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## **New Structured Knowledge Network for strategic decision making in IT Innovative and implementable projects**

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### **Abstract**

This paper investigates the impact of knowledge management processes among public and private organisations in Saudi Arabia and it develops structured and new knowledge network models that link knowledge with organisations for strategic decision making in IT innovative and implementable projects. We attempt to understand how knowledge networks could be built, how they could be structured, the outcomes from building these networks and the issues involved in building them. To answer these questions, we employed practice-based perspective by using case study method. An exploratory approach was adopted to generate potentially significant themes. In order to understand the networks interactions between international companies, local companies and public organisations, case studies of relevant organisations were conducted. Thematic analysis of our results discovered four main themes that have potential impact on these new and structured knowledge networks and these are organisational factors, knowledge networks initiation processes, knowledge channels and knowledge network environmental factors.

### **Keywords:**

Knowledge Networks; decision making; IT Projects; knowledge channels, knowledge culture; structured knowledge

## **1 Introduction**

There has been growing interest in treating global outsourcing as a significant organisation's overall strategy particularly in transition economy (Gupta & Polonsky, 2014). This is as a result of the technological change which is driving needs for skilled employees and goading a promotion of skills across economies (Gupta & Polonsky, 2014; Kefelal, 2010). The global radical change in managing information technology (IT) projects has become one of the most important and widely discussed topics in organisations today, where employees' involvement in decision making is directly linked to maximizing the success of IT projects (Eweje, Turner & Müller, 2012). This is has led organisations to restructure their operations, re-make their strategies, change their intra and inter organisational relationships (Gupta & Polonsky, 2014). However, there have been such complex issues raised in both academic and practical research regarding outsourcing strategies. These issues are illustrated as collaborative learning, organisational learning and sharing knowledge in strategic alliances, and the operation of network structures and intra and inter firm's strategic coupling within dynamic relationships (Gupta & Polonsky, 2014; Andersson et al, 2007)).

The ever increasing demands of multi organisational cooperation has led to a rapid growth in multi organisational partnerships whilst issues of a systematic governing intra and inter organisations networks are rarely addressed (Martin-Rios, 2014). A very strategic knowledge network has to be effective for long term built on momentum to remain sustainable (Walter et al, 2007). To ensure the effectiveness and the meaning of connections, knowledge networks in multi organisations need a channel of people cooperation, a clear knowledge path, a well-defined policy and organisational structures, and knowledge infrastructure. Many supporting mechanism provided by advanced IT systems have established new ways of connecting people together, pulling resources from different disciplines and linking expertise with recipients to support networking across different fields. Addressing the issue of knowledge networks connections is a key to increase knowledge flow and maximise the traceability of

knowledge channel whilst embodying collective understanding of such knowledge (Parcell, 2010).

Knowledge networks has been classified into four types based on the classic SECI model (Gourlay 2003) and these include knowledge networks of interaction, knowledge networks of interpretation and translation, knowledge networks of influence, and institutional knowledge networks (i.e. knowledge bases) (Alkhuraiji, et al, 2014) . Such classification is vital to connect different parties of multi organisational corporations including, but not limited to: Knowledge brokers, intermediaries, boundary spanners, stakeholders, vendors, resources, key players and key activities. Creating a well-defined knowledge network embodied across different related industries is a motivating force to mobilising knowledge and delivering effective knowledge that can be used as a commodity for an organisation. Thus, knowledge network in IT innovative projects is a key approach to capacity development that seeks not only to enhance organisational readiness capacity, but also to pull a large number of common expertises to make strategic decision (Alkhuraiji et al, 2014). A strategic knowledge network would help to maintain the integration of knowledge into the business operations and most especially, when business units are unconnected to the internal and external knowledge. For instance, some of knowledge providers may justify the reason of isolating knowledge as a commercial secret, whereas isolating knowledge from receivers' perspectives is time consuming and also exaggerates the cost. Common practice knowledge networks facilitate cost reduction in searching for isolated knowledge, non-codified knowledge and recruiting expertise (Villasalero, 2014).

### **1.1 Importance of understanding relationship in knowledge networks**

A formal knowledge network usually consists of expert institutions sharing the group's common interests and concerns, attempts to build up their understanding on a focused knowledge topic, to enhance their capacity of grasping such knowledge to deliver solutions

for particular dilemma to support decision making (Creech, 2001). The ultimate aim of researchers and practitioners engaged in knowledge networks research and issues in IT projects is to obtain the services workforce, employees and suppliers to have knowledge of facts and in turn implementing these facts in their business procedures, policies and products (Lomas, 2007; Deligonul et al, 2013). Previous studies assert that in order to build a knowledge network that supports strategic decision making in IT projects it is crucial to consider the alignment of external and internal organisational factors. These factors include organisational strategy (e.g. strategic orientation, Structure, Policy and process, Politics factors), organisational culture (e.g. trust, culture typologies, community of practice, collaborations, incentives, Behaviours and leadership), organisational capacity (e.g. readiness and resources), and knowledge management infrastructure (e.g. KM strategies and tools), (Alkhuraiji et al, 2014; Nielsen, 2005).

The term of networks can usually mean connections, linkages, action, brokering and intermediaries that have to be systematically addressed to achieve a better overview into building strategic knowledge network (Jashapra, 2011; Hislop et al, 2000). Considering knowledge as a fundamental asset to firms, increase in knowledge distribution, creation, discovery and acquiring has emerged as a fundamental organizational asset (Sambamurthy & Subramani, 2005; Takeishi, 2002; Teece et al, 1997). To remain competitive and support long term strategies in the market, firms should not only depend on exploiting such existing knowledge, but more importantly, to invest in continually exploring new knowledge as a strategic choice (Erden, Klang, Sydler & Krogh, 2014). Given the recent shift in knowledge management and market regarding the sources of competitive advantage that has been drifted from being based on economies of scale to being based on economies of “know-how”, intra-organisational and inter-organisational relationships are derived by leveraging knowledge distributed in the organisation’s network (Sambamurthy & Subramani, 2005).

Knowledge networks is particularly important for markets within the innovation system which connect a set of systems, institutions, procedures, social relations, networks and infrastructures through key actors to participate in the exchange of knowledge and associated intellectual property (IP) rights. Knowledge networks and markets (KNMs) support decision making by providing a number of critical services to facilitate the knowledge exchange process, searching for and matching to relevant counterparties and their knowledge. These services include proposing, evaluating, executing and enforcing agreements on the co-creation of future knowledge (OECD 2013). Effective knowledge networks can be built upon the discovery and proper evaluation of the boundary spanning for a network which is s a key element in the acquisition capacity of an organisation. This can provide greater advantages if they are structured and receive management guidance.

Many organisations seek innovation in order to develop their business in terms of services and products. A strategic approach of such innovation arises as result of interactions between disciplines or business units across the boundaries which demand an exploration of the potential of knowledge sharing as well as examining the channel of movement. Such strategy needs to focus on a knowledge network that aligns innovation, growth, employees' development, business vision, research and development (R&D) and marketing to sustain competitiveness. Top Management plays a fundamental role in grasping professionals and normal employees across traditional boundaries and in initiating lasting working networks (Hustad et al, 2003; Luo & Hassan, 2009).

## **1.2 Effects of structured relations in knowledge networks**

Both external and internal knowledge networks are commonly grouped into two kinds of classification including delivery networks which focus on value added and enabling networks to build the overall organisational capacity (Seufert et al, 1999). Structured Knowledge networks can have a significant impact on knowledge transfer and would deliver a cheap

solution for knowledge exchange process (Reagans & McEvily, 2003). When less time and effort are spent to understand the knowledge's sources, the cost of knowledge transfer will reduce. Some of the knowledge remains isolated due to the disconnection among units and divisions or the whole organisation remains unconnected to the external source of knowledge. The primary goal of structured knowledge network is to provide traceability and the connection of procedural knowledge to 'lessons learned', ensuring the ability to support decision-making (Alkhuraiji et al, 2014). The key points of structured relations are the traceability and the documentation of such developments, the rise of the association with innovation, the dissemination of new knowledge, the correspondence of such developments with the reality of knowledge creation, and how knowledge network corresponds practically to its developmental level (Etemad & Lee, 2003). Whilst knowledge networks usually occur in response to a unique set of circumstances, addressing issues regarding the effectiveness of such networks, its structure and governance, efficiency, the availability of resources and sustainability are vitally significant (Creech & Ramji, 2004).

## **2 Theoretical Framework**

Recent works in knowledge management and information systems studies provide four main theories regarding the conceptualization in inter-organizational issues; these include process theory, system theory, network theory and actor-network theory. Process theories provides conceptual framework on knowledge creation processes which are aligned with actor-network theory, whereas, system theory focuses on the interrelationships among divisions and units alongside their business environment. However, network theories tend to focus more on the structures and dynamics of such interrelationships (Olsen et al, 2014; Thomas et al, 2010; Welch & Wilkinson, 2005; Blackler & McDonald, 2000). The dyadic relationship in knowledge network activities is seen as reciprocal with mutual abilities to influence certain aspects. Such relations are usually processed, governed and controlled to coordinate

organisations' activities for the aim of harvesting collective gains. This will allow organisations to be attached to other existing source of knowledge for reducing knowledge purchasing cost as well as developing their position in the market (Olsen et al, 2014). The connection between knowledge producers and policy makers is the primary aim for efficient knowledge network which will increase knowledge practices in terms of thoughts, research, understandings and analysis, into policy realms. The advantage is to have greater outcomes on knowledge producers through advocacy and alliance with market forces (James & Jorgensen, 2009; Lee, 2011).

While this research aims to shed light on knowledge networks initiation alongside their benefits to organisations; it employs the actor-network theory to underpin the networks interactions between the aligned interests.

Many information system (IS) studies have employed actor-networks theory (ANT) to facilitate the understanding of the complex socio-technical issues associated with IT projects (Olsen et al, 2014; Alexander et al, 2014; Doolin & Lowe, 2002; Underwood, 2008). ANT explains the interactions among actors within a network; how such actors are joined up by using non-human actors (artifacts) to increase the potential for more alliances to achieve common interests (Mahring et al, 2004). The main focus of ANT is to inanimate objects and their impact on social processes. ANT perceives an actor as the central point of an action irrespective of being a human or non-human. It views technology as an emergent concept from social interest that can have the potential to shape social interaction (Doolin & Lowe, 2002). Its epistemological and ontological stance to perceive the world as being shaped by networked nodes which includes people, objects, concepts and ideas which all can be actors within a network. It argues that everything is constructed by events which gather aspects on common interests. It focuses on an investigation of how networks come to being, how they are structured, how such networks can relate to others and how actors can be enrolled into a



network (Alexander et al, 2014). In IS studies, ANT is deployed to examine the introduction of technology into an organisation which will mostly affects the whole organisational networks. It defines the difference between the Intermediaries and mediators in terms of their outputs, whilst the formers' outputs can be easily predicted on the basses of their inputs; the latter converts the input to unpredictable outputs. This variations is very crucial in social issues outcomes which are most frequently unpredictable, thus exploring how local networks are structured, reconfigured, initiated and demanded (Underwood, 2008). ANT delivers lens on how technology forms the social networks alongside its holistic views on key actors through the introduction of a complex IT project. It has been widely used in IS studies to facilitate the interpretation of the political processes of IT innovation and implementation (Cresswell et al, 2010). It helps decision makers to perceive outstanding features including precise details, examples, lessons learnt and project factors in a way that ensures decisions on project objective are built accordingly. In this paper, ANT has been applied to understand how knowledge networks could be constructed, how they could be structured, the consequences from building these networks and the issues involved in building them (Mahring et al, 2004).

### **3 Methodology: Research context**

Developing economies have witnessed a booming in IT outsourcing services and this has been one of the most widely discussed topics in management practices (Bardhan and Kroll 2003). The Kingdom of Saudi Arabia is a wealthy developing country in the Middle East region, having a strong economy since it is the leading country in oil production (Gylfason 2001). IT projects have been significantly increasing in Saudi since the transformation to e-Government services. The introduction of national e-Government projects in 1998 has made the government of Saudi Arabia to cooperate with the private international and local organisations to come together as business partners (Sahraoui et al, 2006). Such decision had

been made in order to contribute to the build-up of national expertise and the localization of IT capacities in terms of initiation, evaluation, planning, execution, implementation and operation. This decision was due to several reasons including, and not limited to, the lack of experts in the area of IT management, IT project management and IT operation management; the lack of IT maturity among public organisations; the lack of IT resources and knowledge; the lack of IT infrastructure; and such cultural and political issues among organisations. This has been attracting international companies to enter Saudi market for two main reasons which are increasing their growth and practising their knowledge in different area of the world. However, international companies have faced some challenges in the areas of cultural aspects in order to understand Saudi market alongside identifying the needs of public organisations. Consequently, international companies which are the vendors of hardware and software systems have been forced to make use of local companies to play as intermediaries to address cultural issues of Saudi Market and within time become business partners. The major effects on vendors and public organisations are the cost consultancy, operations, cash flow and some of political aspects involved in organisations.

### **3.1 Research design and method**

This study sets out to gain deep insight into knowledge management activities. In particular, it attempts to understand how knowledge networks could be built, how knowledge networks could be structured, what are the outcomes from building networks and what are the issues involved in building knowledge networks. To answer these questions this research has moved from theoretical concepts to a practice-based perspective. An exploratory approach was adopted to generate potentially significant themes. In order to understand the networks interactions between international companies, local companies and public organisations, a case study method was conducted. Case studies are seen as appropriate due to their inherent flexibility as well as addressing complex issues and embedded relationships for certain

markets (Gupta & Polonsky, 2014; Dubois & Araujo, 2004; Aaker et al, 2002). In order to gain in-depth insights into how international companies, local companies and public organisations exchange knowledge, the external validity was accommodated against opportunities (Burgelman, 1983; Gupta & Polonsky, 2014).

The research data were collected within one and half year in two phases. Thirty three participants from seven large organisations were involved and two experts of IT projects were chosen from leading international companies and local companies in IT projects (software and hardware) and advanced public organisations in IT projects practices. The selected international companies were advised by Saudi experts in IT projects alongside international experts. The companies' profiles through their websites were revised in order to gain insight into their IT projects practices. Their services varied from being hardware vendors, software designers, business evaluation and innovation, process and structure consultant, change management services and IT projects (initiation, planning, implementation, evaluation and operation). Local companies were selected as advised by Saudi experts and those international companies as being practicing IT projects' implementation, engaging in partnership activities and presenting a role of intermediaries between international companies and public organisations. The chosen public organisations were chosen based on three main criteria: 1) implementing large IT projects; 2) engaging in national IT projects committees; and 3) advanced and matured in IT projects implementation and practices (Table 1).

**Table 1** Protocol steps and research activities.

<b>Protocol Steps</b>	<b>Research Outline</b>
<b>Procedures Used</b>	<ul style="list-style-type: none"> <li>▪ Pilot study in June 2013</li> <li>▪ Selecting the appropriate IT project's organisations</li> <li>▪ Getting access permission on August 2013</li> <li>▪ Identifying the appropriate sampling</li> <li>▪ Scheduling the site visit and interview times from the mid of June 2013 to the end of November 2014</li> <li>▪ Using a recorder device for the interviews</li> <li>▪ Collecting all the necessary information and data</li> <li>▪ Developing a technique for managing, storing and retrieving all the textual material</li> </ul>
<b>Case study</b>	<ul style="list-style-type: none"> <li>▪ Interview agenda including general information, organisational factors, knowledge networks</li> </ul>

**questions**

initiation in IT projects, factors influencing knowledge channel and knowledge networks factors (environmental and critical)

- Transcribing all the recorded interviews into MS Word 10 documents
- Using a Computer Assisted Qualitative Data Analysis Software (Nvivo) application for analysing the collected fieldwork data

The researchers intended to focus on the targeted stakeholders and interviewing whoever was available as long as the person met the necessary research selection criteria. The purposive sampling technique was used to identify the participants who were in charge of IT projects in terms of planning, evaluation, execution, implantation and post-implementation. A chain referral or snowball sampling technique was also used to identify other informants. This includes identifying experts who are in charge of decision making, but not affiliated to IT project management or specific organisation. . This is to gain more transparency about certain issues. The main criteria for selecting the targeted samples were that (a) the company should be involved in IT projects; consultancy and business evaluation and restructuring for more than five years and (b) there should be ongoing interaction between the decision makers from both sides to investigate issues regarding their collaborative practices. In-depth face-to-face semi-structured interviews lasting between 0.45mins and 2.30h were held with 34 participants including directors, chief executives and general managers within these organisations (Table 2). The targeted sampling was carefully pre-planned and selected regarding three main criteria: 1) recommendations from top Saudi experts in the area of IT projects; 2) snowball techniques; and 3) their profile records, reputations and their contribution into IT projects in Saudi Markets for more than five years. The selected samples were agreed to participate and pre-arrangements were made in order to introduce the topic and to ensure that research area is very attached to the participants' experience. Some of the participants were working in public, local and international organisation, this allows to gain in-depth understanding where potential participants had a range of roles in multiple knowledge networks practices, associated with conducting IT projects.

**Table 2** List of the research participants

	Case Studies	Abbreviations of organisations' name	Organisations (Main Business focus)	Interviewees	Size of staff
1	International company	IPC	culture of partnership with a strong commercial focus	1- The head of project office 2- Project manager 3- Business analysis director 4- IT Consultant 5- Total quality director	180K
2	International company	ISS	Industrial Services Company	6- Project manager (specialises in health care projects) 7- Project manager (specialised in national services projects) 8- Project manager (public O)	150K
3	Local Company	LHZ	Information technology services	9- Chief executives 10- The head of project office 11- The head of IT services 12- Project Manager	500
4	Local Company	LEM	Information Technology services	13- Knowledge management officer 14- Strategic management director 15- The head of project office 16- Project manager (specialised in public organisation)	700
5	Public Organisation (Project Centre)	PYR	E-services projects and programmes	17- Strategic management director 18- The head of knowledge management office 19- The director of public organisation e-services 20- The head of project office 21- Project manager (specified in internal projects) 22- IT project consultant	500
6	Public Organisation	PIC	Information technology services and regulations	23- The director of IT services 24- The head of project office 25- The head of business strategy and development office 26- The director of communication office 27- Information officer	300
7	Public organisation	PNC	Governmental E-services	28- The assistant of general manager 29- Organisation's consultant 30- Project manager (specified in IT project between public and private organisation) 31- Project manager (specified in data centre projects) 32- Project manager ( specified in projects program management and analysis)	1200
8	Experts have been involved in multiple projects consultancy	Consultants	IT projects and IT services and regulations consultancy	33- Vice president 34- Chief executive	

### 3.2 Data Analysis

The interviews addressed questions concerning the organisations' practices to engage in successful knowledge networks, their knowledge exchange activities and issues encountered in building knowledge networks for strategic decision making. Interviewing different levels of management allowed for acquiring various perspectives which are then used to provide rich understanding of knowledge networks practices. All interviews were recorded and transcribed

accordingly. Since this research is built upon interpretive approaches that are widely used in knowledge and information systems studies, it is derived from guidelines for conducting and evaluating grounded theory studies in information system. This approach comprises constant comparison, iterative conceptualization, theoretical sampling, scaling up and theoretical integration (Urquhart et al, 2010).

Thematic analysis method was applied regarding procedures required for analysing qualitative data including the familiarisation with the collected data, the initial codes generation, identification of meaningful themes, revising the identified themes, defining and naming themes and producing the report (Braun & Clarke 2006). The data were initially studied to facilitate revealing uncovered issues in the first phase of data collection. Then, the main emerging issues were extracted and built upon the previously initiated concepts. Subsequently, the data were coded alongside of data analysis software package (NVivo). Themes identification process demanded a re-focus on the analysis at a broader level than had been conducted with the codes. The results of that suggest the production of a satisfactory thematic map that was developed, refined and defined. The reasons behind that are to firstly essence what each theme means and data each theme attained. In addition to this, the iterative literature technique was also used in parallel to compare and contrast the identified themes to facilitate the coding process. The Subcategories of initial codes were generated to allow for iterative conceptualization and constant comparison (Holton, 2007). Four main areas of constructs with corresponding coded interview texts are presented in Table 3.

**Table 3 Examples of constructs with corresponding interview texts.**

Main construct	Sample interview extract connect to that construct
Organisational factors	We always make sure that all divisions and units are in alignment with the overall organisational strategy by updating our websites weekly, producing division or unity reports monthly and sharing the organisational strategy across the organisation, this it to have the buy-in from people. Working in multicultural company we should understands the need of employees to meet it; which is a core part of our organisational strategy. This approach enhances the organisational readiness and facilitates resources allocations.
Knowledge networks initiation in IT projects	The first step to create a strategic knowledge network is to have a support from the top management and to introduce knowledge networks strategies within the organisational strategy. This needs a specific department of knowledge management which is in charge of allocating knowledge management activities, evaluating knowledge management infrastructure, creating vision and missions and chasing knowledge management activities within the organisation and across the border. The knowledge management office has to work cooperatively with all divisions or units within the organisation and whoever could involve in IT projects.
Factors influencing knowledge channels	When knowledge networks are not explicitly defined; not clearly identified in terms of their scope, boundary and allocations; and not highly supported from top management; they won't be efficient.
Knowledge networks factors (environmental and critical)	We introduced financial incentives plus top management acknowledgement certificate, for example whoever we send to an international conference in specific area that we demand further knowledge from, we require the person to absorb as much information as possible from the conference to present what he or she got in front of our employees; in addition to collecting contacts from the experts who attended the conference. Those experts will be called by our organisation and invited to establish relationship. Knowledge networks have to be updated, re-evaluated and explicitly presented. Such rewards, awareness rising, trust, top management support, knowledge management strategies and assistive tools are crucial.

#### **4 The research Findings**

The purpose of this section is to present evidence from the key findings derived from the literature and the empirical studies under the conceptual construct of structured knowledge network including organisational factors, knowledge networks initiation factors, factors influence knowledge channel and knowledge networks factors. A hybrid approach of thematic and cross-case analysis were adopted to analyse the collected data and to present the comparison of emerging themes from three different sectors which are international private companies, local private companies and public organisations. Although the findings presented below are interrelated and interconnected, they are provided separately, to ensure consistency. The thematic analysis provides four main categories that have an impact on structured knowledge network for strategic decision making in IT projects.

## 4.1 Organisational factors

### 4.1.1 Organisational strategy

The authors have identified different practices from the three main samples which are public organisations, private local organisations and international organisations. All those organisations have different roles in managing IT projects which can be categorised into four main areas including hardware and software vendors (e.g. international private companies); Knowledge brokering and knowledge mediators (e.g. local private companies specialised in software implementation and the PNC (local E-service program); IT solutions seekers (governmental or public organisations) and Full IT project management which include initiation, consultations, execution, implementation, evaluation and post implementation ( e.g. International companies) (Figure 1). As shown in Figure 1, the model is divided into two parts; the first part explains how governmental organisations seek IT solutions; while the second part shows how international and local companies provide IT solutions to public or governmental organisations. This figure also identifies the role of PYR in trying to play the role of knowledge brokering on one hand, and raise the awareness for public organisations on the other hand. The interviewees explained some communication channels issues regarding the alignment of IT projects alongside the organisational strategies. A business analysis director from IPC declared that

*“Some of public organisation seek IT solution whereas they cannot identify their needs, their organisational strategies are not clear, no clear vision and missions, and when we propose overall organisational re-engineering they become unhappy so we just propose them an IT system that can do the work for short term plan. We may know that the projects will not last for that long, but we have to do the job. Interestingly we had organisations that seek IT solutions because they want to be like another organisations in terms of IT use, of course in the end it is a market so we have to sell our products, our responsibility is to raise the awareness, but sometimes we cannot make the decision instead of them”.*

This was an issue which has been raised by the interviewees from private local companies. Strategic management is the predominant characteristic of the international companies visited



and to some extent applied to private local organisations. The vision and mission are explicitly shared within their employees. This makes it easier for their employees to be aligned with their current and future work. One of their strategies is to extract cultural knowledge from private local companies and to have them as partners in dealing with governmental organisations projects. A Project manager from one of the international company's comments:

*“Private Local organisations are our strategic partners in terms of building knowledge sharing communities, enhancing our business practices in such area and engaging them in some complex projects and sharing best practice. These multicultural communities provide chances for exchanging expertise and bridging the way to local market. For IT implementation services, we have some classification for private local companies based on their historical records in cooperating with us, they can benefit from us when we advise them on local public organisations projects”.*

Most of the interviewees bring concern on policy and procedural issues and particularly with the introduction of new IT systems for an organisation. For example International companies and private local companies lay the charge at governmental organisations doors in terms of lacking a clear policy and procedure. One expert claimed that

*“When revising the contract of an IT projects we always bring concern on the ambiguity of the goals and objectives. Most of organisations are not capable of conducting project request of proposals (RFPs) by themselves, we try to do our best to help, but we cannot get all information needed easily. No standard project methodology is followed by some of the public organisations”.*

The interviewees explained the importance of having clear policy and procedure alongside well defined projects; objectives and requirements. These help in facilitating organisation's effectiveness by decreasing issues of politics such as the lack of coordination among divisions and the lack of cooperation's within external industries.

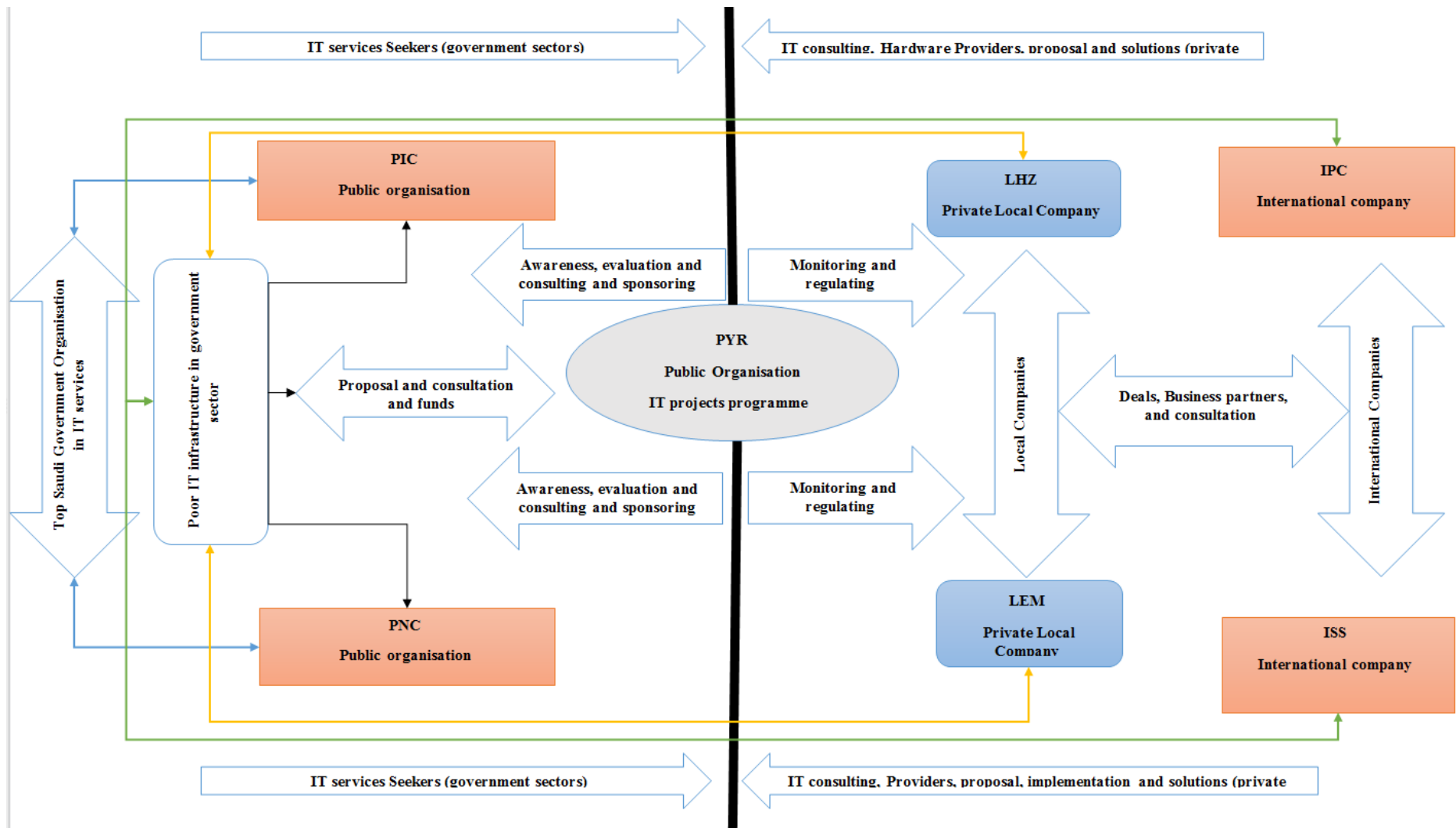


Figure 1: An illustration of IT Projects in The market of Saudi (How IT projects work). The first part explains how governmental organisations seek IT solutions; while the second part shows how international and local companies provide IT solutions to public or governmental organisations.

#### **4.1.2 Organisational culture**

Analysis of the collected data revealed that most public organisations attribute to silo culture where divisions, departments or groups are working separately and resisting to share information with others. Most of the interviewees point out that from the outset of an IT projects there seems to be corporate culture, however when the information are needed silo culture seems to be dominant. Project manager in ISS who has been involved in large IT system integrations claimed:

*“Projects delays or failures attributes strongly to the lack of transparency especially in the planning stage. Transparency is the key to put everything on the right track and move further”*

Others reveal the lack of transparency as a result of lack of training on community of practice systems, rewards systems are not supported in a proper way and in some organisations are not exists. Those issues damage the trust level among employees and their organisations. Many of the leaders are trying to solve cultural issues with empowerment and this has been argued not to be a proper technique to resolve such issues.

One Knowledge Management Officer in a private company stated that:

*“Public organisations are not willing to cooperate with internal management and that’s why they rely on outsourcing companies to do their works; it is a matter of complex culture”. For example, we were assigned to implement an IT system after it had some delay due to the lack of cooperation inside the organisation with the projects team. It was managed internally and had been handed to us after there were delays, we managed to get it done within the time and cost proposed. That is why I think there is always need for outsourcing”.*

#### **4.1.3 Organisational capacity**

All the interviewee believed that issues of organisational capacity have to be clearly identified, discussed and resolved before the adoption of an IT system. Issues include, but not limited to organisational readiness in terms of resource availability, experts, organisation IT

maturity, IT structure, infrastructure and budget. One of the key successes in IT projects is resource allocation, in this light one Consultant from an organisation claims:

*“An adequate budget has to be allocated and the required resources such as training courses, educational programmes and consultation have to be established. There is also need that the new system introduced has to be compatible with the existing system and that current infrastructure is ready to accommodate the new system.*

#### **4.2 Knowledge networks initiation in IT innovative and implementable projects**

The interviewees explain how networks are initiated for the IT projects in terms of innovation, planning, evaluation, extension, implementation, management and structuring. The results have been varied based on sectors. For example private sector tends to be more cost and financial outcomes oriented. An IT Consultant claims that:

*“Before going on IT projects we have to figure out who are the stakeholders, who are the knowledge holders, who are the project owners, who are the most effective people in decision making, what sources of knowledge can we access, whom do we need, who are our initial concerns, middle concern and final concern. Those details have to be available in order to draw our own knowledge map, then we process it, it has to go into many checks points before we make it explicit to our employees. If knowledge map is explicitly available, there will be a higher chance to succeed in IT project implementation within the cost and time agreed”.*

Though this technique is not widely practised by private companies, it is a recent shift towards processing knowledge networks in order to achieve an effective knowledge exchange with whoever is concern.

On the other hands, public sector depends more on private sectors to take such initiatives due to several complex issues including, but not limited to, silo culture which means that public sectors are not working on a pool of knowledge exchange, lack of experts in the area, lack of knowledge base, lack of IT maturity in terms of such systems, lack of external networks, lack of community of practice, lack of top management support as well as unavailability of knowledge sources.

One of the IT project experts who specialises in knowledge management and has worked as consultant with many public organisations said that:

*“Public sector organisations have to spot the opportunity whilst the current economy of the country is strong to gain knowledge as much as they can, and trying to implement such techniques, innovation and strategy into their needs. Otherwise private companies will always take advantages over public organisations areas of weakness”.*

The lack of national project documentation usually leads to weakening decision making, thereby making the business cases unclear and resulting in subjectivity of the assessment of IT project activities.

### **4.3 Factors influencing knowledge channels**

#### **4.3.1 Knowledge Networks Externalities**

*(a) Internal factors:* The interviewees clarified that some internal networks consist of links of communication channels which coordinate their industry knowledge regarding IT projects in terms of production, developments and innovation activities. On one hand, these networks aim to enhance the flow of organisation’s resources while on the other hand, some of the networks purposes are to diffuse knowledge. Thus, knowledge networks can be formal and informal. For example, business reports, conference, seminars and structural organisational procedure and the activities involved within are “formal knowledge networks”. However, an informal knowledge networks are affected by common knowledge interests, share value, political and cultural involvement. A Business Analyst revealed that:

*“We hear about the term of knowledge networks, but what we have are not knowledge networks, they are business networks defined by job roles. Knowledge networks are not explicitly defined in order to be efficient. The main barrier is the misconception between knowledge networks and business networks”.*

*(b) External factors:* the findings suggest that the external pressure of the IT industry on public organisation to develop their IT services has shaped non-strategic knowledge networks

and most of which could not last to the end of an IT project implementation. A Knowledge Officer claimed that:

*“Some decisions are made subjectively based on a success story of an IT projects somewhere else”*

#### **4.3.2 Knowledge intermediaries**

The interviewees explain the role of knowledge brokering to connect different parties into a common knowledge topic, rising up issues, provide best practices and become the master key in connecting decision makers to the sources of knowledge. However, the lack of knowledge interpretation, translation and documentation could not show the value of knowledge brokering activities. Project managers of private companies believed that knowledge brokering activities have to be understood, interpreted, translated, evaluated and implemented within the strategy of an organisation.

#### **4.3.3 Knowledge management infrastructure**

The authors have identified through the data collected that knowledge infrastructure including knowledge management strategies, processes, tools (e.g. IT communication systems), knowledge base could contribute to shaping a strategic knowledge channels. A project manager from an international company who specialised in IT projects implementation in public sectors claimed that:

*“Having a solid knowledge of infrastructure alongside knowledge base allows companies to have standardisation in IT project advertising, marketing, innovation, implementation and evaluation”.*

### **4.4 Knowledge networks environmental and critical factors**

#### **4.4.1 Top management commitment**

The results of the interviews suggest that the top management involvement is the key in initiating such knowledge networks, building its strategic direction and committing to its objectives.

#### ***4.4.2 Clear goal and vision***

The authors identified from the data collected that knowledge networks in IT projects need to have a clear goals including set of objectives, network champions, networks boundaries, expansion criteria and regularly updating the networks over the time.

#### ***4.4.3 Routinizing knowledge networks activities***

The interviewees explained that knowledge networks activities can be classified into external and internal activities. The former includes resources, knowledge brokering and social activities; whilst the latter includes networks governing and managing, stakeholders' engagement, projects owners' identification, norms and routine, cultural and social characteristic of an organisation, collaborations and communication activities.

#### ***4.4.4 The identification of knowledge network***

The results show that the networks have to be defined and cascaded with a proper structure alongside defining roles of all parties engaged within a network. For the knowledge network to be more effective, it has to be explicitly defined. One of the case studies has a knowledge map systems that connect its employees in common knowledge topic across the border, it has been acknowledged to be cost effective and a base for the innovation.

#### ***4.4.5 Incentives systems***

One of the most agreed factor among the interviewees is motivating whoever contributes significantly in knowledge networks to facilitate sharing of knowledge, problem solving and innovation. For example, one of the case studies has implemented incentives systems for those who attend conferences and introduce experts to the company as well as presenting what he/she gains from the conferences in front of its employees. The incentive can be gained by a like and dislike system implemented within the portal of the company.

#### ***4.4.6 Alignment of the key organisational factors and the strategy of knowledge network:***

The authors have identified through the collected data that in trying to facilitate knowledge networks for long term strategy, key organisational factors have to be taking into consideration in alignment with knowledge network strategies. IT support system should be as a tool for facilitating an explicit knowledge network.

## **5 Discussion**

Despite that structured knowledge networks are assumed to be critical solutions for strategic decision making in IT Innovative and implementable projects, the adoption of knowledge networks models remains significantly low among business organisations in Saudi Arabia. Understanding the issues of building a structured knowledge network remains complex, subject to the business context of a research. In this research, an attempt has been made to explore several issues in trying to build structured knowledge networks for strategic decision making in IT innovative and implementable projects. Research on the issues of outsourcing of IT projects has given rise to several issues including collaborative learning, organisational learning and sharing knowledge in strategic alliances, and the operation of network structures and intra and inter firm's strategies. For example, prior studies made an attempt to understand knowledge exchange within multiple networks, and how they could add value, the role of knowledge brokering in assisting the dissemination of knowledge and learning within the network as well as business partners issues in exchanging knowledge within the network (Gupta & Polonsky, 2014). This paper critiques and builds upon prior literature and sheds the light on understanding how knowledge networks are built, how they could be structured, what social and technical issues are involved and what outcomes can be gained. The sticking points of structured knowledge networks are the traceability and the documentation of such developments.



To achieve the knowledge traceability, knowledge channels should be clearly defined within the business processes. Application of actor-network theory (ANT) is commonly used in practical settings due to its robustness in explaining the systematic way of considering the infrastructure surrounding innovative and implementable technological achievements. It is considered as invaluable framework for researchers to gain deep insights into specific issues that occur within a network as well as conceptualising the way and how multiple realities are practised and conducted by different actors. Previous studies have flagged this issue to facilitate ANT application according to the need of theoretical research or practical use.

Since knowledge network is explicitly or implicitly composed of actors that can be human and non-human, ANT has been used to assist in understanding of the complex socio-technical issues associated with IT projects. To allow structured knowledge networks, the empirical results revealed four main areas including organisational factors, knowledge networks initiation processes in IT projects, factors influencing knowledge channels and knowledge networks critical and environmental factors. Previous studies have highlighted organisational factors that have an impact on knowledge sharing (Walter et al, 2007), but the framework ignores some aspects of the external and internal networks of an organisation regarding the capabilities to obtain and share information and knowledge. Thus the model of this study extends and contributes to knowledge in this field by modelling knowledge network interaction using a more holistic approach and framework. It has examined three key areas of organisational factors comprising organisational strategy, organisational culture and organisational capacity which have to be aligned and carefully addressed to achieve structured knowledge networks. Organisational strategy is a core part to shape structured knowledge networks, issues of strategic alliance, partnership, policy and procedural issues as well as the issues of knowledge networks governance. Corporate culture is affected by the level of transparency; thus impacting on structured knowledge networks. Organisational capacity

determines the allocation of resources since it provides details on organisation's IT maturity, IT structure, infrastructure and budget. This identified the needs for an organisation to build their knowledge networks in relation to their demands.

To initiate knowledge networks in IT projects, the research results shed light on how to observe key actors which include human and non-human, in order to facilitate building knowledge map that could pull all parties involved as well as common interests. Knowledge channels are influenced by three main factors namely knowledge networks externalities, knowledge intermediaries and knowledge management infrastructure. Internal organisational factors are those actors which coordinate the processes of chasing such development and innovation as well as the process of sharing organisation's resources. Knowledge brokering is a master key in connecting decision makers to the sources of knowledge; whilst knowledge infrastructure contributes to shaping strategic knowledge channels.

Knowledge networks environmental and critical factors include top management commitment, clear goal and vision, methods of routinizing knowledge networks activities and how the identification of knowledge network and incentives systems are aligned with the key organisational factors and the strategies of knowledge network. This is particularly important to leverage knowledge distributed in the organisation's network (Sambamurthy & Subramani, 2005) and to have knowledge of facts as well as implementing these facts in their business procedures, policies, products and innovation (Lomas, 2007); whilst learning is considered as an integral part of innovative firms' core competency (Prahalad & Hamel, 1990).

## **6 Conclusion**

Despite that structured knowledge networks are expected to be vital solutions to bridge business social capital with the sources of knowledge across the border of an organisation, the implementation and application of its theory remains very limited among organisations in emerging economies such as Saudi Arabia. This reaffirms the need for a more in-depth study

to evaluate the implementation of its theories. In this paper, we have investigated the impact of knowledge management processes among public and private organisations in Saudi Arabia through multiple case studies using thematic analysis of the qualitative data.

This study contributes to knowledge in this research area by developing structured and new knowledge network models that connect organisations with the sources of knowledge for strategic decision making in IT innovative and implementable projects. The results of this study can be used by Saudi decision makers and top management in IT public sector to initiate a national project management centre as a central agency within knowledge networks which would provide traceability and the connection of procedural knowledge to 'lessons learned' among public and private organisations.

The theoretical contribution of this study develops a new knowledge network model which will provide researchers, who are devoted to the ongoing use of structured knowledge networks, with significant bodies of empirical evidence. Though the literature still lacks examining theories on knowledge networks implementation, in particularly in IT projects in Saudi Arabia, the findings of this research might be further examined with more case studies from other relevant countries or using different methods to strengthen the findings.

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