

2022-05-30

# Northern sea route as an emerging option for global transport networks: a policy perspective

Karamperidis, Stavros

<http://hdl.handle.net/10026.1/19484>

---

10.1007/s13437-022-00273-3

WMU Journal of Maritime Affairs

Springer Science and Business Media LLC

---

*All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Please cite only the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.*

## **Northern Sea Route as an Emerging Option for Global Transport Networks: A Policy Perspective**

**Stavros Karamperidis**

Plymouth Business School

University of Plymouth

United Kingdom

Email: [stavros.karamperidis@plymouth.ac.uk](mailto:stavros.karamperidis@plymouth.ac.uk)

**Nikolaos Valantasis-Kanellos**

School of Transport Engineering Environment and Planning

Technological University Dublin

Ireland

Email: [Nikolaos.ValantasisKanellos@TUDublin.ie](mailto:Nikolaos.ValantasisKanellos@TUDublin.ie)

### **Abstract**

The Northern Sea Route (NSR) is an emerging alternative route to the Suez Canal; however, inconclusive research exists on its benefits and viability. This paper uses a two-stage Delphi approach to collect qualitative data from experts, on what actions Nordic countries<sup>1</sup> can undertake to prepare themselves to enter NSR and capture potential benefits deriving from trading in global transport networks. By conceptually developing a framework based on First Movers Advantage (FMA) and Dynamic Capabilities Theory (DCT), this paper empirically identifies a path to develop capabilities that could allow stakeholders to reduce logistics costs through collaborations in NSR. Our paper has made a twofold contribution, first to literature by linking FMA/DCT in a single framework and elaborating it in a global transportation and logistics context. Second, a practical contribution by identifying how countries along the NSR, and specifically Nordic countries, can capture and maximise its benefits by using the right policy framework.

**Keywords:** Northern Sea Route, First Movers Advantage, Dynamic Capabilities Theory, Delphi method, Nordic countries.

---

<sup>1</sup> Nordic countries are: Denmark, Norway, Sweden, Finland, and Iceland, as well as the Faroe Islands, Greenland, and Åland (Nordic Co-operation, 2020)

## 1. INTRODUCTION

The swift changes of the Arctic climate owing to recorded warmer atmosphere, land and ocean (NASA, 2019), affect the Arctic Ocean and create opportunities for Arctic trade routes. One of these routes is the Northern Sea Route (NSR), which was opened to the international community in 1991 (Brubaker and Ragner, 2010). The Northern Sea Route Information Office (2020) reported a 194.5% traffic increase since 2017. In the past 6 years NSR has experienced eightfold development of traffic volume. Estimates predict that by 2024, more than 80 million tons of cargo would be shipped via the NSR (Chuy *et al.*, 2022).

When contemplating the Asia-Europe route, the NSR includes the entire Norwegian shoreline, allowing uncomplicated connection to the Nordic countries and their respective resources (Østhagen, 2021). Therefore, if Nordic countries fail to react and adapt in time by investing in infrastructure and development policies, opportunities may be lost to other Arctic actors, which according to UK and Finish governments anticipate investments in the region up-to \$500bn (GOV.UK, 2017). Russia with the development program entitled: “The Foundations of Russian Federation Policy in the Arctic until 2020 and Beyond” is attempting to pre-empt those assets in the Arctic (Liu *et al.*, 2021).

Several academics i.e. (Xu *et al.*, 2011; Lasserre, 2014; Tseng and Pilcher, 2017; Wang, Zhang and Meng, 2018; Cariou *et al.*, 2019; Faury, Cheaitou and Givry, 2020; Theocharis *et al.*, 2021; Gunnarsson, 2021) consider NSR as a route between ports in Northwest Europe and Asia. However, the distance savings, and subsequent economic benefit, would be even larger for ports in Northern Europe, such as Norway and Kola Peninsula (Koçak and Yercan, 2021). Although Norway is rather small in relation to Arctic “heavyweights”, such as the USA, Canada and Russia, in terms of geographical coverage (Hastings, 2014) and investments (GOV.UK, 2017), the strategic geographical location of its ports on NSR, make Norway an important player (Østhagen, 2021).

The highly discussed NSR (Lavissière, Sohler and Lavissière, 2020), as an alternative new sailing route can create opportunities to enhance capacity of global transport networks (Chien-Yun, Cheng-Hsien and Dong-Taur, 2020). A view that has received new appreciation in the aftermath of COVID-19 and other socio-political threats.

This coincides with the endeavours of the maritime transport industry to meet the demands of global supply chains for cost efficient freight transportation (Rodrigue, Comtois and Slack, 2017). Shipping companies on Asian-European voyages strive for savings in any possible aspect. Use of the NSR, shortens the distance between Northern Europe and Asia (40% shorter than the southern route (Zeng *et al.*, 2020; Theocharis *et al.*, 2021)), saves on fuel consumption, and reduces voyage time (Cariou *et al.*, 2019), environmental footprint (6,800 tonnes of CO<sub>2</sub> per voyage) (IMAREST, 2016; Chien-Yun, Cheng-Hsien and Dong-Taur, 2020), and transportation costs (Ha and Seo, 2014; Lindstad, Bright and Strømman, 2016; Cariou *et al.*, 2019) as more cargo can be carried (improved vessel economics) (Faury, Cheaitou and Givry, 2020; Keltto and Woo, 2020). That will meet customers’ requirements for greater selection of products, competitive prices and increased availability, which could be facilitated by the shorter lead-time achieved via the NSR.

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

Several countries, including member and observer countries of the Arctic Council, attempt to formulate their own strategies and policies (e.g., Polar Code), related to the Arctic, while simultaneously have started a “fierce” battle trying to overcome their competitors on a global scale. The anticipated advantages of NSR in terms of fuel cost savings, reduced transport lead time, and anticipated healthy returns on investment could benefit not only cargo-owners but a variety of stakeholders (e.g. Governments, Cargo owners, Shipping lines, etc.) who are involved in shipping along the NSR (Solvang *et al.*, 2018) if the right policies and operation strategies are in place. Russia has already created such policies, and Norway, a member of NATO, has one of the most mature arctic policies among NATO members (Panahi *et al.*, 2021; Norwegian Government, 2021).

Academic research (e.g. Cariou *et al.*, (2019), Koçak and Yercan (2021)) and commercial trials (e.g., MAERSK and COSCO) attempt to prove the feasibility and competitiveness of the NSR as an alternative route (World Maritime News, 2018; Humbert, 2019). However, these findings remain inconclusive (Solvang *et al.*, 2018; Faury, Cheaitou and Givry, 2020; Theocharis *et al.*, 2021). The NSR trials by shipping lines demonstrate that these stakeholders have an interest in identifying how to capture the inherent benefits of the route. Nevertheless, there is limited attention from academics and practitioners on how other stakeholders can capture the anticipated benefits. The main research question of this study is:

*How can Nordic countries prepare themselves to enter the NSR and capture potential benefits derived from trading in global transport networks?*

To answer this novel question and tackle the aforementioned inconclusiveness, we designed a unique framework that combines First Movers Advantage (FMA) with Dynamic Capabilities Theory (DCT) to demonstrate how stakeholders can benefit from reduced operational costs, faster turnaround of assets, and increased market opportunities. More specifically, we identify how countries in the Nordic region could realise a positive impact through the development and utilisation of their transportation networks, including seaports and inland multimodal networks, and access to new markets. By answering this question and by linking FMA and DCT for a maritime related study we achieve a theoretical contribution. According to our knowledge, such framework does not exist in the transport and supply chain management (SCM) literature. The practical contribution of this study is to show how countries along NSR could capture and maximise their competitiveness (specifically Nordic countries) through infrastructure development and policies.

## **2. FIRST MOVER ADVANTAGE AND DYNAMIC CAPABILITIES THEORY: THE CASE OF THE NSR**

Building upon Solvang *et al.* (2018) who argue that Scandinavian/Nordic countries could benefit from the NSR if they act fast, before regional competitors, we attempt to identify theoretical frameworks, which underpin this development. FMA theory suggests that first movers have the opportunity to increase economic profit and market share (Suarez and Lanzolla, 2007). Since its introduction, FMA has gained many supporters and opponents (Haleblian *et al.*, 2012; Suarez, Grodal and Gotsopoulos, 2015; Hawk, Pacheco-De-Almeida and Yeung, 2013). Opponents suggest that companies can harvest more benefits if they wait to enter the market after competitors (Hawk, Pacheco-De-Almeida and Yeung, 2013). Haleblian *et al.* (2012) uses the Awareness-Motivation-Capability framework, which links competitive

dynamics theory with FMA, to demonstrate that early movers during merger waves outperform followers as they have characteristics that lead to greater awareness, motivation, and capability. The Awareness-Motivation-Capability framework allows organisations to be aware of opportunities in their ecosystem and utilise them depending on motivation and capabilities (Hutzschenreuter and Gröne, 2009). The Awareness-Motivation-Capability framework allows for sensing and seizing of opportunities in the ecosystem of organisations. However, organisations will invest in opportunities, which will return sustainable benefits. Herein, we go further and link FMA with DCT. According to Teece (2007) Dynamic Capabilities (DCs) not only allow organisations to identify (sense) and exploit (seize) potential opportunities to generate benefits but also allow them to reconfigure their capabilities to sustain those benefits in the long-term. The “reconfigure” phase can help the long-term operational sustainability of the NSR, thus it is appropriate to our aforementioned research question.

The literature review conducted in this study revealed a gap in the use of FMA and DCT theories in the transport and SCM literature. Previous studies in transportation and SCM journals have mostly introduced FMA or DCT in relation to technological innovations (Kilubi and Rogers, 2018; Miemczyk, Howard and Johnsen, 2016; Cheng, Chen and Huang, 2014). FMA and DCT theories are not combined in a country level however, by examining that we can enhance competition (Lawson, 1999) which is important for transportation. Therefore, this paper contributes to the literature by linking FMA/DCT in a single framework and elaborating it in a transportation and SCM context (Lawson, 1999).

## 2.1 First Movers Advantage

FMA is a theory based on anecdotal empirical observations on the competitive performance of first entrants in a particular market in comparison to the performance of late-entrants (Suarez and Lanzolla, 2007; Haleblan *et al.*, 2012). FMA has been applied in various disciplines such as business, hospitality and tourism and psychology (Loschelder *et al.*, 2014; Suarez, Grodal and Gotsopoulos, 2015; Lee and Jang, 2017). Lieberman and Montgomery (1988), and Hsiao *et al.* (2017) argue that first movers tend to produce profits greater than their capital expenses, and capture and sustain larger market share in comparison to competitors (Suarez and Lanzolla, 2007; Gomez, Lanzolla and Maicas, 2016). Exploration of a new market (sensing) could enable a firm to become a first mover as the organisation tries to explore its potential opportunities (Luo, 2000). Empirical studies demonstrate that FMA leads to competitive advantage for technological leadership, resources, market dominance, and consumer transaction costs (Hsiao *et al.*, 2017; Barnett, Feng and Luo, 2013). Additionally, FMA could generate value by reaching new customers and developing new markets, if a “burden” becomes a potential competitive advantage (Beske and Seuring, 2014). Herein, the NSR could turn the “burden” of distance between Asia and Europe to competitive advantage.

First movers can pre-empt primary resources such as superior positions in geographic space (Lieberman and Montgomery, 1998); that is, reducing the possibilities for competitors to enter the market. Consequently, Nordic countries, could leverage the geographical location of their ports to enter the NSR (Solvang *et al.*, 2018). Thus, if they move first into the NSR they could achieve pre-emption of superior geographical locations. Key factor in the realisation of first mover benefits is timing, specifically for entry in undetermined markets (Suarez, Grodal and Gotsopoulos, 2015). Haleblan *et al.* (2012) demonstrate that during merger waves early entrants outperform later ones. Hawk *et al.* (2013) counter-argue that even though early entrants could face less competition, lack of information and learning opportunities, could lead

to costly mistakes. Also, the rewards derived from new “products” which first movers could achieve are limited and short lived (Fearne and Hughes, 1999) thereby affecting the profitability of early entrants, as literature suggests that first mover disadvantages exist (Frynas, Mellahi and Pigman, 2006). Late entrants can avoid these mistakes but may face higher pre-emption costs (Hawk, Pacheco-De-Almeida and Yeung, 2013). The apparent trade-off between anticipated early-entrant benefits and costs prevents a unanimous agreement regarding the optimal entry time and subsequent performance (Lieberman and Montgomery, 1998; Suarez and Lanzolla, 2007; Hawk, Pacheco-De-Almeida and Yeung, 2013; Suarez, Grodal and Gotsopoulos, 2015). Additionally, lack of theoretical grounding of extant empirical research creates contradicting results and subsequent inconclusiveness about the optimal entry-time of a firm into emerging industries (Suarez, Grodal and Gotsopoulos, 2015). Thus, Lieberman and Montgomery (1998) call for more research to demonstrate potential differences between pioneers or followers in their entry-time choices in different business ecosystems.

Furthermore, political factors such as political instability negatively affect the first mover benefits of foreign investors. Therefore, political resources are one of the contributing factors to achieve FMA (Frynas, Mellahi and Pigman, 2006). Recent research has identified that enhanced new product performance can be achieved if the firm utilises a first mover strategy in combination with its core capacity (Hsiao *et al.*, 2017). Considering the long shipping tradition and capabilities of Nordic countries, a first mover strategy to enter the NSR, designed upon such capabilities, could result in enhanced performance. The inconclusiveness of FMA research has led researchers to investigate the benefits of delayed entry to market. Hawk *et al.* (2013) assert that firms could achieve low pre-emption risks if they have intrinsic speed capabilities<sup>2</sup>. These capabilities allow them to wait longer until more information for an undetermined market is available and avoid exposure to irreversible investments before deciding to enter new markets. This suggests that fast followers have a better chance of achieving competitive advantage than first movers (Hawk, Pacheco-De-Almeida and Yeung, 2013; Luoma *et al.*, 2017).

After reviewing the literature related to FMA and with Hawk *et al.* (2013) in mind, ports with pre-empted resources (e.g., Rotterdam) could afford to wait, while ports in Norway cannot wait, as they lack such resources. Thus, as the Nordic countries lack resources and capabilities compared to the Netherlands and Belgium, it would be more difficult for them to succeed as late entrants (or fast followers) in the NSR market. Additionally, Russia who has underdeveloped ports, recognises that ports are enablers for development and has started investing in its ports (Liu *et al.*, 2021).

According to Suarez *et al.* (2015), Hawk *et al.* (2013) and Luoma *et al.* (2017) late entrants have intensified competition through entrenched competitors. An early entrance may lock-in customers as they will establish supply chain structures in Norwegian ports; thus, regardless of the competition which may increase from new entrants due to switching costs, custom could be secured (Langerak and Hultink, 2005; Lieberman and Montgomery, 2013). First movers develop organisational capabilities related to innovation (Hsiao *et al.*, 2017), which herein is the new route, NSR. Despite those benefits the sustainability of the FMA is not secured, as early entrants are often overtaken by competitors with more potent resources or capabilities (Lieberman and Montgomery, 1998). Ultimately, the sustainability of a first-mover advantage

---

<sup>2</sup> Intrinsic speed capabilities are defined as the firms’ ability to execute investment projects faster than competitors at the same cost.



This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

depends upon the initial resources captured by the pioneer, plus the resources and capabilities subsequently developed, relative to the quality of resources and capabilities held by late entrants (Lieberman and Montgomery, 2013).

To overcome its inconclusiveness and constraints, FMA research should create links with complementary theories such as the Resource Based View (RBV), that would further advance the FMA theory (Lieberman and Montgomery, 1998). In Section 2.3, we demonstrate how FMA and DCT, a theory/framework derived from the RBV, could be linked. Gomez *et al.* (2016) identify a gap in the literature for research associated with the sustainability of first mover benefits, and call for further investigation. Therefore, our attempt to link FMA with DCT aims to examine how first movers can capture potential benefits and sustain their advantages over the long-term. This is further enhanced by the contextualisation of the FMA/DCT framework in the context of the NSR; Gomez *et al.* (2016) argue that context theorising is a promising way to study the conditions under which FMA persists.

## 2.2 Resource Based View and Dynamic Capabilities Theory

Driven by the need to advance FMA research with complementary theories, this section examines the RBV and argues that DCT would be better suited to achieve sustainability for FMA. Over the last decades, the notion that resources and capabilities are crucial elements in the Sustainable Competitive Advantage of firms is common among scholars of strategy and management (Barney, Ketchen and Wright, 2011; Hitt, Xu and Carnes, 2016). This notion is derived from the RBV of the firm which views firms as a bundle of value generating resources tied “semi-permanently” to the firm (Lockett, Thompson and Morgenstern, 2009).

The RBV is focused on how strategists can exploit existing firm-specific internal and external assets and develop new capabilities (Wernerfelt, 1984; Hitt, Xu and Carnes, 2016). RBV has been criticised for terminological liberalism and ambiguity, and for problematic operationalisation within the firm (Foss, 1998; Hoopes, Madsen and Walker, 2003; Kogut, 2008). Additionally, the RBV has been criticised due to lack of empirical evidence, with particular focus on how resources and capabilities evolve over time (Lieberman and Montgomery, 1998; Hoopes, Madsen and Walker, 2003). Beyond criticism, various scholars have encompassed the RBV and developed it further by proposing other theoretical frameworks. One of these is the Dynamic Capabilities Theory (DCT) of Teece *et al.* (1997), which is based on the evolutionary theory of the firm of Nelson and Winter (1982), and other research areas (such as R&D management, technology transfer and organisational learning) (Gebauer, 2011).

In highly dynamic environments characterised by exposure in open international commerce, innovative technologies, complex consumer demands, emerging and shrinking markets, and accelerated competition, the mere ownership of strategic resources (e.g. location of Norway on the NSR) does not suffice for the realisation of sustainable competitive advantage (Teece 2007; Dixon *et al.* 2014). Therefore, firms need to develop Dynamic Capabilities (DC) which enable them to identify the sources that create new strategic paths, integrate, develop and reconfigure internal and external competencies to directly and indirectly capture wealth and competitive advantage in such dynamic environments (Teece, Pisano and Shuen, 1997; Teece, 2007; Helfat and Peteraf, 2009; Gebauer, 2011). In other words, DCs have the capacity to continuously build, develop and keep relevant the asset base of a firm (Teece, 2007; Dixon, Meyer and Day, 2014).

The understanding and exploitation of DCs is of key concern for managers. DCs not only allow firms to identify opportunities for increased profitability and deploy strategies to exploit these opportunities, they also allow firms to become agile by continuously reflecting on environmental opportunities and be able to yield sustained profitability (Teece, 2007). DCs provide the opportunity to companies to enter new markets, develop new products or processes (Trkman, Budler and Groznic, 2015) and address sustainability concerns of shipping companies and their stakeholders (Yuen *et al.*, 2019). Most importantly, DCs enable firms to identify new opportunities in their ecosystem and to convert old organisational resources and capabilities in tangible and intangible resources and capabilities, which will be relevant to the new ecosystem of the organisation. The new resources and capabilities will allow the firm to produce products and services that fit more efficiently and effectively the demand of customers (Easterby-Smith, Lyles and Peteraf, 2009; Makkonen *et al.*, 2014). Teece (2007, p.1346) argues that DCT encompasses an entrepreneurial management function which allows firms to recognise problems and trends, allocate and reallocate resources, and reconfigure organisational structures and systems “*so that they create and address technological opportunities while staying in alignment with customer needs*”. Even though academics have been widely engaged with the concept of DC, literature remains under-developed, and lacks empirical contribution on how DCs are created and utilised (Helfat and Peteraf, 2009; Gebauer, 2011; Dixon, Meyer and Day, 2014). Our research contributes to the development of DCT, by bridging FMA and DCT, and contextualising the framework in the context of the NSR.

## 2.3 Bridging of DCT with FMA

Addressing the call of Lieberman and Montgomery (1998) for further research on bridging FMA research with other complementary theories, we attempt to develop a framework that incorporates key attributes of FMA with DCT. To the best of our knowledge, these concepts have not been combined in a transport and SC management-related study before as identified by the structured literature review undertaken for the purpose of this research (Appendix 1 demonstrates the steps undertaken for the structured literature review). Additionally, we aspire to develop DCT research theoretically by proposing a framework that bridges DCT and FMA, and empirically by investigating how Norway can develop DCs for the utilisation of a trading route innovation. The development of our framework is based on Teece’s (2007) three categories of DCs, namely: ***sensing, seizing and reconfiguring capabilities***. He argues that a successful firm will develop and exploit all three types of activities, some of which might be employed simultaneously. The logic which underlies the three types of DCs is the rationale of introducing strategic change (Helfat and Peteraf, 2009; Gebauer, 2011).

### 2.3.1 Sensing

Sensing capabilities involve recognising and dealing with new opportunities and threats, which are identified through the processes of scanning and searching the ecosystem of the organisation (Teece, 2007). The sensing capability relates to market-focused learning, which regards the efforts of a firm to search its market and ignites the processes that enable the firm to predict customer requirements and market developments (Weerawardena and O’Cass, 2004; Gebauer, 2011).

### 2.3.2 Link of FMA with the sensing and seizing activities of DCT

Herein, we tackle our case through the merger of FMA with DCT, in the context of the NSR, which is a dynamic ecosystem that changes due to political risk factors and weather conditions



(luck). DCT extends the RBV to the dimension of how well a “firm” (in our case country) can change over time (Suarez and Lanzolla, 2007). For example, to assess the environment and respond rapidly, the “firm” needs to adopt internal and external competencies as circumstances change (Chicksand *et al.*, 2012). Thus, Nordic countries (through port operators) which intend to provide port services to shipping companies using the NSR through Norwegian ports have to rapidly assess and access their ecosystem in terms of political risk factors and weather, so it could provide its services at the lowest possible cost, as shipping (especially container shipping) is a cost-driven industry (Notteboom, 2004). For such an undertaking, they need to obtain FMA and develop DCs. Various mechanisms lead to FMAs as well as disadvantages. Several characteristics exist for companies to achieve FMA, these are: 1) technological leadership; 2) pre-emption of assets; and, 3) buyer switching costs (Lieberman and Montgomery, 1988; Suarez and Lanzolla, 2007). Herein the first characteristic is not applicable as technology refers to product development, while the second and third advantages could be applicable if Norway (Nordic countries) signs bilateral agreements with neighbouring countries regarding the exploitation of the NSR, which will lead to a pre-emption of assets. The bilateral agreements (pre-empted assets), if combined with the unique geographic location of Norway (Østhagen, 2021), will provide a rare asset. The use of the NSR could lead to reduced costs for shipping companies and potentially for shippers compared to the traditional route via the Suez Canal, thus, the logistics/shipping industry (a cost-driven industry) will be reluctant to change to the traditional route as the NSR could be utilised. The pioneering opportunities needed for the FMA arise endogenously and are based upon proficiency and luck (Lieberman and Montgomery, 1988). In terms of proficiency, according to the Logistics Performance Index (LPI), Norway ranks lower in comparison to other Nordic countries (e.g., Sweden) for logistics services provided. However, Norway’s main competitors (UK, NL, DE, BE) rank higher (World Bank, 2018) which means that luck could play an important role in its FMA if Nordic countries want to utilise the NSR. Norway’s location is an important factor for the utilisation of the NSR, but it needs a stable bilateral agreement with neighbouring countries to utilise its position on the NSR. Political factors are related to risk (e.g., Brexit, etc.) or in other terms related to luck. Such FMA opportunities need to be examined carefully in terms of their evolution over time as they are dynamic and may differ at the time of entry (Suarez and Lanzolla, 2007). Location is a static factor, but luck is dynamic. Careful examination is needed as an abrupt change in terms of the environment which the NSR is operating could potentially create opportunity windows for late entrants.

### 2.3.3 Seizing

Seizing capabilities refer to how companies address the opportunities sensed, through the development of new products, processes, or services, as well as delineating the most suitable business model for the exploitation of the sensed opportunities (Teece, 2007; Gebauer, 2011). Seizing capabilities also regard the maintenance, improvement and exploitation of any investments in technological competences and complementary assets realised from the sensing capabilities (Helfat and Peteraf, 2009). An important part of seizing capabilities is to identify optimal opportunity to invest heavily in those technologies and designs that will facilitate acceptance in the market (Teece, 2007). The existence of network externalities enforces upfront entry and commitment through significant investments. These can allow a network to overtake competitors and maintain that edge. However, if there are few potential users and strong network effects, customers will not use the product. Therefore, organisations need to develop clear and timely investment strategies, which will lead to increasing return advantages and will have broad functionality between products and services. Equally important is the development

of business models that support the commercialization strategy and investment priorities (Teece, 2007). In the case of the NSR, Nordic countries, even if they develop a clear and timely investment strategy, which will potentially create a strong network effect, have to consider the potential users of those investments and ensure their commitment in NSR routing, to achieve desirable return on investments. Faury *et al.*, (2020) assert that ship owners (and potentially the maritime sector) will be benefited from such investments.

### 2.3.4 Reconfiguring

Reconfiguring capabilities refers to the necessary enhancement, protection and modification of operational capabilities (assets and organisational structures) to maintain competitiveness and sustain profitability. Reconfiguring capabilities should remain aligned with the seized opportunities, market and technology changes and inevitable organisational growth (Weerawardena and O'Cass, 2004; Teece, 2007; Gebauer, 2011). Additionally, reconfiguring capabilities allows organisations to avoid unfavourable path dependencies, and enable them to develop new routines necessary for operational efficiency. These new routines can sustain continuity until the next ecosystem shift (changing those routines comes at a significant cost). Therefore, any routine change will not receive acute acceptance. In addition to new routines and organisational structures, organisations need to embrace a continuous improvement philosophy to build, maintain and adjust the complementarity of their offerings and systems (Teece, 2007). For NSR, reconfiguring capabilities should align with the seized opportunities, should enable monitoring of customer demand, and allow for modification of the offering.

In summary, if Nordic countries wish to enter the NSR through Norwegian ports, they need to act fast to sense and seize the opportunities in their “ecosystem”, achieve FMA, and reconfigure their capabilities to sustain gained benefits. Table 1 presents the linking of DCT with FMA and its application to the NSR context.

Table 1 Theoretical framework

	<b>Combined DCT-FMA framework</b>	<b>Adaptation to NSR context<sup>3</sup></b>
Sensing	Recognizing and dealing with opportunities	Which are the opportunities for Norway to exploit NSR?
	Recognizing and dealing with threats	Which are the threats Norway might face in its venture to exploit NSR?
FMA	Pre-emption of assets	How could Norway secure the “rights” to use the NSR?
	Buyer switching costs	How can Norway demonstrate the financial benefits for the use of NSR?
Seizing	Exploiting the sensed opportunities	How could Norway exploit the sensed opportunities of NSR?
	Fending off threats	How could Norway tackle the threats faced in the exploitation of NSR?
Reconfiguring/ Transformation	Maintain competitiveness through enhancing, combining, protecting, and, when necessary, modifying operational capabilities	How can Norway maintain its competitiveness in the NSR by enhancing, combining, protecting and, when necessary, modifying operational capabilities?

<sup>3</sup> The questions presented in column 3 of Table 1 were included in the experts’ questionnaire.

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

*Source: Adapted from Teece (2007), Gebauer (2011), Lieberman and Montgomenry (1988)*

Figure 1 depicts how FMA and DCT elements could, conceptually, help Nordic countries to bypass existing hubs and create a new route to market. The conceptual framework guided our data collection and analysis demonstrated in Section 3.2.

[Insert Figure 1]

### 3. EMPIRICAL INVESTIGATION

#### 3.1 Research Method

Often, as in this research study, the idiosyncrasies of the research context and the dynamic nature of the research process prevent the implementation of a clear inductive or deductive approach (Dubois and Gadde, 2002). The novelty of the research context prevents the use of a deductive research approach. Additionally, the lack of a sufficient sample size would prevent a purely inductive approach, through which we could reach theoretical saturation and develop new theory. Thus, we employ the compromise position of abductive research, where we begin with establishing the benefits that Nordic countries could yield if they commercialise the NSR, before we search the literature for suitable theoretical frameworks to answer the question of how Nordic countries can prepare themselves to enter the NSR and capture potential benefits derived from trading in global transport networks.

In our research, the best explanation could be provided by the combination of FMA and DCT as each of which alone would not suffice as previously argued. We then contextualise the framework with empirical data collection and analysis as discussed below. This approach is defined as “systematic combining” or abductive approach (Dubois and Gadde, 2002) and is extremely relevant in the elaboration of theories in new contexts, because it modifies the general theory to reconcile it with contextual characteristics (Ketokivi and Choi, 2014).

For the development of new theories, or further elaboration/extension of existing theories, case studies are preferred according to Eisenhardt (1989), Dubois and Gadde (2002), and Ketokivi and Choi (2014). Dubois and Araujo (2007) argue that a discipline could be developed, in terms of theory, by case studies, as case studies are able to provide strong exemplars and test theories extracted from other disciplines. To elaborate our conceptual framework empirically, we examine the case study of Nordic countries’ (through Norwegian ports) feasibility on the NSR. We considered Nordic countries as a unit of analysis, because Norway has direct access to NSR along its North coastline, but it is dependent on its neighbours (Nordic countries) for multimodal transportation.

The uniqueness of NSR justifies a single case study research strategy (Yin, 2003). Triangulation overcomes common criticism of single case study research and increase the robustness of our research design (Patton, 1990; Worley and Doolen, 2006). Because of the scarce literature on the application of DCT on transportation and SCM research, we use

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

theoretical triangulation to propose a framework developed by the bridging of two theories that originate in the field of strategic management. This study also utilises data triangulation using multiple data sources (primary data: interviews and focus group; and secondary data), practice that is highly encouraged in case study research, as it results in more grounded theoretical implications (Eisenhardt, 1989; Yin, 2003; Barratt, Choi and Li, 2011).

Combination of two theoretical frameworks and contextualisation of the developed framework in transport-related research follows recent attempts to introduce management theories in the transport and SCM (e.g. (Vonck and Notteboom, 2016; Franc and Van der Horst, 2010)). Case study research can empirically justify such frameworks (Gebauer, 2011). Our study acknowledges the benefits that can be derived by bridging different theories but, since it applies an abductive reasoning, our starting point was the case study rather than the missing link between theories.

Primary data collection was conducted through a two round Delphi survey. Delphi survey was chosen as it is a method used to reach consensus amongst experts, collect feedback from the panellists participating in the research, and achieve long-term projections (von der Gracht, 2012; Darkow, Foerster and von der Gracht, 2015). These projections are extremely useful, as we want to anticipate the benefits for the involvement of the Nordic countries in the NSR in the coming years. Delphi was used in various studies which attempt to address future logistics and SCM challenges/changes (Sanchez Rodrigues, Harris and Mason, 2015).

The Delphi method is commonly used when complex and subjective judgements are required instead of precise quantitative results (Batista, 2012). The main advantage of this method is that reliable consensus could be achieved on complex issues, especially in the absence of accurate information or where information and experts are limited and difficult to get hold off (Linstone and Turoff, 1975) such as with the case of NSR which is at an embryonic phase. Our study uses Delphi as main data collection instrument (See Figure 2), similar to Sanchez Rodrigues *et al.* (2015).

[Insert Figure 2]

### 3.2 Data Collection and Analysis

Two methods of data collection were used, namely, structured interviews and a focus group. Stage 2 (Round 1 of Delphi) included 29 structured interviews to explore the experts' views on the feasibility of the NSR route, how to capture its benefits and explore the adaptation of the combined DCT-FMA framework to NSR context. In Stage 3, a focus group among 12 representatives from the interviews was conducted to verify the findings from Stage 2. The number of participants fall within the range of 10 to 50 experts, which are the recommended values for the size of a Delphi panel with a niche topic (Okoli and Pawlowski, 2004; von der Gracht and Darkow, 2010; Garcia Reyes and Giachetti, 2010; Batista, 2012). Invitations through emails were sent to participating experts. A short introduction to the topic, purpose of the interview and a link to an online platform was included in the email. Such a rigorous phase-based process helps ensure the quality of the ensuing results (von der Gracht and Darkow, 2010; Darkow, Foerster and von der Gracht, 2015)

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

To gain a deep and well-rounded understanding of the operations in the NSR we included a range of experts with operations in the region (Garcia Reyes and Giachetti, 2010). The participants were from the following sectors: policy, academia, and industry. Concerning academics, we approached those with relevant research experience on NSR. On average, participants had 20.8 years of experience. The geographical cover of services of our participants was 48% from Northern Europe, 28% Global, 21% North East Asia and 3% North America. Table 2 demonstrates the number of participants, their year of experience, key stakeholder group and their coding.

Table 2 Participant characteristics

No	Key stakeholder group	Years of experience	Coding	No	Key stakeholder group	Years of experience	Coding
1	Academia	1	A1	16	Industry	32	I6
2	Academia	17	A2	17	Industry	25	I7
3	Academia	36	A3	18	Industry	10	I8
4	Academia	10	A4	19	Industry	32	I9
5	Academia	35	A5	20	Industry	35	I10
6	Academia	50	A6	21	Industry	20	I11
7	Academia	22	A7	22	Industry	28	I12
8	Academia	5	A8	23	Industry	14	I13
9	Academia	9	A9	24	Policy	5	P1
10	Academia	1	A10	25	Policy	6	P2
11	Industry	45	I1	26	Policy	30	P3
12	Industry	9	I2	27	Policy	8	P4
13	Industry	40	I3	28	Policy	20	P5
14	Industry	20	I4	29	Policy	15	P6
15	Industry	25	I5				

Thematic analysis was used to analyse information extracted from participants as demonstrated in the following section.

### 3.3 Thematic Analysis

The literature is inconclusive regarding the viability and benefits of the NSR, and regarding the most appropriate type of traffic and cargo to be navigated through the NSR. To address the first issue the experts were asked to comment upon whether the NSR has the potential to benefit Nordic countries. The analysis of the responses demonstrates that 86% of participants assert that Nordic countries could benefit from the NSR; meanwhile 7% are unsure and 7% are negative. Those with a positive perspective argue that the Nordic countries could benefit by engaging with the NSR through access to resources along the route; the possibility to exploit new, shorter, faster, greener and cheaper routes to NE Asia; the advantageous geographic location; increased market opportunities and regional competitiveness through new multimodal capabilities; existing know-how of maritime sector; and the perspective additional traffic. Participant A1 argues, “*Nordic countries could be benefited from the use of the NSR due to their geographical location*”, which is further supported by participant A3 who claims that the “*closer geographical location to the one end of the NSR is advantageous*”. Explicit mention is made of the benefits for Norwegian ports and the possibilities to export raw material to Asian markets. Participant A8 argues, “*The NSR may benefit the Nordic countries more precisely the Norwegian at two layers. First via the ports of Kirkenes and/or Hammerfest. They could posit themselves as a HUB and thus competitors to the Russian ports. Besides, the shortcut represented by the NSR may be an opportunity for this country to export the oil and gas to*



*Asia*". The potential for exports is not limited to Norway, as stated by participant I4 who argues, "Norwegian ports can also be important export ports for products from northern Finland/Sweden". Thus, NSR is anticipated to benefit all the Nordic countries. In contrast, political instability and dependency on Russian infrastructure; the cost (economic viability of NSR) and unreliability of the NSR; the need to develop new capabilities through business models; and lack of information communications technologies (ICT) support are factors which will not allow Nordic countries to benefit from the NSR.

To clarify how the NSR could be used, experts were asked to comment upon which traffic and cargo types are the most suitable for sailing through the NSR. From our findings, 45% of the experts believe that the NSR is best suited for transit<sup>4</sup> traffic, 14% both (transit and destination), 10% destination<sup>5</sup>, and 31% could not specify. The embryonic stage of NSR justifies the reluctance to predict short-term traffic development and the high percentage for unspecified traffic.

Figure 3 demonstrates that the most prominent sectors are dry and wet bulk carriers, with container and LNG closely following. Dry and wet are expected to dominate the NSR due to the demand in NE Asia for such natural resources; participant A3 distinctively argues, "Bulk sector, because natural resources to be generated in the Arctic region are expected to be transported to the markets (Asia and Europe). Container sector (especially time-sensitive/valuable cargo) because shortened transit time between large production centres and markets (Asia and Europe) is advantageous especially for above-mentioned cargo". LNG traffic associates with exploitation of the natural resources existing in the area. Therefore, LNG cargo is mostly suited for destination shipping as claimed by A10, "Ice-breaking and destination shipping (LNG) in the short-term perspective". However, the experts argued that in the long-term the suitability of containers could increase if the reliability of NSR increases and the accessibility of hinterlands improves through infrastructural development.

[Insert Figure 3]

### 3.3.1 Round 1

#### *Sensing (Norway's opportunities seen by Delphi participants)*

To contextually adapt the theoretical framework presented in Figure 1 the questions included in column 3 of Table 1 were asked to experts. Initially they were asked to name at least three factors enabling Nordic countries through Norwegian ports to enter the NSR market before competing ports. Each researcher independently conducted the initial thematic categorisation of experts' responses. Afterwards we compared and combined the outcomes to identify the most common factors, practices that increase the robustness of the findings (Okoli and Pawlowski, 2004). Data analysis revealed the five most common factors anticipated to enable the Nordic countries to enter the NSR market before other competing ports. These are: 1) the advantageous geographic location (shorter route between N Europe and NE Asia); 2) the ability to provide supply chain efficiencies; 3) excellence and price competitiveness of existing ports; 4) international cooperation and regulatory competitiveness; 5) regional existing knowhow in safe navigation in arctic shipping. Location and geography are recognised as important factors

---

<sup>4</sup> Transit: A complete voyage from the Atlantic to the Pacific or vice versa by using any of the Arctic routes.

<sup>5</sup> Destination: A voyage from/to the Arctic region to/from any port outside the Arctic.

for FMA and maritime transportation respectively. The identification of location by the experts as a key factor stresses the importance of geographic location as a key factor to enter a new market (Table 3 demonstrates the capabilities extracted in Round 1 by experts).

Additionally, Nordic countries have a stable regulatory environment, which could help them to enter the NSR market that lacks a stable regulatory framework. Building on the aforementioned factors, experts were asked to identify which capabilities Nordic countries should build to exploit the NSR based on Norwegian ports. In the short-term, those capabilities are: a) The development of a transshipment hub; b) the development of hinterland infrastructure. However, according to experts, some threats to the full exploitation of the opportunities of the NSR for Nordic countries through Norwegian ports, are: 1) The NSR sailing costs and risks; 2) politics and regulatory framework; 3) reliability and safety of NSR; 4) regional port competition; 5) uncertain market and unestablished demand.

These capabilities will allow the Nordic countries to enter the NSR and create pre-emption of assets (as discussed in 2.3.3 Seizing). To achieve that, Nordic countries need to “secure operational rights”. According to experts, to secure operational rights Nordic countries should, firstly, be actively involved with the development of port capabilities; secondly, facilitate the adherence of navigational standards in the Arctic; thirdly, attract and secure international funding; fourthly ensure efficient hinterland connectivity; and, finally, achieve international political and commercial cooperation among Arctic actors.

### *FMA*

To achieve buyer switching costs and gain FMA (see Table 1), Nordic countries should generate financial benefits and increase the market share for NSR users (Suarez and Lanzolla, 2007; Gomez, Lanzolla and Maicas, 2016). According to experts, financial benefits can be achieved by: 1) ensuring route reliability and providing multimodal services; 2) further research to calculate total costs (demonstrate the long-term viability of the project); and, 3) disseminating information to stakeholders (e.g., authorities, public, etc.). Additionally, the market shares of Nordic countries through Norwegian ports, and subsequent NSR users, can be increased by the following capabilities: 1) the development and conservation of port multimodal capabilities and the provision of cost-efficient service; 2) ensure sailing quality and service of existing and destination markets; 3) develop long-term policies and agreements with other Arctic actors; 4) advance marketing capabilities to secure trade; and, 5) develop and conserve hinterland infrastructure.

### *Seizing*

The next step of the proposed framework requires the identification of capabilities to enable Nordic countries through Norwegian ports to exploit the sensed opportunities of the NSR. The analysis of the first round of the Delphi survey revealed five such capabilities. Some of these capabilities have been identified in previous steps. The development and conservation of port multimodal capabilities and hinterland infrastructure and the provision of a cost-efficient service, the advancement of their marketing capabilities to secure trade, and the achievement of long-term policy plans in cooperation with other Arctic actors are identified as capabilities that will allow the exploitation of sensed opportunities in addition to increasing financial benefits and increasing market share. Additionally, the exploitation of the location of the Norwegian ports was identified as an important capability at this stage. Equally important with the identification of capabilities that will enable Nordic countries through Norwegian ports to

exploit the sensed opportunities of the NSR, is the identification of the capabilities that these countries need to build to address the threats that could be faced during the exploitation of NSR. The most common responses from the data analysis were: The development of SAR (Search and Rescue) capabilities and dynamic navigational charts; the advancement of marketing and communication capabilities; adherence and facilitation of navigational standards in the Arctic; and, investments in development of ice-class vessels. In addition to these four capabilities, the responses of the experts reveal that the development of long-term policy plans in cooperation with other Arctic actors would enable Nordic countries to not only achieve financial benefits, increase market share, and exploit sensed opportunities, but will also allow them to overcome any difficulties faced during the exploitation of the NSR.

### *Reconfigure*

Once Nordic countries have entered the NSR and have achieved FMA, then they should focus their investments in reconfiguring their capabilities to sustain market share and competitiveness. The last two questions of the Delphi survey aimed to identify these capabilities. The data analysis revealed three overlapping factors that would enable Nordic countries to both sustain market share and competitiveness. These are: 1) the development of long-term policy plans in cooperation with other Arctic actors, and collaboration with key stakeholders; 2) the advancement of marketing capabilities that have both been mentioned in previous steps of the framework; and 3) the capability to secure funding through innovative projects (e.g., digitalisation) to increase transit cargo volume. Additionally, the development and conservation of multimodal capabilities, services and sailing quality, and the provision of a competitive offering in terms of cost and quality are two capabilities that will allow Nordic countries to sustain potential market share. Whereas, investments in infrastructure and in single management structure with executive control, and investments in ice-class vessels and icebreakers are two additional capabilities that will allow Nordic countries to sustain their competitiveness in the NSR. Figure 4. Demonstrates the empirically adapted conceptual framework.

[Insert Figure 4]

The capabilities that Nordic countries need to develop to enter and succeed in NSR were identified from the analysis of the responses of the first round of the survey. These findings are verified and ranked below.

### **3.3.2 Round 2**

Once the most common capabilities for each stage of the framework were identified through the analysis of the first round, the experts were asked to verify and rank them per their importance. Ranking and confirmation was the outcome of average responses collected by the experts (as demonstrated in Figure 2). The mean for each factor was then calculated (Okoli and Pawlowski, 2004) and the most important capabilities for each stage of the proposed framework are presented in this section. Table 3 presents the outcome of this analysis and shows a clear path for the development of capabilities to enter and succeed in the NSR. As demonstrated in Table 3, Nordic countries should ensure that sensed capabilities are met prior to moving to the next stages of the framework. Within the sensing capabilities the most important aspect is the utilisation of the advantageous geographic location of Norwegian ports. This will enable them to enter the NSR and recognize and deal with opportunities. However, to deal with threats such as uncertain market and unestablished demand, the NSR should improve its reliability and safety. To pre-empt assets, in other words secure operational rights

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

for the NSR, international political and commercial cooperation among Arctic actors should be established. To fully achieve FMA, Nordic countries need to achieve buyer switching costs by demonstrating the financial benefits and increase in the market share. Financial benefits could be achieved through the demonstration of the long-term viability of the NSR, while market share could be achieved by implementing long-term policy plans in cooperation with other Arctic actors and collaborating with key stakeholders.

Long-term policy plans in cooperation with other Arctic actors and collaboration with key stakeholders are key factors for using seized and reconfigured capabilities. Seized capabilities could include exploitation of the sensed opportunities and fending off threats identified for the NSR. Reconfigured capabilities could be regarded as factors related to how Nordic countries, through Norwegian ports, could sustain potential NSR market share in a dynamic environment. In such dynamic environment, the NSR could maintain competitiveness through enhancing, combining, protecting and, when necessary, modifying operational capabilities.

Table 3 Round 1 and 2 combined analysis

Capabilities stages	Framework	Sense			FMA			Seize		Reconfigure	
		S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>1</sub>	Buyer switching costs		Z <sub>1</sub>	Z <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>
						F <sub>2</sub>	F <sub>3</sub>				
Advantageous geographic location (shorter sailing distance)		21%	20.90%					20.76%			
International cooperation and Regulatory competitiveness		19.10%									
Excellence and price competitiveness of existing ports		20.50%									
Regional existing knowhow in safe navigation in Arctic shipping		19.80%	19.60%								
Ability to provide SC efficiencies		19.30%									
Development of a transshipment hub			19.90%								
Shorter route for exporting resources to NE Asia			20.60%								
Development of hinterland infrastructure			18.90%								
Reliability and safety of NSR				20.70%							
Uncertain market and unestablished demand				20.70%							
NSR sailing costs and risks				19.80%							
Politics and regulatory framework				18.10%							
Regional port competition				20.40%							
International political and commercial cooperation among Arctic actors					21.90%						
Active involvement and development of port capabilities					20.66%						
Adherence and facilitation of navigational standards in the Arctic					20.31%						
Ensuring efficient hinterland connectivity					18.57%						
Attract and secure international funding					18.57%						
Further research to calculate total costs						20.77%					
Demonstration of long-term viability of the NSR						21.50%					
Ensure route reliability and provision of multimodal services						19.48%					
Disseminate (Share) information to stakeholders (e.g. authorities, public etc.)						19.30%					
Development and conservation of port multimodal capabilities, cost efficient services							18.84%	19.15%			
Assurance of sailing quality and service of existing and destinational markets							20.63%				
Long-term policy plans in cooperation with other Arctic actors, and collaboration with key stakeholders							21.62%	21.77%	22.15%	21.62%	22.22%
Advancement of marketing capabilities to secure trade							19.64%	19.75%		19.24%	19.01%
Development and conservation of hinterland infrastructure							19.24%	18.54%			
Development of SAR capabilities, and dynamic navigational charts									20.66%		
Advancement of marketing and communication capabilities									18.56%		
Investment in development of ice class vessels and ice breakers									19.88%		20.72%
Adherence and facilitation of navigational standards in the Arctic									19.12%		
Secure funding through innovative projects (e.g. digitalisation), to increase transit cargo volume										18.25%	18.59%
Competitive offering in terms of cost and quality										21.03%	
Development and conservation of multimodal capabilities, services and sailing quality										19.84%	
Investment in infrastructure and in single management structure with executive control											19.44%

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

**NOTE:** S<sub>1</sub>: Opportunities to Enter the NSR, S<sub>2</sub>: Recognize and deal with opportunities, S<sub>3</sub>: Recognize and deal with threats, F<sub>1</sub>: Pre-emption of assets (secure operational rights), F<sub>2</sub>: Financial benefits, F<sub>3</sub>: Increase market share, Z<sub>1</sub>: Exploit the sensed opportunities, Z<sub>2</sub>: Fend off threats, R<sub>1</sub>: Sustain potential NSR market share in a dynamic environment, R<sub>2</sub>: Maintain competitiveness



## 4. Discussion and Policy Implication

This research set to answer: How can Nordic countries prepare themselves to enter the NSR and capture potential benefits derived from trading in global transport networks? Previous research has identified the potential benefits for Nordic countries through the NSR; however, the NSR literature lacks any theoretical and practical underpinning on how to accomplish this. This theoretical gap, could be filled through research that follows an abductive approach (Dubois and Gadde, 2002). Reviewing existing theoretical models, such as DCT and FMA, and considering that organisations/countries will invest in opportunities that will return sustainable benefits, we proposed an innovative framework that demonstrates the reasons to be fast in entering a market while also identifying resource investments needed to enter, grow and succeed in the long-term. By doing so, stakeholders could achieve cost reductions in maritime SCs through collaboration in the NSR. Therefore, we combine DCT with FMA (see section 2.3) and we seek to contextually adapt the framework through a Delphi with experts. The analysis resulted in a clear path for the development of capabilities of Nordic countries.

### 4.1 Sensing

Sensing was defined as the stage that organisations recognise and deal with opportunities and threats in their wider business environment. Literature emphasises the importance of location for SCM (Melo, Nickel and Saldanha-da-Gama, 2009), and recognises the advantages of establishing a transshipment hub in Norway as identified by Solvang *et al.* (2018). The empirical findings suggest the possibility to establish a transshipment hub in Kirkenes, Northern Norway, which is the closest point to where an ice-class vessel is redundant. This Arctic town has gained considerable attention from Chinese companies looking to utilise the NSR, and from Finland with the ambition to establish a railway from Kirkenes to Rovaniemi to further distribute goods to Northern and Central European markets (Bertelsen, 2015). The existence of various transport modes increases logistics resilience. Additionally, this part of Norway has a relatively higher proportion of population than any other country in the world living north of the Arctic Circle (Norwegian Ministries, 2017; Norwegian Government, 2021). Therefore, the establishment of commercial activities on the NSR could benefit the large population living in the area which now lacks infrastructure that could support regional development. Additional trade volumes could generate activity for the ports (mining, forest industry, fishing, etc.) all year-round operation and further justifying NSR's establishment.

The empirical findings recognise the utilisation of the advantageous geographic location of Norwegian ports as the most important sensing capability for Nordic countries. The exploitation of the geographical location could also enable pre-emption of superior resources and in extent FMA (Lieberman and Montgomery, 1998). The largest threats identified in the literature included poor infrastructure (Xu *et al.*, 2011; Cariou *et al.*, 2019) and the actions of other players in the NSR area (Borgerson, 2008). Empirical findings further add to these threats by considering uncertain market and unestablished demand as the most important threats. Nordic countries could overcome such threats by improving reliability and safety.

### 4.2 FMA

To achieve FMA, organisations should secure pre-emption of assets and create buyer switching costs (Lieberman and Montgomery, 1988; Suarez and Lanzolla, 2007). According to our

empirical findings, to pre-empt assets, in other words secure operational rights for the NSR, international political and commercial cooperation among Arctic actors should be established. However, to fully achieve FMA we need to gain buyer switching costs. Based on the empirical analysis this could be achieved by demonstrating the financial benefits of switching to the NSR and increasing the market share. Financial benefits could be realised through the demonstration of the long-term viability of the NSR, while market share could be gained by implementing long-term policy plans in cooperation with other Arctic actors and collaboration with key stakeholders. If Norway (Nordic countries) signs bilateral agreements with neighbouring countries regarding the exploitation of the NSR, this will lead to a pre-emption of assets. Bilateral agreements (pre-empted assets), if combined with the unique geographic location of Norwegian ports, will provide an extremely rare asset. The use of the NSR could lead to reduced costs for shipping lines and potentially for shippers compared to the traditional route via the Suez Canal; thus, locking-in users for the longer-term as the logistics/shipping industry is predominantly a cost-driven industry. However, if Nordic countries fail to react and adapt in time, opportunities may be lost to other Arctic actors. British and Finnish governments identify opportunities for the UK and other countries, while they anticipate tremendous investments (\$500bn) in the region (GOV.UK, 2017). This stresses the need for a prompt response from Nordic countries.

### **4.3 Seizing and Reconfiguration**

Seizing capabilities refers to how companies tackle the opportunities sensed in their ecosystem, through the development of new products, processes or services, as well as delineating the most suitable business model for the exploitation of the sensed opportunities (Teece, 2007; Gebauer, 2011). For NSR, even if Nordic countries develop a clear and timely investment strategy, which may create a strong network effect, to achieve desirable return on investments they should consider potential users of those investments and ensure their commitment to NSR routing. Reconfiguring capabilities refers to the necessary enhancement, protection and modification of operational capabilities (assets and organisational structures) to maintain competitiveness and sustain profitability (Weerawardena and O'Cass, 2004; Teece, 2007; Gebauer, 2011). As mentioned in the literature review, reconfiguring capabilities should align with seized opportunities, enable monitoring of customer demand, and allow for modification of the offering. Based on our experts' views, we observe an overlap between the most important capabilities in those two stages (seizing and reconfiguration). Empirical analysis emphasised that long-term policy plans in cooperation with other Arctic actors and collaboration with key stakeholders are key factors for using seized and reconfigured capabilities. Seized capabilities could exploit the sensed opportunities and fending-off of threats identified in the NSR and reconfigured capabilities could be regarded as factors related to how Nordic countries, through Norwegian ports, could sustain potential NSR market share in a dynamic environment. In such a dynamic environment, the NSR could maintain competitiveness through enhancing, combining, protecting and, when necessary, modifying operational capabilities.

## **5. CONCLUSION**

We have identified a gap in the use of FMA and DCT theories in the transport management literature. Previous studies in transportation management journals have introduced FMA or DCT in relation to technological innovations (Cheng, Chen and Huang, 2014; Miemczyk, Howard and Johnsen, 2016; Kilubi and Rogers, 2018). Our paper contributes to the literature

by linking FMA/DCT in a single framework and elaborating upon it in the transportation and SCM context without focusing to the technological innovation but in utilisation of existing resources (e.g., geographical location). Even though academics have been widely engaged with the concept of dynamic capabilities, extant literature lacks empirical contribution on how DCs are created and utilised (Helfat and Peteraf, 2009; Gebauer, 2011; Dixon, Meyer and Day, 2014). Our research contributes to the development of the DCT (by bridging FMA and DCT) in transportation and SCM and contextualising the developed framework through the case of NSR. Our practical contribution is that we identify how countries along the NSR (see Table 3), and specifically Nordic countries, can capture and maximise its benefits. That responds to the call from Christenses *et al.*, (2019, p.17) who mention the need for “further studies on Arctic maritime infrastructure [which] could provide further evidence to support decision-makers and regional governments in establishing port facilities at strategic locations around the Arctic sea”.

The maritime transport industry strives to meet the demands of global SCs for cost efficient freight transportation (Rodrigue, Comtois and Slack, 2017). Therefore, there is an appetite from ship-owners to generate savings through innovative routes such as the NSR, by calling on the Norwegian seaports along the route. In this scenario, alternative routes, such as the NSR, must be envisaged to optimise the flow of goods between Asia and Europe, achieve improved vessel economics (Faury, Cheaitou and Givry, 2020) and increase capacity of global maritime transport SCs. Additionally, the attractiveness of Norway’s geographical location is further enhanced by the position of its ports outside of the ECAs (IMO, 2017) which could enhance the opportunities to establish a transshipment hub in this area. Although the NSR is currently operational only three-four months per year, there are additional trade volumes that could generate activity for the ports (mining, forest industry, fishing, etc.) and create a year-round operation and further justify its position. The aforementioned could conclude that jobs could be generated and global trade could fundamentally change with the implementation of the NSR, impacting not only the shipping companies who will use/utilise the NSR but also global multimodal transport networks (shippers, logistic providers, etc.).

The data collection was restricted to the willingness and availability of invited informants to participate in the research. The small sample size of experts participating in the research was justified due to the novelty of NSR, which is still at embryonic stage. Future research could expand the sample size as the number of experts will increase and attempt to apply quantitative analysis. Potentially, a larger sample could be achieved through a more structured data collection technique. However, interactive techniques, such as those used, provide more detailed data as they can expose relationships between the variables imposed in the investigation of complex phenomena (Worley and Doolen, 2006). This research investigated the benefits of Nordic countries entering the NSR without examining any interest from the cargo owners’ and shippers’ perspectives. Such interest, as we have seen, is growing as global SCs are attempting to reduce their overall costs. Future research could include cargo owners and shippers to identify if they would have an interest in modifying their global SCs to include the NSR, considering global SC trends of the future. Finally, according to the empirical findings, future research should attempt to calculate total costs of using the NSR and calculate its impact to global trade flows.

#### **Funding and/or conflicts of interests/competing interests**

Authors would like to disclose that they have not received any financial or non-financial support that is directly or indirectly related to the work submitted for publication.

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

## REFERENCES

- Barnett, W. P., Feng, M. and Luo, X. (2013) 'Social identity, market memory, and first-mover advantage', *Industrial and Corporate Change*, 22(3), pp. 585-615.
- Barney, J. B., Ketchen, D. J. and Wright, M. (2011) 'The Future of Resource-Based Theory: Revitalization or Decline?', *Journal of Management*, 37(5), pp. 1299-1315.
- Barratt, M., Choi, T. Y. and Li, M. (2011) 'Qualitative case studies in operations management: Trends, research outcomes, and future research implications', *Journal of Operations Management*, 29(4), pp. 329-342.
- Batista, L. (2012) 'Translating trade and transport facilitation into strategic operations performance objectives', *Supply Chain Management: An International Journal*, 17(2), pp. 124-137.
- Bertelsen, T. (2015) 'Care for Arctic people trumping Northern Silk Road vision', *GBTimes*, Jun 28 2015. Available at: <https://gbtimes.com/care-arctic-people-trumping-northern-silk-road-vision> (Accessed: 21/03/2018).
- Beske, P. and Seuring, S. (2014) 'Putting sustainability into supply chain management', *Supply Chain Management: An International Journal*, 19(3), pp. 322-331.
- Borgerson, S. G. (2008) 'Arctic meltdown: The economic and security implications of global warming', *Foreign Affairs*, 87(2), pp. 63-77.
- Brubaker, R. D. and Ragner, C. L. (2010) 'A review of the International Northern Sea Route Program (INSROP) - 10 years on', *Polar Geography*, 33(1-2), pp. 15-38.
- Cariou, P., Cheaitou, A., Faury, O. and Hamdan, S. (2019) 'The feasibility of Arctic container shipping: the economic and environmental impacts of ice thickness', *Maritime Economics & Logistics*.
- Cheng, J.-H., Chen, M.-C. and Huang, C.-M. (2014) 'Assessing inter-organizational innovation performance through relational governance and dynamic capabilities in supply chains', *Supply Chain Management: An International Journal*, 19(2), pp. 173-186.
- Chicksand, D., Watson, G., Walker, H., Radnor, Z. and Johnston, R. (2012) 'Theoretical perspectives in purchasing and supply chain management: an analysis of the literature', *Supply Chain Management: An International Journal*, 17(4), pp. 454-472.
- Chien-Yun, Y., Cheng-Hsien, H. and Dong-Taur, S. (2020) 'Effects of new shipping routes on the operational resilience of container lines: potential impacts of the Arctic Sea Route and the Kra Canal on the Europe-Far East seaborne trades', *Maritime Economics & Logistics*, 22(2), pp. 308-325.
- Christensen, M., Georgati, M. and Arsanjani, J. J. (2019) 'A risk-based approach for determining the future potential of commercial shipping in the Arctic', *Journal of Marine Engineering & Technology*, pp. 1-18.
- Chuy, S., Ilin, I., Jahn, C. and Devezas, T. (2022) 'Northern Sea Route Development Concept', in Ilin, I., Devezas, T. and Jahn, C. (eds.) *Arctic Maritime Logistics: The Potentials and Challenges of the Northern Sea Route*. Cham: Springer International Publishing, pp. 1-16.
- Darkow, I.-L., Foerster, B. and von der Gracht, H. A. (2015) 'Sustainability in food service supply chains: future expectations from European industry experts toward the environmental perspective', *Supply Chain Management: An International Journal*, 20(2), pp. 163-178.
- Dixon, S., Meyer, K. and Day, M. (2014) 'Building Dynamic Capabilities of Adaptation and Innovation: A Study of Micro-Foundations in a Transition Economy', *Long Range Planning*, 47(4), pp. 186-205.
- Dubois, A. and Araujo, L. (2007) 'Case research in purchasing and supply management: opportunities and challenges', *Journal of Purchasing and Supply Management*, 13(3), pp. 170-181.
- Dubois, A. and Gadde, L.-E. (2002) 'Systematic combining: an abductive approach to case research', *Journal of Business Research*, 55(7), pp. 553-560.
- Easterby-Smith, M., Lyles, M. A. and Peteraf, M. A. (2009) 'Dynamic capabilities: Current debates and future directions', *British Journal of Management*, 20(s1), pp. S1-S8.
- Eisenhardt, K. M. (1989) 'Building theories from case study research', *Academy of management review*, 14(4), pp. 532-550.



This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

- Faury, O., Cheaitou, A. and Givry, P. (2020) 'Best maritime transportation option for the Arctic crude oil: A profit decision model', *Transportation Research Part E: Logistics and Transportation Review*, 136, pp. 101865.
- Fearne, A. and Hughes, D. (1999) 'Success factors in the fresh produce supply chain: insights from the UK', *Supply Chain Management: An International Journal*, 4(3), pp. 120-131.
- Foss, N. J. (1998) 'The resource-based perspective: an assessment and diagnosis of problems', *Scandinavian Journal of management*, 14(3), pp. 133-149.
- Franc, P. and Van der Horst, M. (2010) 'Understanding hinterland service integration by shipping lines and terminal operators: a theoretical and empirical analysis', *Journal of Transport Geography*, 18(4), pp. 557-566.
- Frynas, J. G., Mellahi, K. and Pigman, G. A. (2006) 'First mover advantages in international business and firm-specific political resources', *Strategic Management Journal*, 27(4), pp. 321-345.
- Garcia Reyes, H. and Giachetti, R. (2010) 'Using experts to develop a supply chain maturity model in Mexico', *Supply Chain Management: An International Journal*, 15(6), pp. 415-424.
- Gebauer, H. (2011) 'Exploring the contribution of management innovation to the evolution of dynamic capabilities', *Industrial Marketing Management*, 40(8), pp. 1238-1250.
- Gomez, J., Lanzolla, G. and Maicas, J. P. (2016) 'The role of industry dynamics in the persistence of first mover advantages', *Long Range Planning*, 49(2), pp. 265-281.
- GOV.UK (2017) *Mapping Opportunities for the UK in the Arctic: Study Report for the British Embassy in Helsinki*. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/591445/Report Mapping of UK business opportunities in the Arctic.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/591445/Report_Mapping_of_UK_business_opportunities_in_the_Arctic.pdf) (Accessed: 19/12/2018).
- Gunnarsson, B. (2021) 'Recent ship traffic and developing shipping trends on the Northern Sea Route—Policy implications for future arctic shipping', *Marine Policy*, 124, pp. 104369.
- Ha, Y.-S. and Seo, J. S. (2014) 'The Northern Sea Routes and Korea's Trade with Europe: Implications for Korea's Shipping Industry\*', *International Journal of e-Navigation and Maritime Economy*, 1, pp. 73-84.
- Haleblian, J., McNamara, G., Kolev, K. and Dykes, B. J. (2012) 'Exploring firm characteristics that differentiate leaders from followers in industry merger waves: a competitive dynamics perspective', *Strategic Management Journal*, 33(9), pp. 1037-1052.
- Hastings, J. G. (2014) 'The rise of Asia in a changing Arctic: a view from Iceland', *Polar Geography*, 37(3), pp. 215-233.
- Hawk, A., Pacheco-De-Almeida, G. and Yeung, B. (2013) 'Fast-mover advantages: Speed capabilities and entry into the emerging submarket of atlantic basin LNG', *Strategic Management Journal*, 34(13), pp. 1531-1550.
- Helfat, C. and Peteraf, M. (2009) 'Understanding dynamic capabilities: progress along a developmental path', *Strategic organization*, 7(1), pp. 91.
- Hitt, M. A., Xu, K. and Carnes, C. M. (2016) 'Resource based theory in operations management research', *Journal of Operations Management*, 41, pp. 77-94.
- Hoopes, D. G., Madsen, T. L. and Walker, G. (2003) 'Guest editors' introduction to the special issue: why is there a resource-based view? Toward a theory of competitive heterogeneity', *Strategic Management Journal*, 24(10), pp. 889-902.
- Hsiao, Y.-C., Chen, C.-J., Guo, R.-S. and Hu, K.-K. (2017) 'First-mover strategy, resource capacity alignment, and new product performance: a framework for mediation and moderation effects', *R&D Management*, 47(1), pp. 75-87.
- Humbert, M. (2019) *Chinese Shipping Company COSCO To Send Record Number of Ships Through Arctic*: High North News. Available at: <https://www.highnorthnews.com/en/chinese-shipping-company-cosco-send-record-number-ships-through-arctic> (Accessed: 22 July 2019).



This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

- Hutzschenreuter, T. and Gröne, F. (2009) 'Product and geographic scope changes of multinational enterprises in response to international competition', *Journal of International Business Studies*, 40(7), pp. 1149-1170.
- IMAREST (2016) *Ships avoiding the Suez Canal*. The Marine Professional. Available at: <https://www.imarest.org/themarineprofessional/item/2241-ships-avoiding-the-suez-canal> (Accessed: 19/12/2018).
- IMO (2017) *Sulphur Oxides (Sox) – Regulation 14*. Available at: <http://www.imo.org/en/Regulation-14.aspx> (Accessed: 21/03/2018).
- Keltto, T. and Woo, S.-H. (2020) 'Profitability of the Northern Sea Route for liquid bulk shipping under post 2020 sulphur regulations', *The International Journal of Logistics Management*, 31(2), pp. 313-332.
- Ketokivi, M. and Choi, T. (2014) 'Renaissance of case research as a scientific method', *Journal of Operations Management*, 32(5), pp. 232-240.
- Kilubi, I. and Rogers, H. (2018) 'Bridging the gap between supply chain risk management and strategic technology partnering capabilities: insights from social capital theory', *Supply Chain Management: An International Journal*, 23(4), pp. 278-292.
- Kogut, B. (2008) *Knowledge, Options, and Institutions*. OUP Oxford.
- Koçak, S. T. and Yercan, F. (2021) 'Comparative cost-effectiveness analysis of Arctic and international shipping routes: A Fuzzy Analytic Hierarchy Process', *Transport Policy*, 114, pp. 147-164.
- Langerak, F. and Hultink, E. J. (2005) 'The Impact of New Product Development Acceleration Approaches on Speed and Profitability: Lessons for Pioneers and Fast Followers', *IEEE Transactions on Engineering Management*, 52(1), pp. 30-42.
- Lasserre, F. (2014) 'Case studies of shipping along Arctic routes. Analysis and profitability perspectives for the container sector', *Transportation Research Part A: Policy and Practice*, 66, pp. 144-161.
- Lavissière, A., Sohier, R. and Lavissière, M. C. (2020) 'Transportation systems in the Arctic: A systematic literature review using textometry', *Transportation Research Part A: Policy and Practice*, 141, pp. 130-146.
- Lawson, C. (1999) 'Towards a competence theory of the region', *Cambridge Journal of Economics*, 23(2), pp. 151-166.
- Lee, S. K. and Jang, S. (2017) 'Early Mover or Late Mover Advantage for Hotels?', *Journal of Hospitality & Tourism Research*, 41(1), pp. 23-40.
- Lieberman, M. B. and Montgomery, D. B. (1988) 'First-Mover Advantages', *Strategic Management Journal*, 9, pp. 41-58.
- Lieberman, M. B. and Montgomery, D. B. (1998) 'First-mover (dis)advantages: retrospective and link with the resource-based view', *Strategic Management Journal*, 19(12), pp. 1111-1125.
- Lieberman, M. B. and Montgomery, D. B. (2013) 'Conundra and Progress: Research on Entry Order and Performance', *Long Range Planning*, 46(4), pp. 312-324.
- Lindstad, H., Bright, R. M. and Strømman, A. H. (2016) 'Economic savings linked to future Arctic shipping trade are at odds with climate change mitigation', *Transport Policy*, 45, pp. 24-30.
- Linstone, H. and Turoff, M. (1975) *The Delphi Method: Techniques and Applications*. Reading, MA: Addison-Wesley.
- Liu, C.-Y., Fan, H.-M., Dang, X.-j. and Zhang, X. (2021) 'The Arctic policy and port development along the Northern Sea Route: Evidence from Russia's Arctic strategy', *Ocean & Coastal Management*, 201, pp. 105422.
- Lockett, A., Thompson, S. and Morgenstern, U. (2009) 'The development of the resource-based view of the firm: A critical appraisal', *International Journal of Management Reviews*, 11(1), pp. 9-28.
- Loschelder, D. D., Swaab, R. I., Trötschel, R. and Galinsky, A. D. (2014) 'The First-Mover Disadvantage: The Folly of Revealing Compatible Preferences', *Psychological Science* (0956-7976), 25(4), pp. 954-962.

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

- Luo, Y. (2000) 'Dynamic Capabilities In International Expansion', *Journal of World Business*, 35(4), pp. 355.
- Luoma, J., Ruutu, S., King, A. W. and Tikkanen, H. (2017) 'Time delays, competitive interdependence, and firm performance', *Strategic Management Journal*, 38(3), pp. 506-525.
- Makkonen, H., Pohjola, M., Olkkonen, R. and Koponen, A. (2014) 'Dynamic capabilities and firm performance in a financial crisis', *Journal of Business Research*, 67(1), pp. 2707-2719.
- Melo, M. T., Nickel, S. and Saldanha-da-Gama, F. (2009) 'Facility location and supply chain management – A review', *European Journal of Operational Research*, 196(2), pp. 401-412.
- Miemczyk, J., Howard, M. and Johnsen, T. E. (2016) 'Dynamic development and execution of closed-loop supply chains: a natural resource-based view', *Supply Chain Management: An International Journal*, 21(4), pp. 453-469.
- NASA (2019) *Arctic Sea Ice Minimum*. Available at: <https://climate.nasa.gov/vital-signs/arctic-sea-ice/> (Accessed: 22/10/2019).
- Nelson (1982) *An evolutionary theory of economic change*. Harvard Univ P., 1982.
- Northern Sea Route Information Office (2020) *NSR Shipping traffic - Transits in 2019*. Available at: <https://arctic-lio.com/nsr-shipping-traffic-transits-in-2019/> (Accessed: 23/04/2020).
- Norwegian Government (2021) *The Norwegian Government's Arctic Policy: People, opportunities and Norwegian interests in the Arctic*. Available at: [https://www.regjeringen.no/en/dokumenter/arctic\\_policy/id2830120/#tocNode\\_16](https://www.regjeringen.no/en/dokumenter/arctic_policy/id2830120/#tocNode_16) (Accessed: 28/03/2022).
- Norwegian Ministries (2017) *Norway's Arctic Strategy - between geopolitics and social development*. Available at: <https://www.regjeringen.no/contentassets/fad46f0404e14b2a9b551ca7359c1000/arctic-strategy.pdf>.
- Notteboom, T. E. (2004) 'Container shipping and ports: an overview', *Review of network economics*, 3(2).
- Okoli, C. and Pawlowski, S. D. (2004) 'The Delphi method as a research tool: an example, design considerations and applications', *Information & Management*, 42(1), pp. 15-29.
- Panahi, R., Ng, A. K. Y., Afenyo, M. and Lau, Y.-y. (2021) 'Reflecting on forty years contextual evolution of arctic port research: The past and now', *Transportation Research Part A: Policy and Practice*, 144, pp. 189-203.
- Patton, M. Q. (1990) *Qualitative evaluation and research methods*. SAGE Publications, inc.
- Rodrigue, J.-P., Comtois, C. and Slack, B. (2017) *The geography of transport systems*. 4th edn. New York: Routledge.
- Sanchez Rodrigues, V., Harris, I. and Mason, R. (2015) 'Horizontal logistics collaboration for enhanced supply chain performance: an international retail perspective', *Supply Chain Management: An International Journal*, 20(6), pp. 631-647.
- Solvang, H. B., Karamperidis, S., Valantasis-Kanellos, N. and Song, D.-W. (2018) 'An exploratory study on the Northern Sea Route as an alternative shipping passage', *Maritime Policy & Management*, 45(4), pp. 495-513.
- Suarez, F. F., Grodal, S. and Gotsopoulos, A. (2015) 'Perfect timing? Dominant category, dominant design, and the window of opportunity for firm entry', *Strategic Management Journal*, 36(3), pp. 437-448.
- Suarez, F. F. and Lanzolla, G. (2007) 'THE ROLE OF ENVIRONMENTAL DYNAMICS IN BUILDING A FIRST MOVER ADVANTAGE THEORY', *Academy of Management Review*, 32(2), pp. 377-392.
- Teece, D. J. (2007) 'Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance', *Strategic management journal*, 28(13), pp. 1319-1350.
- Teece, D. J., Pisano, G. and Shuen, A. (1997) 'Dynamic Capabilities and Strategic Management', *Strategic Management Journal*, 18(7), pp. 509-533.

This preprint has not undergone peer review or any post-submission improvements or corrections. The Version of Record of this article is published in WMU Journal of Maritime Affairs, and is available online at: <https://doi.org/10.1007/s13437-022-00273-3>

- Theocharis, D., Rodrigues, V. S., Pettit, S. and Haider, J. (2021) 'Feasibility of the Northern Sea Route for seasonal transit navigation: The role of ship speed on ice and alternative fuel types for the oil product tanker market', *Transportation Research Part A: Policy and Practice*, 151, pp. 259-283.
- Trkman, P., Budler, M. and Groznik, A. (2015) 'A business model approach to supply chain management', *Supply Chain Management: An International Journal*, 20(6), pp. 587-602.
- Tseng, P.-H. and Pilcher, N. (2017) 'Assessing the shipping in the Northern Sea Route: a qualitative approach', *Maritime Business Review*, 2(4), pp. 389-409.
- von der Gracht, H. A. (2012) 'Consensus measurement in Delphi studies: Review and implications for future quality assurance', *Technological Forecasting and Social Change*, 79(8), pp. 1525-1536.
- von der Gracht, H. A. and Darkow, I.-L. (2010) 'Scenarios for the logistics services industry: A Delphi-based analysis for 2025', *International Journal of Production Economics*, 127(1), pp. 46-59.
- Vonck, I. and Notteboom, T. (2016) 'Panarchy within a port setting', *Journal of Transport Geography*, 51, pp. 308-315.
- Wang, H., Zhang, Y. and Meng, Q. (2018) 'How will the opening of the Northern Sea Route influence the Suez Canal Route? An empirical analysis with discrete choice models', *Transportation Research Part A: Policy and Practice*, 107, pp. 75-89.
- Weerawardena, J. and O'Cass, A. (2004) 'Exploring the characteristics of the market-driven firms and antecedents to sustained competitive advantage', *Industrial Marketing Management*, 33(5), pp. 419-428.
- Wernerfelt, B. (1984) 'A Resource-Based View of the Firm', *Strategic Management Journal*, 5(2), pp. 171-180.
- World Bank (2018) 'Logistics Performance Index Rankings'. Available at: <https://lpi.worldbank.org/> (Accessed 20/10/2020).
- World Maritime News (2018) *Venta Maersk completes Northern Sea Route trial passage*. Available at: <https://worldmaritimeneews.com/archives/261519/venta-maersk-completes-northern-sea-route-trial-passage/> (Accessed: 19/12/2018).
- Worley, J. M. and Doolen, T. L. (2006) 'The role of communication and management support in a lean manufacturing implementation', *Management Decision*, 44(2), pp. 228-245.
- Xu, H., Jia, D., Yin, Z., Jin, F. and Ouyang, H. (2011) 'The potential seasonal alternative of Asia-Europe container service via Northern sea route under the Arctic sea ice retreat', *Maritime Policy and Management*, 38(5), pp. 541-560.
- Yin, R. K. (2003) *Case study research: Design and methods*. 3rd edn. London: Sage Publications Ltd.
- Yuen, K. F., Wang, X., Wong, Y. D. and Ma, F. (2019) 'A contingency view of the effects of sustainable shipping exploitation and exploration on business performance', *Transport Policy*, 77, pp. 90-103.
- Zeng, Q., Lu, T., Lin, K.-C., Yuen, K. F. and Li, K. X. (2020) 'The competitiveness of Arctic shipping over Suez Canal and China-Europe railway', *Transport Policy*, 86, pp. 34-43.
- Østhagen, A. (2021) 'Norway's Arctic policy: still high North, low tension?', *The Polar Journal*, 11(1), pp. 75-94.