective alignment of marketing and technical resources and skills to tap market opportunities better than competitors and in alleviating obstacles to satisfy target market's requirements, which in turn enhances innovation team's creativity and ability to develop and launch a new menu-item with superior quality, speed-to-market, and cost efficiency. Refer to, for instance, Song and Montoya-Weiss (2001), García *et al.* (2008), Lee and Wong (2010), Nakata and Im (2010), and Brettel *et al.* (2011) across diverse manufacturing settings.

Thirdly, a restaurant's top-management typically has the highest level and scope of knowledge, experience, skills, resources, authority, and power. Therefore, top-management's commitment and involvement can enable the innovation team to, proficiently, execute the new menu-item innovation activities and innovate a new menu-item characterised by superior quality, speed-to-market, and cost efficiency. It can do so, in several ways, by, for instance: *(1)* setting the proper mindset, direction, and innovative environment; *(2)* conveying the sense of urgency, priority, relevance, legitimacy, and risk-tolerance for a new menu-item innovation; *(3)* providing clear vision, guidance, and goals of the new menu-item innovation activities; *(4)* anticipating potential discord between functions and taking necessary actions to avoid it; *(5)* resolving, bypassing, or at least alleviating, common potential innovation's uncertainties, obstacles, constrains, and pitfalls that are beyond innovation team's capabilities, yet could delay or derail a new menu-item innovation; *(6)* providing innovation team, especially during the critical innovation periods, with the crucial motivation/encouragement, incentives, authority, flexibility, and resources that could enrich their engagement, enthusiasm, creativity, and innovation capabilities; and *(7)* finding, prioritising, dedicating and/or redeploying scarce resources to handle critical innovation problems and tasks. The more resources – people, money, time, production facilities, etc. – are pulled by a restaurant's top-management into a new menu-item innovation, the more likely it will be developed and launched within the desired goals of quality, time, and cost. See, for example, Swink (2000), Gomes *et al.* (2001), González and Palacios (2002), Thieme *et al.* (2003), Yang (2008), Kleinschmidt *et al.* (2010), and Song *et al.* (2011) within the manufacturing context.

Together, these previously discussed findings provide a compelling evidence that, despite the variations in the restaurant's size, age, and the level of new menu-items innovativeness, those restaurateurs who concurrently succeed in enhancing their: (1) joint goals achievement, open and frequent communications, as well as sharing of ideas, information and resources among the internal restaurant's functions/departments responsible for new menu-item innovation (e.g., R&D, production, and marketing), (2) top-management's resources dedication, commitment, and involvement, and (3) new menu-items compatibility with the available restaurants skills/resources (e.g., marketing research, sales force, advertising, promotion, R&D, and production), *descendingly ranked*, are more adept in executing their overall new menu-item innovation process activities, which in turn would grant them outstanding new menu-item quality, speed-to-market, and cost efficiency, which consequently would augment their new menu-item customer satisfaction, sales, and profits.

6.5. This Study Model's (CFEMOs) Explanation/Prediction of the Variation of the PEProf, OperLP, ProdLP, and FirmLP

Respecting the model's explanatory/predictive power, while half of the previous relevant empirical studies (section 2.3) has not reported the percentages of the variance's explanations for their models (Calantone *et al.*, 1996; Lee & Wong, 2010; Millson & Wilemon, 2002, 2006; Song & Montoya-Weiss, 2001; Song & Parry, 1999; Song *et al.*, 1997a; Thieme *et al.*, 2003), the other half has reported limited variables and percentages, as detailed next in a chronological order.

Initially, *Calantone and di Benedetto's (1988) model* explains 40%, 43%, and 46% of the variation of the execution proficiency of the technical, marketing, and launch activities, respectively, 12% of the variation of the NP quality, and 40% of the variation of the NP success/failure. *Song and Parry's (1997a) model* explains 20-49% of the variation of the execution proficiency of the innovation process individual stages (idea's development and screening, market-opportunity analysis, technical development, product testing, and commercialisation), 18-23% of the variation of the NP differentiation, and 37-44% of the variation of the individual components of the NP performance (profitability, sales, and market share). *Song and Parry's (1997b) model* explains 48.3% of the variation of the relative NP success. *Song et al.'s (1997c) model* explains 46% and 83% of the variation of the NP performance in the Taiwanese and South Korean firms, respectively. *Kleinschmidt et al.'s (2007) model* explains 38-56% of the variation of the individual components of the global NPD process capabilities (homework activities and launch preparation), and 25-32% of the variation of the individual components of the global NPD programme performance (windows of opportunity and financial performance). *Lee and Wong's (2011) model* explains 39-43% and 43-49% of the variation of the execution proficiency of the marketing and technical activities, respectively, and 33-37% of the variation of the NP's launch success. *Song et al.'s (2011) model* explains 48-50% of the variation of the individual components of the first NP performance (gross margin and sales growth).

Finally, *Calantone and di Benedetto's (2012) model* explains 17%, 39%, and 74% of the variation of the quality of marketing effort, lean launch, and NP performance, respectively.

Based on section 5.5.3.3, this study's integrated model (Critical Firm-based Enablers-Mediators-Outcomes: CFEMOs, section 3.2.10), simultaneously, explains/predicts 72% of the variation of the overall execution proficiency of the new menu-item innovation process activities, 67% of the variation of the overall new menu-item superiority (quality, speed-to-market, and cost-efficiency), 76% of the variation of the overall new menu-item performance (customer satisfaction, sales, and profits), and 75% of the variation of the new menu-item contribution to the overall restaurant performance (sales, profits, and market share). Hence, compared to the models of the extant relevant empirical studies (section 2.3), it is evident that this study's model (CFEMOs) has both broader scope and superior explanatory/predictive power. Such advantages of this study model over the models of the relevant previous studies might be justified as follow.

There is a consensus among scholars that product innovation is a disciplined problem-solving process (Atuahene-Gima, 2003; Brown & Eisenhardt, 1995), and inherently a multifaceted phenomenon that encompasses complex and simultaneous direct and indirect interrelationships among product innovation's enablers, process, and performance outcomes (e.g., Calantone *et al.*, 1996; Campbell & Cooper, 1999; Cooper, 1979; Cooper & Kleinschmidt, 1995a; Chryssochoidis & Wong, 1998; García *et al.*, 2008; Healy *et al.*, 2014; Kong *et al.*, 2014; Langerak *et al.*, 2004a, b; Song & Parry, 1997a), which in turn stimulates the need for an integrative model based on a system approach (Brown & Eisenhardt, 1995; Calantone & di Benedetto, 1988; Kessler & Chakrabarti, 1996) that can provide product innovation researchers and managers with a holistic view for better and comprehensive understanding of these complex and simultaneous interrelationships.

However, the extant relevant empirical studies (section 2.3.3) have examined product innovation variables by focusing mainly on the direct effects and some different measurements/dimensions of product innovation's CFEs, PEProf, and performance outcomes. Consequently, it is challenging to have a holistic understanding of the simultaneous interrelationships among these variables in light of the fragmented findings, varied focus and level of analysis for most of these studies.

In this sense, this study's theoretical model (CFEMOs) covers those critical, managerially controllable factors that have high potential for achieving the majority of the significant improvements in the desired (intermediate and ultimate) NPD efforts outcome(s). Precisely, after accounting for the control variables effects (firm size, firm age, and NP innovativeness), the CFEMOs model integrates, on an individual NP level, the simultaneous direct and indirect/mediated interrelationships among the product innovation's critical firm-based enablers (PFit, CrosFI, and TMS), PEProf, and performance outcomes (OperLP, ProdLP, and FirmLP).

Besides the significant relationships identified from the relevant empirical studies (section 3.3), the hypothesised direct and indirect/mediated relationships of the CFEMOs model are based on integrating the complementary theoretical perspectives of the Critical Success Factors (CSFs) approach (Bullen & Rockart, 1981; Daniel, 1961; Rockart, 1979), the Resource-Based View (RBV) of the firm theory (Barney, 1991; Grant, 1991; Peteraf, 1993; Wernerfelt, 1984), and the Input-Process-Output (IPO) model (Hackman & Morris, 1975; McGrath, 1984), together, under the system(s) approach's umbrella (Ackoff, 1964, 1971), as detailed in section 3.2.

In contrast, within all the 16 extant relevant studies, the theory/framework's usage was evident in only five works (i.e., Kleinschmidt *et al.*, 2007; Song & Montoya-Weiss, 2001; Song & Parry, 1997a; Song *et al.*, 2011; Thieme *et al.*, 2003). Additionally, except for Kleinschmidt *et al.* (2007) and Song *et al.* (2011), no study has attempted to develop and empirically test its research model based on integrating two or more seminal theories/frameworks.

Firstly, Kleinschmidt *et al.* (2007) adopted a Capabilities view of the Resource-Based Theory (CRBT) to develop their model. Explicitly, they explored the extent to which the global NPD-process capabilities/routines (i.e., global knowledge's integration, homework activities, and launch preparation) mediate the effects of the organisational resources (i.e., global innovation culture, top-management involvement, resource commitment, and NPD process formality) on the global NPD-programme performance (i.e., opening windows of market opportunities for a firm and financial performance).

Secondly, to develop their model, Song *et al.* (2011) integrated the Resource-Based View (RBV) of the firm theory with Day and Wensley's (1988) framework of the Sources of advantage, Positional advantage, and Performance (SPP). Their model specifies how the internal (i.e., R&D and marketing) and external (i.e., supplier's specific investment) resources can be deployed to create positional advantages (i.e., product innovativeness, supplier involvement in production, and NP's launch quality), which can then be exploited by a new venture to increase its first NP's sales and profits margins.

6.6. Summary

By adopting the present study's *Research Questions* (RQ1 to RQ6, section 2.5) as an *outline*, this chapter has discussed the answers to these research questions in light of this study's theoretical underpinnings and model (CFEMOs, section 3.2), research hypotheses (H1 to H14c, section 3.3), and empirical findings within U.S. restaurants context (sections 5.5.3.5, 5.5.4, and 5.5.5), as well as the (dis)similar findings of the previous, relevant empirical studies on product innovation literature within the manufacturing context (sections 2.3, 3.2, and 3.3). In this respect, this chapter has discussed the answers to RQ1 to RQ6 as follow.

Initially, *section 6.2.* has discussed the answer for *RQ1* regarding the direct and indirect (mediated) interrelationships among the components of product innovation performance (OperLP, ProdLP, and FirmLP). Then, based on the RQ1's discussion (section 6.2), *section 6.3.* has discussed the answers to both *RQ2* and *RQ3* concerning the direct and indirect (mediated) interrelationships between PEProf and the components of product innovation performance. Next, building upon the discussions of RQ1 to RQ3 (sections 6.2 and 6.3), *section 6.4.* has discussed the answers to both *RQ4* and *RQ5* respecting the direct and indirect (mediated) interrelationships among the product innovation's critical firm-based enablers (PFit, CrosFI, and TMS), PEProf, and the components of product innovation performance. This chapter has ended with *section 6.5.* that has discussed the answer for *RQ6* about this study model's (CFEMOs) explanation/prediction of the variation of the PEProf, OperLP, ProdLP, and FirmLP.

The next chapter concludes the thesis by, concisely, recalling the present study's main empirical findings (section 7.1). Additionally, it provides several key original contributions and crucial implications to product innovation's research and practice (section 7.2). Furthermore, it offers promising avenues for future research based on the current study's limitations (section 7.3).

Chapter 7: Research Conclusions, Contributions and Implications, and Limitations and Directions for Future Research

This chapter concludes the thesis by, concisely, recalling the present study's main empirical findings (section 7.1). Next, it provides several key original contributions and crucial implications to product innovation's research and practice (section 7.2). Finally, it offers promising avenues for future research based on the current study's limitations (section 7.3).

7.1. Conclusions

Overall, despite the variations in the restaurant's size, age, and the level of new menu-items innovativeness, *ceteris paribus*, the current study substantiated that those restaurateurs who, concurrently, succeed in enhancing their: (1) joint goals achievement, open and frequent communications, as well as sharing of ideas, information and resources among the internal restaurant's functions/departments responsible for new menu-item innovation (e.g., R&D, production, and marketing), (2) top-management's resources dedication, commitment, and involvement, and (3) new menu-items compatibility with the available restaurants skills/resources (e.g., marketing research, sales force, advertising, promotion, R&D, and production), *descendingly ranked*, would be more proficient in executing their overall new menu-item innovation process activities, which in turn would grant them superior new menu-item quality, speed-to-market, and cost efficiency, which consequently would enrich their new menu-item customer satisfaction, sales, and profits, which ultimately would augment their overall restaurant's sales, profits, and market share.

7.2. Contributions and Implications to Product Innovation Research and Practice

This study provides several key original contributions and crucial implications to product innovation research and practice (both generally and specifically within U.S. restaurants context), as follow.

This study significantly contributes to the product innovation literature within the restaurants context:

First, the present study has devoted substantial pioneer effort to collect, synthesise, and evaluate the key relevant previous studies on product innovation within the restaurants context in a single study. Such an effort could serve as a helpful guide and inspiration source for future studies on this promising research area. ***Second***, in response to the identified research gaps and shortcomings of restaurants product innovation literature, the present study has managed to achieve its aim by developing and empirically testing, within U.S. restaurants context, an integrated, theory-informed model comprehensively: (1) explicating the simultaneous direct and indirect/mediated interrelationships among the product innovation's Critical Firm-based Enablers (CFEs), Process Execution Proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP); as well as (2) explaining/predicting the variation of the PEProf, OperLP, ProdLP, and FirmLP. By doing so, and building upon the key relevant previous studies on product innovation within various manufacturing contexts, it is believed that the present study has significantly contributed to shift the product innovation literature within the restaurants context from the back seat to the forefront in this crucial research area.

This study advances the product innovation literature methodologically:

First, this study has based its hypotheses testing on conducting comprehensive PLS-SEM mediation analyses that simultaneously explicate the total, direct, total indirect, specific indirect, and sequential indirect effects among the investigated variables. However, there is a limited employment of such comprehensive mediation analyses in the relevant previous empirical studies. For example, Song and Parry (1997b) and Song *et al.* (1997a) indicated that their models investigate the mediating roles for some variables; however, their results about such mediators leave ambiguity, given the lack of distinctness in testing and reporting the direct, indirect (mediated), and total effects (i.e., the specific mediating roles of the intervening variables are not clear).

Unfortunately, when such results are not precisely and/or fully reported, fellow researchers and managers are left to the risk of guessing by themselves the importance of these factors in determining NPD performance outcomes. Additionally, without controlling for the potential mediating roles, the yielded conclusions regarding the importance of antecedents to their consequences are likely to be flawed (i.e., either underestimated or overestimated). Thus, in response to the calls of relevant previous research (e.g., Langerak *et al.*, 2004a, b; Zhao *et al.*, 2015), the present study's utilisation of the comprehensive mediation analyses addresses previous research limited usage of such an advanced statistical analysis and serves as a guide for future research in this area.

Second, all the current study's main constructs were conceptualised and specified as formative constructs instead of reflective ones; answering the calls of the relevant methodological literature (e.g., Albers, 2010; Jarvis *et al.*, 2003; Peng & Lai, 2012; Petter *et al.*, 2007; Roberts *et al.*, 2010) to address the common constructs misspecification (erroneously specified as reflective when they should have been formative) within the relevant empirical studies. Such a misspecification negatively affects numerous of the most widely used constructs in the field, as it severely biases structural parameter estimates and can lead to inappropriate/different conclusions regarding the hypothesised relationships between constructs. Thus by implication, a considerable part of the empirical results in the literature may be possibly misleading. Additionally, utilising formative constructs is highly recommended in success factor studies (as it is the case with this study) that concentrate on the differential impacts/weights of the various success factors actionable indicators/drivers. Unfortunately, there is lack of formative constructs utilisation in all of the relevant previous empirical studies. With the assumption of reflective indicators, it is only possible to derive results for the constructs-level but not for the differential effects of the indicators.

Alternatively, with formative indicators, valuable managerial implications would be more achievable, as the differential impacts/weights of the various market orientation's actionable indicators/drivers, which are mostly responsible for the success, are identifiable and more achievable. To this end, success factor studies should utilise actionable/formative indicators. Moreover, only by using formative indicators, it is possible to extract the influence/weight of every single formative indicator on not only its corresponding construct, but also on the other subsequent/target construct(s).

Third, this study has conducted comprehensive PLS-SEM Importance-Performance Matrix Analyses (IPMA) (priority mappings) for the research model's constructs. By doing so, it is considered the first study (both generally and specifically within U.S. restaurants context) that allowed product innovation managers (especially who have a limited-resources availability) to have access to fine-grained and actionable information, as well as prioritised, effective and efficient improvement actions about their product innovation practices (e.g., PFit, CrosFI, and TMS), process (e.g., PEProf), and performance outcomes (e.g., OperLP, ProdLP, and FirmLP), along two dimensions (i.e., importance and performance), and at three interrelated levels (i.e., the measurement and structural models levels, and across the measurement and structural model levels).

Further key contributions and crucial theoretical and practical implications:

First, this study extends the scope of product innovation's empirical literature into a new promising context (i.e., U.S. restaurants). ***Second***, to address previous models lack of theories-integration and/or explanation/prediction power, and drawing on the relevant empirical literature and grounded on the integration of the complementary theoretical perspectives of the critical success factors (CSFs) approach, the resource-based view (RBV) of the firm theory, and the input-process-output (IPO) model, together, under the system(s) approach's umbrella, the present study has proposed and developed an original theoretical model of those critical, managerially controllable factors that have high potential for achieving the majority of the significant improvements in the desired (intermediate and ultimate) outcome(s) of product innovation efforts.

Compared to the empirical models of the extant relevant product innovation studies, the CFEMOs model, thanks for its comprehensive theories-integration, has both broader scope and superior explanatory/predictive power. It, simultaneously, explains/predicts 72% of the variation of the overall execution proficiency of the new menu-item innovation process activities, 67% of the variation of the overall new menu-item superiority (quality, speed-to-market, and cost-efficiency), 76% of the variation of the overall new menu-item performance (customer satisfaction, sales, and profits), and 75% of the variation of the new menu-item contribution to the overall restaurant performance (sales, profits, and market share).

Thus, in response to the calls of previous research (e.g., Brown & Eisenhardt, 1995; Calantone & di Benedetto, 1988; Kessler & Chakrabarti, 1996), this study's theoretical model (CFEMOs) provides product innovation researchers and managers with a holistic view/blueprint for better and comprehensive understanding of the simultaneous and complex interrelationships among these core variables, which in turn could have crucial theoretical and practical implications for guiding and significantly improving the product innovation's research, planning, organisation, resources allocation, and process execution proficiency, as well as the operational, product, and firm performance.

Third, through its pioneer theoretical suggestion and empirical substantiation and clarification of the simultaneous, differential direct and indirect (mediated) effects among the three sequential components of product innovation performance outcomes (i.e., *overall* OperLP, ProdLP, and FirmLP), the current study has managed to provide product innovation researchers and managers (in general and especially within U.S. restaurants context) with a, relatively, more precise, comprehensive, and better measurement and understanding of the complex interactions among these crucial (interdependent, yet distinctive) product innovation performance outcomes.

The present study has revealed that the restaurateurs achievement of an enhanced overall restaurant performance (i.e., FirmLP as an ultimate outcome: greater new menu-item contributions to the overall restaurants sales, profits, and market share) is based on their continuous development and launching of successful new menu-items (i.e., ProdLP as a second intermediate outcome: higher new menu-item customer satisfaction, sales, and profits), which in turn depends on their attainment of a superior new menu-items operational performance (i.e., OperLP as a first intermediate outcome: characterised by high new menu-item quality, speed-to-market, and cost efficiency).

By implication, although their continuous innovation of successful new menu-items is typically a challenging endeavour, restaurateurs still have to pursue such an endeavour as it is deemed imperative for their restaurants success and even survival. Additionally, to improve their chances of success, *restaurateurs* should devote their efforts to innovate new menu-items that are superior over competitors with reference to quality, speed-to-market, and cost efficiency (OperLP). Hence, rather than limiting their *achievement efforts* (/investigation and measurement) to only one of them, it is highly recommended for *restaurateurs* (/researchers) to pursue the concurrent *realisations* (/investigation and measurement) of the superior new menu-item (1) *quality*, (2) *speed-to-market*, and (3) *cost efficiency*. Such an endeavour would allow *restaurateurs* (/researchers) to improve their *achievement* (/understanding and explanation) of the overall new menu-items success and consequently the overall restaurant's performance. Additionally, neither OperLP nor ProdLP are ends in themselves (OperLP and/or ProdLP are not enough for measuring product innovation performance); instead, they are sequential precursors to the ultimate outcome (FirmLP). Thus, to have a better measurement, understanding, and/or achievement of the product innovation performance, it is highly recommended for academics and practitioners to avoid basing their investigations, measurements, and/or achievements efforts on just one of these three dimensions of product innovation performance outcomes or their sub-dimensions, or merely combining all of them in one factor. Otherwise, such limited investigations, measurements, and/or achievements efforts might yield incomplete, irrelevant, or even misleading research conclusions and understanding, which in turn would lead restaurant managers to take the wrong decisions, misallocate their restaurants limited resources, and suffer from the subsequent disheartening consequences along their various product innovation performance outcomes.

Fourth, by empirically explicating, for the first time, the concurrent, differential direct and indirect (mediated) effects between the *overall* PEProf and the components of product innovation performance (i.e., the *overall* OperLP, ProdLP, and FirmLP), this study is generally *expanding* the *collective* empirical findings of the pertinent extant research on product innovation literature. This study proved that those restaurateurs who execute their overall new menu-item innovation process activities (i.e., PEProf: comprising the marketing and technical activities needed for innovating a new menu-item) with high proficiency, would enjoy superior new menu-item quality, speed-to-market, and cost efficiency (OperLP), which consequently would enrich their overall new menu-item customer satisfaction, sales, and profits (ProdLP), which ultimately would improve their overall restaurant's sales, profits, and market share (FirmLP).

By implication, *execution proficiency* is the element that holds the key to a restaurant's achievements of its various desired outcomes of product innovation performance. A firm's innovation of successful new products necessitates an understanding of its customers, markets, and competitors, which yields profitable new products that deliver superior value to customers. Additionally, a restaurateur ability to get the most out of his/her restaurant's limited and valuable resources (i.e., realising high efficiency in innovation time and costs by focusing on those new menu-item ideas with star potentials instead of those with low potentials) is subject to his/her level of proficiency in executing new menu-item screening and testing. Screening (i.e., evaluating, ranking, and selecting) a new menu-item idea should be based on its appeal to target market, its compatibility with restaurant's resources/skills (e.g., innovation, production, and marketing), as well as its potential benefits to restaurant's sales, profits, and market share. It is also crucial for restaurateurs to test new menu-items under real-life conditions (e.g., with customers and/or in restaurants) to be able to identify in advance their potential levels of market acceptance and areas for improvements before wasting excessive resources in the full production and commercialisation of new menu-items that are infeasible/inefficient or have an inferior quality. The gained insights from doing so would help new menu-items developers to ultimately provide customers with profitable new menu-items that closely meet their expectations by optimising and fine-tuning a new menu-item culinary aspects, recipe, packaging, food safety, name, and pricing, as well as its operational procedures in relation to supply, preparation, storing, selling, and serving.

Furthermore, commercialising a NP at an inappropriate (too early/late) time could lead to market opportunities obsolescence owing to misfit with market-demand volume, customers preferences, and/or competitors activities. If a NP improperly positioned, priced too high/low, poorly advertised, and/or resulted in a tougher than expected competitors fight back, this would bring about low levels of customers satisfaction, sales, market share, and profits. Moreover, as NP's relative advantage and compatibility (i.e., NP's superior benefits and fit with customers preferences relative to competitors) are key drivers for NP success, elevating customers perception of a NP's relative advantage and compatibility, via the proficient execution of its launch activities, can play a pivotal role in positively stimulating their purchasing decisions of that NP and maximising a firm's chances of profitably achieving NP's acceptance in a specific target market. Specifically, such a proficient launch comprises, among others, sufficient inventory is available at the time of launch, the firm has set a price level that is perceived to be appropriate, sufficient investment has been made in promotional programs (including quantity discounts, trade shows, and events) and quality advertising, and on-time delivery and quick response to customer requests are assured.

Finally, the aforementioned primary benefits accrue from the firms adept in performing their marketing and technical activities (needed for developing and commercialising a new product) could be enriched by carrying out a post-launch audit. A post-launch audit comprises a continuous monitoring of the various actual indicators of the NP's performance outcomes (e.g., operational, financial, market) along the NP's life-cycle and marketing-mix relative to previous expectations and competitors, as well as the NP's compatibility/synergy with the firm's other products. Such a monitoring is followed by executing a root-cause analysis and implementing any needed (immediate and/or future) corrective actions/changes (strategic and/or tactical adjustments) to close any highlighted gaps/deviations. Important lessons learned from such an audit can and should be used to improve future firm's NP innovations. By doing so, a firm can be in a better position, relative to competitors, to optimise its various NP's performance outcomes along its life-cycle and marketing-mix, as well as ensure high compatibility/synergy between its NP and the other existing products.

Fifth, by empirically explicating, for the first time, the concurrent, differential direct and indirect (mediated) effects among the product innovation's critical firm-based enablers (i.e., PFit, CrosFI, and TMS), the *overall* PEProf, and the components of product innovation performance (i.e., the *overall* OperLP and ProdLP), the current study is generally: (1) *advancing* the *collective* empirical findings of the germane prior studies on product innovation literature; as well as (2) *clarifying* the seemingly *conflicting* empirical findings of the relevant existing works on product innovation literature arguing for the *insignificant versus significant direct impacts* of the PFit's *measures, CrosFI,* and *TMS* on the OperLP's *three individual components* and the *overall* ProdLP.

The present study verified that those restaurateurs who concurrently succeed in enhancing their: (1) joint goals achievement, open and frequent communications, as well as sharing of ideas, information and resources among the internal restaurant's functions/departments responsible for new menu-item innovation (CrosFI: e.g., R&D, production, and marketing), (2) top-management's resources dedication, commitment, and involvement (TMS), and (3) new menu-items compatibility with the available restaurants skills/resources (PFit: e.g., marketing research, sales force, advertising, promotion, R&D, and production), *descendingly ranked*, are more adept in executing their overall new menu-item innovation process activities (PEProf), which in turn would grant them outstanding new menu-item quality, speed-to-market, and cost efficiency (OperLP), which consequently would augment their new menu-item customer satisfaction, sales, and profits (ProdLP).

A theoretical contribution of this study is to clarify the till now inconsistent effects of PFit, CrosFI, and TMS on the overall OperLP and ProdLP. This study's model, in contrast to previous studies, controls for the concurrent direct effects of the product innovation's critical firm-based enablers (i.e., PFit, CrosFI, and TMS) on the components of product innovation performance (i.e., the *overall* OperLP and ProdLP) alongside the simultaneous specific and sequential mediating roles of the overall PEProf and/or OperLP in such relationships. Without controlling for such mediating roles, the yielded conclusions, regarding the importance of these product innovation's critical firm-based enablers to the components of product innovation performance, are likely to be flawed (i.e., either underestimated or overestimated). In order to avoid such flawed conclusions, this study contends that if the *direct effects* of the product innovation's critical firm-based enablers (i.e., PFit, CrosFI, and TMS) on the components of product innovation performance (i.e., the *overall* OperLP and ProdLP) are *insignificant*, this does not necessarily suggest that these enablers are trivial especially if the following two conditions hold.

Firstly, if these enablers have significant positive correlations with the overall OperLP and ProdLP. *Secondly*, if these enablers direct effects on the overall: (1) *OperLP* were reduced from significant positive (before including the suggested *mediator* – i.e., the *overall PEProf* – in the model) to insignificant (after *its* inclusion because of *its* full mediation); and (2) *ProdLP* were reduced from significant positive (before the simultaneous inclusion of the suggested *two sequential mediators* – i.e., *the overall PEProf and OperLP* – in the model) to insignificant (after *their* simultaneous inclusion because of *their* full mediation).

In other words, this study maintains that firms may simply ensure PFit, adopt CrosFI, and provide TMS, but if they have not utilised these practices/enablers in such a way as to generate a high PEProf that yields superior OperLP, the mere employment of such practices/enablers by firms may not lead to enhancements in their OperLP and/or ProdLP. Hence, in this sense, rather than considering PFit, CrosFI, and TMS as either *irrelevant* or *crucial "in themselves"* to boost the overall OperLP and/or ProdLP, it is better to consider *CrosFI*, *TMS* and *PFit*, *descendingly ranked*, as three key preconditions/enablers that have to be utilised in improving the overall PEProf, which in turn would enhance the overall OperLP, which consequently would augment the overall ProdLP.

Restaurateurs have to devote much effort to provide the necessary rewards, training, and information technology that facilitates the integration of their functionally diverse staff across all new menu-item innovation activities. Doing so creates a common-value-based focus (instead of a function-oriented focus) that facilitates accessing, leveraging, and melding their distinct but complementary resources, skills, efforts, and perspectives, as well as increases the amount, variety, and quality of information available to innovation's team members regarding competitors and target market.

Furthermore, it increases the creativity, quality, speed, and cost-efficiency of information processing, problem solving, and decision-making for the innovation team by: *(1)* reducing misunderstanding and conflicts among team members; *(2)* reducing uncertainties, reworks, redesigns, and respecifications; *(3)* overlapping and compressing the development phases; *(4)* advancing mutual support, communication, and cooperation; *(5)* encouraging the cross-fertilisation of ideas and reaching optimal solutions; and *(6)* allowing team members to contribute their knowledge, skills, and resources to their full potential.

As it is typically has the highest level and scope of knowledge, experience, skills, resources, authority, and power, and to realise high adept in executing their new menu-items innovation activities that allow them to enjoy superior new menu-item quality, speed-to-market, and cost efficiency, restaurants top management has to be fully and explicitly committed to and involved in their new menu-items innovation activities by doing the following: *(1)* setting the proper mindset, direction, and innovative environment; *(2)* conveying the sense of urgency, priority, relevance, legitimacy, and risk-tolerance for a new menu-item innovation; *(3)* providing clear vision, guidance, and goals of the new menu-item innovation activities; *(4)* anticipating potential discord between functions and taking necessary actions to avoid it; *(5)* resolving, bypassing, or at least alleviating, common potential innovation's uncertainties, obstacles, constrains, and pitfalls that are beyond innovation team's capabilities, yet could delay or derail a new menu-item innovation; *(6)* providing innovation team, especially during the critical innovation periods, with the crucial motivation/encouragement, incentives, authority, flexibility, and resources that could enrich their engagement, enthusiasm, creativity, and innovation capabilities; and *(7)* finding, prioritising, dedicating and/or redeploying scarce resources to handle critical innovation problems and tasks.

Restaurateurs have to ensure in their new menu-items concepts screening a high compatibility between its innovation requirements and the restaurant's available resources and skills. Doing so is fundamental to realise sustainable competitive advantage as it is "restaurant specific" (i.e., difficult for competitors to imitate) and can yield resource efficiency through a more focused scope of attention, applicability of standard restaurant's practices, and by ensuring that a sufficient number of the new menu-item innovation's team members with the relevant knowledge/capabilities and/or appropriate facilities and organisational mechanisms are readily deployed. However, a lack of such a fit prohibits the restaurant from the effective and efficient innovation of a new menu-item because of facing an existing gap between the amount and quality of marketing and technical resources/skills required to perform particular NPD activities proficiently and those already possessed by the restaurant. Therefore, the more the restaurants stay close to what they know best and capitalise on that knowledge, the higher their execution proficiency will be in relation to the marketing and technical activities needed for innovating a new menu-item.

7.3. Limitations and Directions for Future Research

While this study has substantially progressed toward clarifying the complex interrelationships among the product innovation's critical firm-based enablers (PFit, CrosFI, and TMS), process execution proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP), limitations resulting from trade-off decisions required in all empirical research are present. The following study's limitations offer promising avenues for future research.

First, although its causal inferences were strongly grounded on the extant theoretical and empirical literature, this study has employed cross-sectional data, which might lead to causal inferences issues. Although practically challenging, basing future research on longitudinal samples might overcome such issues.

Second, this study's measurements were based on subjective (perceptual) data collected from a senior key informant in each firm, which might bring about common-method bias. Although the relevant procedural precautions for the common-method bias were followed in data collection and its absence from the current study was statistically verified, such a bias might be avoided by future research employing a multiple informant design based on objective (secondary) data. However, besides the problems of having access to multiple respondents in each firm, such an endeavour would have to surmount the challenges of objective (secondary) data availability.

Third, as the focus of this empirical study was on product innovation within the commercial U.S. restaurants context, thus the generalisability of this study's findings could be verified and enriched (e.g., identifying potential differences caused by diverse cultural and/or business environments) by future research that replicate this study utilising one or more of the: (1) other innovation types (e.g., service, process, technological, marketing, and organisational innovation); (2) developing countries and the other developed countries; (3) other contexts within the restaurant, foodservice, hospitality, tourism, service, and manufacturing industries. *Fourth*, only three specific critical firm-based enablers (i.e., PFit, CrosFI, and TMS) were examined as exogenous variables—ones that, based on the theoretical and empirical literature, warranted investigation. Therefore, additional understanding of this study's investigated relationships would be grasped by future empirical research that extends this study's integrated theoretical framework (CFEMOs model) by, for instance: (1) examining the effects of both PFit and TMS on CrosFI; (2) studying the potential roles of other firm-based enablers (e.g., innovation culture, process formality/flexibility, information technology); (3) comparing the roles of the critical firm-based enablers to the potential roles of the out-of-the-firm ones (e.g., external relations with customers, competitors, suppliers, and research institutes) based on the resource-advantage theory; and/or (4) exploring qualitatively (e.g., utilising personal interviews and focus groups) the drivers, facilitators, and barriers for the firms adoption of the PFit, CrosFI, and TMS.

Fifth, besides considering the *overall OperLP*, disentangling *it*, using future research, into *its* three individual components (i.e., NP's quality, speed-to-market, and cost efficiency) would uncover more specific effects: (1) of their antecedents; as well as (2) on their consequences. *Sixth*, this study used a single new product that was representative of the firm's NPD programme. Future research may consider using data on multiple new products embedded within the firms NPD programme, as well as differentiating and comparing between successful and failed new products in relation to their respective product innovation practices, processes, and performance outcomes.

Seventh, as the current study was primarily focused on the mediating effects, thus, to reveal further insights, the author call future research to extend this study by accounting for the potential moderators that might affect (strengthen or weaken) this study's investigated relationships (e.g., product innovativeness, order of market entry, market potential, competitive intensity, environmentally-caused disruption).

As a final note, while unresolved questions for future researchers certainly exist, it is believed that this study, through developing and empirically testing its integrated theoretical framework's (CFEMOs model), has taken (both generally and specifically within U.S. restaurants context) a crucial pioneer step in advancing scholars and managers understanding of the complex interrelationships among the product innovation's critical firm-based enablers (PFit, CrosFI, and TMS), process execution proficiency (PEProf), and performance outcomes (OperLP, ProdLP, and FirmLP), besides offering crucial theoretical and practical implications for guiding and significantly improving the product innovation's planning, organisation, resources allocation, and process execution proficiency, as well as the operational, product, and firm performance.

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Appendices

Appendix 1. Previous studies' operationalisation of new-product fit-to-firm's skills and resources (PFit)

Studies	Construct(s)/Dimensions	Indicators/Items
Calantone and di Benedetto (1988)	Marketing skills	• Our marketing research skills were more than adequate. • Our management skills were more than adequate. • Our sales force and/or distribution skills were more than adequate. • Our advertising and promotion skills were more than adequate.
	Technical skills	• Our financial resources were more than adequate. • Our R&D skills and people were more than adequate. • Our engineering skills and people were more than adequate. • Our production resources or skills were more than adequate.
Calantone et al. (1996)	Marketing resources and skills	• Our marketing research skills and people were more than adequate. • Our sales force and/or distribution resources and skills were more than adequate. • Our advertising and promotion resources and skills were more than adequate. • Our management skills were more than adequate.
	Technical resources and skills	• Our R&D skills and people were more than adequate. • Our engineering skills and people were more than adequate.

Appendix 1. Previous studies' operationalisation of new-product fit-to-firm's skills and resources (PFit) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Song and Parry (1997a)	Marketing skills and resources	• Our company's marketing research skills were more than adequate for this project. • Our company's sales force skills were more than adequate for this project. • Our company's distribution skills were more than adequate for this project. • Our company's advertising/promotion skills were more than adequate for this project. • Our company's marketing research resources were more than adequate for this project. • Our company's sales force resources were more than adequate for this project. • Our company's distribution resources were more than adequate for this project. • Our company's advertising/promotion resources were more than adequate for this project.
	Technical skills and resources	• Our company's R&D skills were more than adequate for this project. • Our company's engineering skills were more than adequate for this project. • Our company's manufacturing skills were more than adequate for this project. • Our company's R&D resources were more than adequate for this project. • Our company's engineering resources were more than adequate for this project. • Our company's manufacturing resources were more than adequate for this project.
Song and Parry (1997b)	Marketing synergy	• Our company's sales force resources were more than adequate for this selected project. • Our company's distribution resources were more than adequate for this selected project. • Our company's advertising/promotion sales force resources were more than adequate for this selected project. • Our company's sales force skills were more than adequate for this selected project.
	Technical synergy	• Our company's R&D skills were more than adequate for this selected project. • Our company's engineering skills were more than adequate for this selected project. • Our company's R&D resources were more than adequate for this selected project. • Our company's engineering resources were more than adequate for this selected project.

Appendix 1. Previous studies' operationalisation of new-product fit-to-firm's skills and resources (PFit) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Song et al. (1997a)	Skills/Needs alignment	• There was a close fit between our marketing skills and the needs of this project. • There was a close fit between our R&D skills and the needs of this project. • There was a close fit between our engineering skills and the needs of this project. • There was a close fit between our manufacturing skills and the needs of this project.
Song et al. (1997c)	Marketing resources synergy	• Our company's marketing research resources were more than adequate for this project. • Our company's sales force resources were more than adequate for this project. • Our company's distribution resources were more than adequate for this project. • Our company's advertising/promotion resources were more than adequate for this project.
	Marketing skills synergy	• Our company's marketing research skills were more than adequate for this project. • Our company's sales force skills were more than adequate for this project. • Our company's distribution skills were more than adequate for this project. • Our company's advertising/promotion skills were more than adequate for this project.
Song and Parry (1999) and Song and Montoya-Weiss (2001)	Marketing synergy	• Our company's marketing research skills were more than adequate for this project. • Our company's sales force skills were more than adequate for this project. • Our company's distribution skills were more than adequate for this project. • Our company's advertising/promotion skills were more than adequate for this project. • Our company's marketing research resources were more than adequate for this project. • Our company's sales force resources were more than adequate for this project. • Our company's distribution resources were more than adequate for this project. • Our company's advertising/promotion resources were more than adequate for this project.
	Technical synergy	• Our company's R&D skills were more than adequate for this selected project. • Our company's engineering skills were more than adequate for this selected project. • Our company's R&D resources were more than adequate for this selected project. • Our company's engineering resources were more than adequate for this selected project.

Appendix 1. Previous studies' operationalisation of new-product fit-to-firm's skills and resources (PFit) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Lee and Wong (2010, 2011)	Marketing synergy	• Our company's marketing research skills were more than adequate for this project. • Our company's sales force skills were more than adequate for this project. • Our company's distribution skills were more than adequate for this project. • Our company's advertising/promotion skills were more than adequate for this project. • Our company's marketing research resources were more than adequate for this project. • Our company's sales force resources were more than adequate for this project. • Our company's distribution resources were more than adequate for this project. • Our company's advertising/promotion resources were more than adequate for this project.
	Technology synergy	• Our company's R&D skills were more than adequate for this selected project. • Our company's engineering skills were more than adequate for this selected project. • Our company's manufacturing skills were more than adequate for this selected project. • Our company's R&D resources were more than adequate for this selected project. • Our company's engineering resources were more than adequate for this selected project. • Our company's manufacturing resources were more than adequate for this selected project.
Song et al. (2011)	Marketing resources	Marketing resources: The total marketing budget for the first product was: ----- (in $1000). Log (marketing budget): Natural logarithmic transformation of the total marketing budget.
	R&D resources	R&D resources: The total R&D budget for the first product was: ----- (in $1000). Log (R&D budget): Natural logarithmic transformation of the total R&D budget.

Appendix 2. Previous studies' operationalisation of cross-functional integration (CrosFI)

Studies	Construct(s)/Dimensions	Indicators/Items
Song and Parry (1997a) and Lee and Wong (2010, 2011)	Cross-functional linkages/integration	• The degree of integration between R&D and manufacturing was high during the entire development process. • This product was developed from frequent interactions between customers and our cross-functional product development team—it was a truly a cross-functional team effort. • The degree of integration between marketing and R&D was high during the entire development process. • The degree of integration between marketing and manufacturing was high during the entire development process.
Song and Parry (1997b) and Song and Montoya-Weiss (2001)	Cross-functional integration	• The integration between R&D and manufacturing was very good for this selected project. • The integration between marketing and R&D was very good for this selected project. • The integration between marketing and manufacturing was very good for this selected project.
Thieme et al. (2003)	Cross-functional integration	• The level of contact between the technical and commercial entities (groups, division, etc.) was high. • The level of information flow between the commercial and technical entities was high. • The level of participation in problem definition by the commercial entities was high.

Appendix 2. Previous studies' operationalisation of cross-functional integration (CrosFI) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Millson and Wilemon (2002, 2006)	Functional integration	NPD team/supporting functional departments-predevelopment • "Avoided creating problems" • "Created mutual goals" • "Worked smoothly together" • "Acted cohesively" NPD team/supporting functional departments-development and launch • "Avoided creating problems" • "Created mutual goals" • "Worked smoothly together" • "Acted cohesively" NPD team/supporting functional departments-post-launch • "Avoided creating problems" • "Created mutual goals" • "Worked smoothly together" • "Acted cohesively"
Calantone and di Benedetto (2012)	Cross-functional integration	• interdepartmental committees were set up to allow departments to engage in joint decision-making. • task forces or temporary groups were set up to facilitate interdepartmental collaboration. • liaison personnel existed whose specific job was to coordinate the efforts of several departments. • cross-functional teams made decisions concerning manufacturing strategy. • cross-functional teams made decisions concerning distribution or logistics strategy. • cross-functional teams made decisions concerning marketing or sales strategy.

Appendix 3. Previous studies' operationalisation of top-management support (TMS)

Studies	Construct(s)/Dimensions	Indicators/Items
Song and Parry (1997a)	Internal commitment	• This product was strongly supported by senior management throughout the entire development process. • A clearly identified individual was an activist in promoting this product's development throughout the product development and the introduction cycle. • We were not confident about the commercial success of the product. *(Reversed scale)*
Song et al. (1997a)	Project management skills	• The level of participation in problem definition by the technical entities was high. • Top management was highly supportive of the project. • Top management was involved in this project from the beginning. • The project manager had the necessary technical skills for this project. • The project manager had the necessary marketing skills for this project. • The project manager had a participative management style. • The project manager was able to motivate the project members. • The project manager had the necessary authority from top management.
Kleinschmidt et al. (2007)	Top-management involvement	Top management is personally involved in international/global NPD program • by playing a central role in project review (i.e., make key go/no-go, spending decisions). • as visionaries or champions of international and global new product ventures. • to enhance reputation of our organisation and new products. • by encouraging strategic customers to adopt our new products. • Top managers do not play an active role in the day-to-day activities of international new product ventures—that is, they usually leave things up to project leader and team. *(Reversed scale)*
	Resource commitment	On average, sufficient resources—people, time, money—are committed so that • international NPD research activities can be undertaken effectively and on time. • international NPD-related marketing activities can be undertaken effectively and on time. • international operational or process activities can be undertaken effectively and on time. • new product steering and coordination committees can operate effectively at the international level.

Appendix 4. Previous studies' operationalisation of process-execution proficiency (PEProf)

Studies	Construct(s)/Dimensions	Indicators/Items
Calantone and di Benedetto (1988)	Marketing activities	• Preliminary market assessment was done: • Detailed market potential and consumer behaviour research was done: • Financial viability study of demand was done: • Sample testing with customers was done: • Test marketing/trial selling was done:
	Technical activities	• Initial screening of the product concept/idea was done: • Preliminary engineering, technical and manufacturing assessment was done: • Product development: engineering, design/R&D was done: • Prototype or sample testing (alpha) was done: • Prototype or sample testing (beta) was done: • Pilot production/trial production was done: • Start-up of full production and ramp-up was done:
	Launch activities	• Our product launch—selling, promoting, distributing was done:
Calantone et al. (1996)	Proficiency of marketing activities	• Preliminary assessment of the market—a cursory look at the market. • Market study or market research—a detailed study of market potential, customer preferences, purchase process, etc. • Prototype or sample testing—with the customer. • Test marketing/trial sell prior to launch. • Launching the product in the market—selling, promoting, and distributing.
	Proficiency of technical activities	• Preliminary engineering, technical, and manufacturing assessment or study. • Product development—engineering, design, or R&D. • Prototype or sample testing—in-house. • Pilot production/trial or test production. • Start-up of full—scale production.

Appendix 4. Previous studies' operationalisation of process-execution proficiency (PEProf) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items	
Song and Parry (1997a)	Proficiency in the idea development and screening stage	• Initial screening of the product idea—the first review of the venture. • Expanding the idea into a full product concept. • Translating the product concept into business terms (such as market share, profitability, marketability).	• Identifying the key business implications of the product concept and its development. • Preparing a written proposal of the product concept.
	Proficiency in the business and market opportunity analysis stage	• Determining the desired product features and their feasibility. • Determining market characteristics and trends. • Conducting a market study or market research—a detailed study of market potential, customer preferences, purchase process, etc. • Appraising competitors and their products—both existing and potential.	• Identifying "appeal" characteristics that would differentiate and sell the product. • Evaluating the feasibility of developing and manufacturing a product with these features. • Assessing the required investment, time and risks of the product concept.
	Proficiency in the technical development stage	• Conducting preliminary engineering, technical and manufacturing assessments. • Building of the product to designated or revised specifications. • Evaluating laboratory tests to determine basic performance against specifications. • Establishing the standards by which product performance and market acceptance will be judged.	• Executing prototype or "in house" sample product testing. • Designing and testing manufacturing facilities. • Determining the final product design and specifications. • Specifying a detailed program for full-scale manufacturing. • Working continuously for cost reduction and quality control.
	Proficiency in the product testing stage	• Selecting customers for testing market acceptance. • Submitting products to customers for in-use testing.	• Executing test marketing programs in line with plans for commercialisation. • Interpreting the findings from in-house and consumer trials, test markets, and trade surveys.
	Proficiency in the product commercialisation stage	• Completing the final plans for manufacturing. • Completing the final plans for marketing. • Establishing the overall direction for commercialisation of this product. • Designating the individuals responsible for each part of the commercialisation program.	• Launching the product in the marketplace—selling, promoting and distributing. • Studying feedback from customers regarding this product. • Specifying activities and tentative plans for the product commercialisation phase.

Appendix 4. Previous studies' operationalisation of process-execution proficiency (PEProf) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items	
Song and Parry (1997b), Song and Montoya-Weiss (2001), and Lee and Wong (2010, 2011)	Marketing proficiency	• Determining market characteristics and trends. • Appraising competitors and their products—both existing and potential. • Identifying "appeal" characteristics that would differentiate and sell the product. • Executing test marketing programs in line with the plans for commercialisation. • Conducting a market study or market research—a detailed study of market potential, customer preferences, purchase process, etc. • Launching and introducing this product into the marketplace—selling, promoting and distributing.	
	Technical proficiency	• Conducting preliminary engineering, technical and manufacturing assessments. • Building of the product to designated or revised specifications. • Evaluating laboratory tests to determine basic performance against specifications. • Executing prototype or "in-house" sample product testing. • Determining the final product design and specifications. • Working continuously for cost reduction and quality control.	
Song et al. (1997a)	Marketing proficiency	• Exploratory stage activities were well undertaken. • Concept stage activities were well undertaken.	• Market development stage activities were well undertaken. • Market start-up activities were well undertaken.
	Technical proficiency	• Prototype development activities were well undertaken. • Prototype testing activities were well undertaken.	• Manufacturing start-up activities were well undertaken. • Technical service activities were well undertaken.
Song et al. (1997c)	Marketing activities proficiency	• Determining marketing characteristics and trends. • Conducting a detailed study of market potential, customer preferences, purchase process, etc. • Appraising competitors and their products—both existing and potential. • Selecting customers for testing market acceptance. • Submitting products to customers for in-use testing.	• Specifying activities and tentative plans of the product commercialisation phase. • Executing test marketing programs in line with the plans for commercialisation. • Interpreting the findings from in-house and customer trials, test markets, and trade surveys. • Completing the final plans for marketing. • Launching and introducing the product into the marketplace—selling, promoting and distributing.

Appendix 4. Previous studies' operationalisation of process-execution proficiency (PEProf) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Song and Parry (1999)	Marketing proficiency	• Initial screening of the product idea—the first review of this venture. • Determining the desired product features and their feasibility. • Determining market characteristics and trends. • Conducting a market study or market research—a detailed study of market potential, customer preferences, purchase process, etc. • Appraising competitors and their products-both existing and potential. • Identifying ''appeal'' characteristics that would differentiate and sell the product. • Completing the final detail plans for marketing. • Establishing the overall direction of the commercialisation of this product. • Launching and introducing this product into the marketplace—selling, promoting and distributing. • Studying feedback from customers regarding this product.
	Technical proficiency	• Evaluating the feasibility of developing and manufacturing a product with these features. • Building of the product to designated or revised specifications. • Evaluating laboratory tests to determine basic performance against specifications. • Executing prototype or ''in-house'' sample product testing. • Completing the final detail plans for manufacturing. • Working continuously for cost reduction and quality control.
Thieme et al. (2003)	Process proficiency	• Exploratory Stage. • Concept Development Stage. • Prototype Development Stage. • Prototype Testing Stage. • Market Development Stage. • Manufacturing Start-up Stage. • Marketing Start-up Stage. • Technical Service Stage.

Appendix 4. Previous studies' operationalisation of process-execution proficiency (PEProf) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items	
Millson and Wilemon (2002, 2006)	Predevelopment stage	• New product strategy development. • Identification of new product idea sources. • Methods for obtaining new product concepts from idea sources. • Initial idea screening. • Preliminary market assessment/test idea.	• Preliminary design assessment. • Preliminary manufacturability assessment. • Concept generation/determine "ideal" product. • Detailed market study (concept testing). • Financial/business analysis.
	Development and launch stage	• Develop prototypes and pilot models. • Develop detailed pricing, promoting, and distributing strategies. • In-house product testing. • Customer product testing. • Test market/trial sell.	• Trial production. • Prelaunch business analysis. • Production start-up. • Market launch.
	Post-launch stage	• New product market strategy implementation. • Customer satisfaction tracking. • Monitor product reinvention suggestions/changes.	• Observe product usage/key to redesign. • Track product maintenance/key to redesign.
	Entire NPD process	• New product strategy development. • Identification of new product idea sources. • Methods for obtaining new product concepts from idea sources. • Initial idea screening. • Preliminary market assessment/test idea. • Preliminary design assessment. • Preliminary manufacturability assessment. • Concept generation/determine "ideal" product. • Detailed market study (concept testing). • Financial/business analysis. • Develop prototypes and pilot models. • Develop detailed pricing, promoting, and distributing strategies.	• In-house product testing. • Customer product testing. • Test market/trial sell. • Trial production. • Prelaunch business analysis. • Production start-up. • Market launch. • New product market strategy implementation. • Customer satisfaction tracking. • Monitor product reinvention suggestions/changes. • Observe product usage/key to redesign. • Track product maintenance/key to redesign.

Appendix 4. Previous studies' operationalisation of process-execution proficiency (PEProf) *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items	
Kleinschmidt et al. (2007)	Homework activities	NPD activities before actual development starts entail • early project assessment and analysis (e.g., market and project appraisals, financial analysis). • complete project definitions (e.g., we identify target markets, project concepts, project benefits, features and requirements). • thorough studies of markets, wherever globally located, to determine, for example, product advantages, positioning, features, and requirements.	
	Launch preparation	When launching new projects to global markets we usually • develop a highly detailed formal launch plan. • base the plan on solid market information and studies of international customer behaviour. • actively promote the new product to our frontline in all locations (internal marketing). • train our front-line personnel regarding project- and customer-related knowledge and skills. • train and empower our front-line personnel to recover potential project failures (e.g., make customer specific adjustments and resolve unforeseen problems).	
Song et al. (2011)	Product launch quality	• Product availability: sufficient inventory available for launch. • Pricing: appropriateness of pricing level(s). • Promotion (e.g., discounts, trade shows, events).	• Advertising. • Product distribution: on-time delivery, quick response.
Calantone and di Benedetto (2012)	Quality of marketing effort	• Selling effort (e.g., the right people, properly trained, etc.). • Advertising. • Promotion (e.g., discounts, trade shows, events). • Service and technical support for the customer (e.g., right people, qualified, responsive). • Product availability: sufficient inventory available.	• Product distribution: on-time delivery, quick response. • Pricing: appropriateness of pricing level(s). • Executing the advertising strategy for this product (e.g., good copy placement, adequate number of insertions). • Managing distribution channel activities for this product.
	Lean launch	• The product launch is considered a "lean" or "low inventory" launch. (A "lean launch" is one where continuous, real-time market feedback and/or quick response stock replenishment is used to keep reseller inventories and costs very low). • Our sales forecasts were really helpful in calibrating plant size. • Our sales forecasts helped keep manpower and training costs reasonable.	• Work-in-process inventories were well-controlled. • QR (Quick Response) or ECR (Efficient Customer Response) programs were in force. • Channel inventories were kept to a minimum. • Flexible manufacturing techniques were used on this project.

Appendix 5. Previous studies' operationalisation of product innovation performance

Studies	Construct(s)/Dimensions	Indicators/Items
Calantone and di Benedetto (1988) and Calantone et al. (1996)	Product quality	• Our product was of higher quality: tighter specifications, or stronger or more reliable, etc., than competing products.
	New product success or failure	• How successful the product was from a profitability standpoint?
Song and Parry (1997a)	Product differentiation	• This product relied on technology never used in the industry before. • This product caused significant changes in the whole industry. • This product was one of the first of its kind introduced into the market. • This product was highly innovative—totally new to the market. • Compared to competitive products, this product offered some unique features or attributes to the customer. • This product was clearly superior to competing products in terms of meeting customers' needs. • This product permitted the customer to do a job or do something he [or she] could not presently do with vVhat was available. • This product was higher quality than competing products—tighter specifications, stronger, lasted longer, or more reliable. • This product had superior technical performance relative to competing products. • We were the first into the market with this type of product.
	Relative profitability	• How successful was this product from an overall profitability standpoint? • Relative to your firm's other new products, how successful was this product in terms of profits? • Relative to competing products, how successful was this product in terms of profits? • Relative to your firm's objectives for this product, how successful was this product in terms of profits?
	Relative sales	• Relative to your firm's other new products, how successful was this product in terms of sales? • Relative to competing products, how successful was this product in terms of sales? • Relative to your firm's objectives for this product, how successful was this product in terms of sales?
	Relative market share	• Relative to your firm's other new products, how successful was this product in terms of market share? • Relative to competing products, how successful was this product in terms of market share? • Relative to your firm's objectives for this product, how successful was this product in terms of market share?

Appendix 5. Previous studies' operationalisation of product innovation performance *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Song and Parry (1997b)	Product competitive advantage	• Compared to competitive products, this product offered some unique features or attributes to the customer. • This product was clearly superior to competing products in terms of meeting customers' needs. • This product permitted the customer to do a job or do something he [or she| could not presently do with what was available. • This product was higher quality than competing products—tighter specifications, stronger, lasted longer, or more reliable. • This product had superior technical performance relative to competing products.
	Level of relative new product success	• How successful was this product from an overall profitability standpoint? • Relative to your firm's other new products, how successful was this product from a sales volume standpoint? • Relative to your firm's other new products, how successful was this product from a profitability standpoint? • Relative to your firm's objectives for this product, how successful was this product from a profitability standpoint?
Song et al. (1997a)	Product quality	• The benefits of this product emphasised high quality. • This product's positioning strategies emphasised benefits, solutions, and needs (e.g., more effective). • The benefits of this product emphasised a competitive introduction price. • The benefits of this product emphasised a low operating cost. • The benefits of this product emphasised product reliability. • The benefits of this product emphasised product compatibility and versatility (e.g., compatible with existing or other operating systems).
	New product performance	• The commercial outcomes of this product met our expectations. • The technical outcomes of this project met our expectations. • There was a close fit between the product's intended market and our existing markets. • The customers were satisfied with the final product.
Song et al. (1997c)	New product performance	• Relative to your firm's other new products, how successful was this product in terms of profits? • Relative to competing products, how successful was this product in terms of profits? • Relative to your firm's objectives for this product, how successful was this product in terms of profits?

Appendix 5. Previous studies' operationalisation of product innovation performance *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Song and Parry (1999)	Product competitive advantage	• Compared to competitive products, this product offered some unique features or attributes to the customer. • This product was clearly superior to competing products in terms of meeting customers' needs. • This product permitted the customer to do a job or do something he could not presently do with what was available. • This product was higher quality than competing products—tighter specifications, stronger, lasted longer, or more reliable. • This product had superior technical performance than competing products.
	Relative new product performance	Relative to your firm's other new products, how successful was this product in terms of: • Sales? • Market share? • Profits? Relative to competing products, how successful was this product in terms of: • Sales? • Market share? • Profits? Relative to your firm's objectives for this product, how successful was this product in terms of: • Sales? • Market share? • Profits? • How successful was this product from an overall profitability standpoint?
Song and Montoya-Weiss (2001)	Product competitive advantage	• Compared to competitive products, this product offered some unique features or attributes to the customer. • This product was clearly superior to competing products in terms of meeting customers' needs. • This product permitted the customer to do a job or do something he could not presently do with what was available. • This product was higher quality than competing products—tighter specifications, stronger, lasted longer, or more reliable. • This product had superior technical performance than competing products.
	Product financial performance	• The return on investment (ROI) for the first year of the product introduction. • The return on investment (ROI) for the second year of the product introduction. • The return on investment (ROI) for the third year of the product introduction.

Appendix 5. Previous studies' operationalisation of product innovation performance *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Thieme et al. (2003)	New product survival	• New product survival.
Millson and Wilemon (2002, 2006)	Degree of new product market success	• Profits. • Sales. • Entering existing markets. • Entering new markets.
Kleinschmidt et al. (2007)	Global NPD program performance: Financial performance	• In terms of sales (revenue) performance, over the last three years, how successful was your international NPD program in meeting its objectives? • In terms of spending, over the last three years, from a technical standpoint, how successful was the global NPD program in meeting its objectives? In terms of profitability, over the last three years: • how profitable was your international NPD program, relative to your spending? • how successful was your international NPD program in meeting its profit objectives?
	Global NPD program performance: Windows of opportunity	On average, how successful was your international new NPD program in: • opening new markets to your firm (division/SBU)? • leading your firm into new product arenas (i.e., products you did not have three years ago)? • opening new technologies for your firm?
Lee and Wong (2010)	NPD timeliness	• The degree to which the project was done in a time-efficient manner. • The degree to which the project adhered to the time schedule.
	International new product rollout timeliness	• The degree to which the actual availability of the new product for sale in the firm's target country-markets was achieved in a time-efficient manner. • The adherence of the new products to the rollout schedule.

Appendix 5. Previous studies' operationalisation of product innovation performance *(Continued)*

Studies	Construct(s)/Dimensions	Indicators/Items
Lee and Wong (2011)	New product launch success	• How successful was this selected project from an overall profitability standpoint? • Relative to your firm's other new products, how successful was this selected project in terms of profits? • Relative to competitors' products, how successful was this selected project in terms of profits? • Relative to your firm's objectives for this selected project, how successful was this selected project in terms of profits? • Relative to your firm's other new products, how successful was this selected project in terms of sales? • Relative to competitors' products, how successful was this selected project in terms of sales? • Relative to your firm's objectives for this selected project, how successful was this selected project in terms of sales? • Relative to your firm's other new products, how successful was this selected project in terms of market share? • Relative to competitors' products, how successful was this selected project in terms of market share? • Relative to your firm's objectives for this selected project, how successful was this selected project in terms of market share?
Song et al. (2011)	First product performance	• First year gross margins in % • Second year gross margins in % • Third year gross margins in % • Second year sales growth in % • Third year sales growth in %
Calantone and di Benedetto (2012)	New product performance	• Relative to your business unit's other new product launches, how successful was this market entry in terms of sales? • Relative to competing product launches, how successful was this market entry in terms of sales? • Relative to your business unit's objectives for this product launch, how successful was this market entry in terms of sales? • ROA (obtained from external sources) • ROI (obtained from external sources)

Appendix 6. Empirical product innovation literature arguing for the (in)significant direct effects of PFit's measures (MFit and TFit) on the OperLP's three individual components (NPQS, NPDTS, and NPDCS) and the overall ProdLP

Direct Effects	Insignificant	Significant Positive
MFit→NPQS	Huang and Tsai (2014), O'Cass et al. (2014), Zhao et al. (2015)	Song and Parry (1996), Harmancioglu et al. (2009), Tsai et al. (2013)
TFit→NPQS	Sengupta (1998), Song and Montoya-Weiss (2001), O'Cass et al. (2014)	Song and Parry (1996), Song and Parry (1997b), Calantone et al. (2006), Harmancioglu et al. (2009), Huang and Tsai (2014)
MFit→NPDTS	Yang (2008), Harmancioglu et al. (2009), Rodríguez-Pinto et al. (2012)	Lee and Wong (2010), Ma et al. (2012), Stanko et al. (2015), Zhao et al. (2015)
TFit→NPDTS	McDonough and Barczak (1992), Yang (2008), Harmancioglu et al. (2009), Lee and Wong (2010), Ma et al. (2012), Zhao et al. (2015)	Hong et al. (2011), Rodríguez-Pinto et al. (2012), Stanko et al. (2015)
MFit→NPDCS	Atuahene-Gima (1995, 1996b)	Hong et al. (2011), O'Cass et al. (2014)
TFit→NPDCS	Atuahene-Gima (1995, 1996b)	Hong et al. (2011), O'Cass et al. (2014)
MFit→ProdLP	Atuahene-Gima (1996a), Song et al. (2011), Rodríguez-Pinto et al. (2012), Bianchi et al. (2014)	Cooper and Kleinschmidt (1987), Song and Parry (1996), Danneels and Kleinschmidt (2001), Henard and Szymanski (2001), Song and Noh (2006), Harmancioglu et al. (2009), Tsai et al. (2013)
TFit→ProdLP	Atuahene-Gima (1996b), Souder et al. (1997), Rodríguez-Pinto et al. (2012), Drechsler et al. (2013)	Cooper and Kleinschmidt (1987), Atuahene-Gima (1996a), Song and Parry (1996), Danneels and Kleinschmidt (2001), Henard and Szymanski (2001), Song and Montoya-Weiss (2001), Song and Noh (2006), Harmancioglu et al. (2009), Song et al. (2011)

Appendix 7. Empirical product innovation literature arguing for the (in)significant direct effects of CrosFI on the OperLP's three individual components (NPQS, NPDTS, and NPDCS) and the overall ProdLP

Direct Effects	Insignificant	Significant Positive
CrosFI→NPQS	Hauptman and Hirji (1996), Gomes et al. (2003), Langerak (2003), Hoegl et al. (2004), O'Dwyer and Ledwith (2009)	Keller (1986), Song et al. (1997b), Swink et al. (2006), Swink and Song (2007), García et al. (2008), McNally et al. (2011), Chaudhuri (2013)
CrosFI→NPDTS	Hauptman and Hirji (1996), Souder et al. (1998), Gomes et al. (2003), Hoegl et al. (2004), Brettel et al. (2011), Johnson and Filippini (2013)	Keller (1986), Pinto and Pinto (1990), Zirger and Hartley (1996), Song et al. (1997b), Sánchez and Pérez (2003), Lu and Yang (2004), Bstieler (2005), Sherman et al. (2005), Swink et al. (2006), Tessarolo (2007), Parry et al. (2009), McNally et al. (2011), Lee and Wong (2012), Chaudhuri (2013), Kong et al. (2014)
CrosFI→NPDCS	Hauptman and Hirji (1996), Gomes et al. (2003), Hoegl et al. (2004), Brettel et al. (2011)	Keller (1986), Pinto and Pinto (1990), Langerak (2003), Sánchez and Pérez (2003), Swink et al. (2006), García et al. (2008), Verworn (2009), Chaudhuri (2013), Kong et al. (2014)
CrosFI→ProdLP	Henard and Szymanski (2001), González and Palacios (2002), Langerak and Hultink (2005), Millson and Wilemon (2006), Leenders and Wierenga (2008), O'Dwyer and Ledwith (2009), Blindenbach-Driessen and Van den Ende (2010), Brettel et al. (2011), Gemser and Leenders (2011), McNally et al. (2011), Johnson and Filippini (2013), O'Cass et al. (2014)	Barczak (1995), Cooper and Kleinschmidt (1995a), Ayers et al. (1997), Song and Parry (1997b), Souder and Jenssen (1999), Song and Xie (2000), Song and Montoya-Weiss (2001), Lu and Yang (2004), Song and Noh (2006), Nakata and Im (2010), Parry et al. (2010), Song and Song (2010), Durmuşoğlu et al. (2013), Lamore et al. (2013), Tsai and Hsu (2014)

Appendix 8. Empirical product innovation literature arguing for the (in)significant direct effects of TMS on the OperLP's three individual components (NPQS, NPDTS, and NPDCS) and the overall ProdLP

Direct Effects	Insignificant	Significant Positive
TMS→NPQS	Gomes et al. (2001), Gemünden et al. (2007), McComb et al. (2008), Caridi-Zahavi et al. (2015)	Larson and Gobeli (1989), Song and Parry (1996), Song et al. (1997b), Swink (2000), Swink et al. (2006), Zwikael (2008a, b)
TMS→NPDTS	Swink (2003), Gemünden et al. (2007), Yang (2008), Islam et al. (2009), Parry et al. (2009), Kleinschmidt et al. (2010)	Larson and Gobeli (1989), Hartley et al. (1997), Song et al. (1997b), Swink (2000), Gomes et al. (2001), Calantone et al. (2003), Reilly et al. (2003), Belout and Gauvreau (2004), de Brentani and Kleinschmidt (2004), Swink et al. (2006), Zwikael (2008a, b), Bstieler and Hemmert (2010)
TMS→NPDCS	Larson and Gobeli (1989), Lewis et al. (2002), Gemünden et al. (2007), Islam et al. (2009)	Gomes et al. (2001), Belout and Gauvreau (2004), de Brentani and Kleinschmidt (2004), Swink et al. (2006), Zwikael (2008a, b)
TMS→ProdLP	Cooper and Kleinschmidt (1995c), Islam et al. (2009), Kleinschmidt et al. (2010)	Cooper and Kleinschmidt (1987), Barczak (1995), Cooper and Kleinschmidt (1995a), Song and Parry (1996), González and Palacios (2002), Reilly et al. (2003), de Brentani and Kleinschmidt (2004), Song and Noh (2006), Kleinschmidt et al. (2007), Blindenbach-Driessen and Van den Ende (2010)