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Insights into Structures in Policy-Driven Inter-Organisational Networks for Innovation: Cases from Malaysia's MSC Flagships

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Abstract The study compares network structures that emerged in three inter-organisational projects set up under the MSC Malaysia initiative by the Government of Malaysia. These consortia are seen as policy-driven inter-organisational networks and, with data collected through interviews; the links among the organisations are mapped to gain an understanding of the structures that emerged in these networks. The findings provide lessons for other emerging countries that are embarking on similar projects i.e. cluster-oriented developments with policy-driven inter-organisational networks. These findings are seen as particularly useful when emerging countries invest in technology-related projects and invite multinational companies to work together with local firms.

Keywords Inter-organisational networks, network structures, innovation, MSC Malaysia, policy-driven

I. Introduction

The mounting significance of inter-organisational networks for innovation necessitates the need for understanding their structures. In emerging economies, these networks are being formed through policy interventions. This paper presents some findings from an investigation of network structures between the organisations in different consortia set up by the Government of Malaysia as part of the Multimedia Super Corridor (MSC Malaysia) initiative.

MSC Malaysia is an initiative by the Government of Malaysia to create an multimedia environment in which an information and communication technology (ICT) industry and society can thrive. A policy-driven inter-

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organisational network approach represents the catalyst in Malaysia's shift to a knowledge economy. MSC Malaysia provides for networks of organisations created through policy-driven cooperative arrangements, or "flagships" to enable the organisations to be innovative. "*The directed networks of exchange relationships create value in that the creativity and talent derived out of such an environment is perceived to result into a combination of knowledge, skills and abilities for innovation*" (Aliza and Mohan, 2010: 246). The terms 'innovation' and 'knowledge' are not restricted to technology alone, but encompass other business and management processes as well (Chaturvedi and Chataway, 2006).

In today's economy, understanding the benefits of inter-organisational networks becomes more essential than ever. This paper addresses the issue of structures that emerge in policy-driven inter-organisational networks in steering organisations to be innovative – in this case, the networks being the flagship projects of MSC Malaysia initiative. In the next section, the context of the study is outlined, proceeded by some background literature that provides the basis for the study. A section on the methodology follows with a subsequent description of the cases and their corresponding network participants. The findings related to their network structures and characteristics are then presented. A set of conclusions makes for the final closing.

Ⅱ. Context of the Study

In 1996, the MSC Malaysia was launched for Vision 2020. "*This was to be in line with the Government's conviction that the future economic prosperity of Malaysia not only rested on the export of primary products but also on the fruits of high technology*" (Andaya and Andaya, 2001:318). MSC Malaysia is meant to encourage innovation among organisations (both local and foreign) where supporting policies and infrastructure are provided to enable the organisations to thrive in their industries and create opportunities for all.

In addition, the flagship applications enable MSC Malaysia "*to make it a global test bed, increase productivity and competitiveness by fast-tracking the infrastructure for electronic business and help overcome the digital divide*" (Aliza and Mohan, 2010:247). It can be said that the flagships act as networks of organisations driving towards a mutual aim (Kamarulzaman, Aliza and Mohan, 2002). This provides the platform to study inter-organisational networks, where, in the next section, some related literature offers a background to this paper.

III. Some Related Literature on Inter-Organisational Networks, Structures and Innovation

In this section, selected pertinent literature is directed towards understanding key issues of inter-organisational networks for innovation and their corresponding structures and characteristics. Subsequently, this provides for the formation of this study's framework. Aspects of inter-organisational networks and innovation are discussed first, followed by a discussion of network structures and characteristics.

1. Inter-Organisational Networks and Innovation

Innovation is largely seen as the fundamental indicator for firm performance (Mone, McKinley and Barker, 1998). It all began in the late 1920s when Schumpeter outlined innovation within the context of the organisation to be that of its new outputs, be it, according to Crossan and Apaydin (2010) in the form of a good, a production method, a market, a supply source or an organisational structure. Innovation is suggested to involve "*new combinations of processes and products" leading to "shifts in the economic state of equilibrium*" (Eschenbaecher and Graser, 2011:373). "*Innovation is when a technological development satisfies a market need; it is a widespread adoption of an invention or a new technology by its intended users*" (Kamarulzaman and Aliza, 2001:1). Dosi (1998), in Schilling and Phelps (2007), characterises innovation as a process that entails searching for solutions to problems. This subsequently leads to new knowledge being created, e.g. patents and new products, by recombining known knowledge elements (Schilling and Phelps, 2007).

At the same time, innovation can also be seen as a process where people socially connect with ideas and resources to create "*novel combinations*" (Obstfeld, 2005). Hemphälä and Magnusson (2012) cite Leonard and Sensiper's (1998) argument that innovation is a "*social and communicative process*", where individuals interact for the purpose of innovation [1]. In addition, Molina-Morales and Martínez-Fernández (2010) emphasise that social structures can impact the innovation process to the point of knowledge access and exploitation. Perhaps, Crossan and Apaydin (2010:1155) surmise it best: "*Innovation is: production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome.*"

In which case, it brings the discussion to the matter of networks and their significance to innovation. Much research on inter-organisational networks has been done (Provan, 1984; Hamel, 1991, Hagedoorn, 1993; Powell, Koput and Smith-Doerr, 1996; Dyer and Singh, 1998; Gulati and Garguilo, 1999; De Wever, Martens and Vandenbempt, 2001; Schilling and Phelps, 2007 etc.). They indicate that organisations develop inter-organisational relationships to acquire, create and use skills and knowledge for innovation. Sydow and Windeler (1998) describe an inter-organisational network as "*an institutional arrangement among distinct but related for-profit organisations which is characterised by* (1) *a special kind of (network) relationship,* (2) *a certain degree of reflexivity, and* (3) *a logic of exchange that operates differently from that of markets and hierarchies*". This suggests that "*network relationships are typically complex, reciprocal and relatively stable*" (Sydow, 1992 in Sydow and Windeler, 1998:266) Goodwin et al. (2004:3) find that networks are usually "*flat organisational structures underpinned by soft values such as trustworthiness and egalitarianism*". According to Van de Ven and Poole (1999), such relationships enable for an organisation's innovative capability. Nambisan and Sawhney (2011) identified relational aspects of modularity, openness and embeddedness as important elements of networks for innovation. Innovation can be said to be a consequence of networks (Granovetter, 1985; Schilling and Phelps, 2007).

Research studies on innovation point to the use of networks. "*Sources of innovation do not reside exclusively inside organisations and, instead, they are commonly found in interstices between firms, universities, research laboratories, suppliers and customers*" (Powell et al., 1996:118). Networks allow for organisations to develop relationships with other organisations enabling innovative ideas to be created among them. Schilling and Phelps (2007:1114) surmise that "*firms that have greater access to and understanding of recombinatory resources should be advantaged in their innovation efforts*". This insinuates that information can be assuredly exchanged among the organisations (Ring and Van de Ven, 1994) while keeping the essence of embeddedness found in intra-organisational interactions (Sydow, 1997).

2. Understanding Network Structures for Innovation

Understanding network structures is important for innovation as network structures enable for the activity of information flow, exchange of ideas, learning, access to resources etc. According to Walter, Kogut and Shan (1997:110), network structure "*induces cooperation through the development of social capital and the gaps in the pattern of information flows reflect potentially profitable opportunities ... to* [stimulate] *connections between unlinked organisations*". They are suggested to "*greatly influence the*

dynamics of information diffusion within the networks" (Schilling and Phelps, 2007: 1114). There are various perspectives as to the structures that networks can take.

Schibany, Hämäläinen and Schienstock (2001:10) look at network structures to comprise of (1) vertical and horizontal, (2) geographical scope, (3) organisational structure, (4) duration (as per achievement of objectives), (5) boundary (to the degree of openness and closeness), (6) architecture and balance of power, and (7) stability and trust (as per nature of membership). Todeva and Knoke (2005:124) identify network structures in the simpler context of inter-organisational relations i.e. hierarchical relations, joint ventures, equity investments, cooperatives, R&D consortia, cartels, franchising, licensing, subcontractor networks, industry standard groups, action sets and market relations.

According to Grandori and Soda (1995:199), there are three main categories of networks, in the context of coordination mechanisms employed and the degree of centralisation and formalisation: (1) social networks, (2) bureaucratic networks and (3) proprietary networks. Leoncini, Montresor and Vertova (2003:14) identify three network approaches under the context of cluster-oriented conditions for collaborations: (1) the industrial district, (2) the innovation milieu and (3) the regional system of innovation.

In a different context, Ahuja (2000) argues for dense network structures for innovation where network structures become more cohesive over time as individuals enhance existing connections among each other. On the other hand, Walker, Kogut and Shan (1997) debate on open network structures for innovation i.e. network structures that are continuously reshaped as individuals seek other new connections while focusing less on their earlier established connections. Burt (2004) adds on by saying that open network structures are the tool to bridge *structural holes* between groups of individuals (or organisations) as these individuals become more accessible to a diversity of information, making them "*more knowledgeable of alternative ways of thinking and behaving*" (Hemphälä and Magnusson, 2012:4). Hence, while open network structures may create greater information diversity (Burt, 2004), dense network structures are likely to result in higher information redundancy (Hemphälä and Magnusson, 2012). This puts forward Obstfeld's (2005) discussion on open and dense network structures, where the two are meant to offer different opportunities. Open network structures offer more opportunities for idea generation while dense network structures facilitate idea realisation.

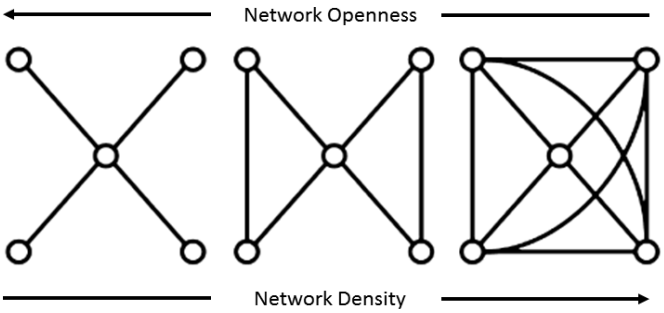


Figure 1 Network structures
Source: emphälä and Magnusson (2012)

2.1 Network Structures and Their Characteristics

Barnes (1954) introduces the concept of "*social networks*" in his study of relationships developed across class groups as means to explain behaviours of individuals in bounded settings. Hall and Wellman (1985) further this by emphasising on network analysis as focusing "*on the characteristic patterns of ties between actors in a social system rather than on characteristics of the individual actors themselves and use these descriptions to study how these social structures constrain network member's behaviour*" (Berkman, Glass, Brissette and Seeman, 2000:845). This insinuates another argument about network structures where their characteristics play an influential role in determining their ability to innovate. Hence, it is imperative to identify an appropriate framework that discusses network structures with social organisation i.e. characteristic patterns of relationships, in mind.

The 4 generic structural types discussed by Goodwin et al. (2004:4) describe networks as "*types of social organisation and are derived through a cross-tabulation of two basic dimensions of social organisation – the degree of social regulation and the degree of social integration*". Initially presented by Durkheim (1951), "*social regulation refers to the degree to which social life is governed by rules or given facts e.g. laws, while "social integration refers to the degree to which social life for an individual is bonded to others, particularly to peers within bonded groups*" (Goodwin et al., 2004:5). This indicates that networks are a result of social bonds or attachments established by individuals to other individual i.e. social integration (e.g. trust, communication, acknowledgement, etc.) and to communities or societies i.e. social regulation (e.g. social norms, company policies, committee guidelines, board regulations, etc.).

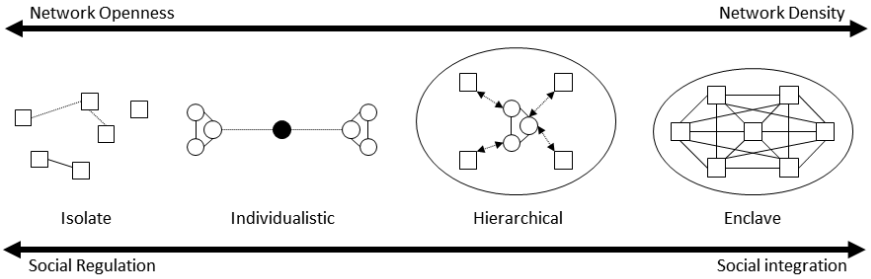


Figure 2 Openness/density continuum of network structures
Source: Goodwin et al. (2004)

Table 1 Network structure descriptions

Type of network	Description
Enclave	It is characterized as a densely knitted group with a high level of social cohesion based on common interests. It exhibits high equality between members, but also are highly bounded to the exclusion of others.
Hierarchical	It has as organizational "core" that has the authority to regulate the work of the network members. It is often controlled by a steering group and is successful at coordination and control. Over-regulation and over-bureaucratic procedures and limit its ability to innovate.
Individualistic	A single individual (or organization) develops an association of affiliates in order to achieve a certain task. Managerial control of information and/or resources provides the organization with the power to shape the network. It tends to be innovative, flexible with the capacity to respond to change as membership is fluid.
Isolate	It is a network that has few bonds of accountability to others. Its members exhibit characteristics that are independent of each other. It has the power to effect change and control over its activities and resources in addition to useful and reliable information.

Source: Goodwin et al. (2004)

In the context of network density, it would insinuate that dense network structures favour connectedness, where connectedness or "social integration" implies ties that "*give meaning to an individual's life by virtue of enabling him or her to participate in it fully, to be obligated and to feel attached to one's community*" (Berkman et al., 2000:849). On the other hand, open network structures support brokering or "controlling" (Antcliff et al, 2007), where controlling or "social regulation" implies means of bridging the gaps between

groups to allow for "*access to a broader diversity of information and ... experience in translating information across groups*" (Burt, 2004:354). Following this, the concept of open and dense network structures coincide well with network structures of Goodwin et al. (2004) (see Figure 2 and Table 1 below).

To further understand the characteristic patterns of relationships that a network can possess, focus can be directed to Spink and Merrill-Sands (1999) where they identify specific elements that ensure a strong foundation is developed among organisations in collaboration: (1) compelling vision, (2) shared problem definition and approach, (3) power equity, (4) interdependency and complementarity, (5) mutual accountability, (6) attention to process, (7) communication linkages, (8) explicit decision-making process, (9) trust and commitment, and (10) credit and recognition. Spink and Merrill-Sands (1999) place emphasis on the interdependence of these elements to the extent that the successful implementation of the elements will lead to "*the creation and development of an open and trusting environment*" (Franco and Estavão, 2010:604). A detailed desciption of these elements can be seen in Figure 3. Hence, using Spink and Merrill-Sands' (1999) network characteristics, a further understanding can be gained of network structures of Goodwin et al (2004) in terms of how the different structures behave by looking at their patterns of relationships.

3. Policy-Driven Inter-Organisational Networks as Context

Inter-organisational networks can often significantly be inter-institutional in nature, as they involve more than just firms. "*Public research institutes, government agencies, academic institutions and individual researchers participate with firms to create and further knowledge and innovation*" (Thompson, 2004:6). "*Traditional theories of government intervention were not developed with network facilitation in mind*" (Hämäläinen and Schienstock, 2000:34). However, "*with the growing importance of networks increasingly recognised by governments over the recent years, different types of policy measures have been developed to facilitate the creation and efficient functioning of inter-organisational networks*" (Hämäläinen and Schienstock, 2000:33). Further, "*many important complementary resources of networks – such as university research infrastructure, industry contacts and inter-nationalisation facilities etc. are already efficiently provided by national governments*" (Hämäläinen and Schienstock, 2000:55). In this light, the MSC Malaysia flagships offer an appropriate setting to study inter-organisational network structures for innovation.

The background literature provides for several aspects that can be investigated to understand the structures of inter-organisational networks. There are studies about different conditions that influence the formation of networks, issues related to power, communication, equity, etc. But these studies are among organisations that have a structure - there seem to be minimal studies in the context of inter-organisational networks formed by policy, as with no predetermined structures available for investigating issues. Given these issues, network of Goodwin et al. (2004) structures in combination with Spink and Merrill-Sands' (1999) characteristics allows for an appropriate framework to investigate the network structures that emerge in the MSC flagship consortia (see Figure 4).

IV. Research Methodology

The research setting chosen, viz. the MSC flagship consortia, involved a highly dynamic environment and warranted for such a design that entailed an exploratory approach; hence the research design was based on case study methodology. The study was guided by "*the identification of data patterns for subsequent cross-referencing with literature for conceptual clarification*" (Human and Provan, 1997:372) towards enabling a recommendation of findings.

Both secondary data and primary data have been used to collect the information for developing the cases. Primary data was collected from interviews of selected respondents, recorded and conducted via face to face. The interviews went on between 30 and 150 minutes. The interviews for the case studies were conducted between July 2005 and December 2006. The primary researcher had the sole responsibility over the data collection. The selection of interviewees was founded based on that they were key employees working in organisations that were the selected MSC Malaysia inter-organisational flagship networks.

Four classes of respondents, totalling to 40 individuals, i.e. top management, managers, operational personnel and external parties (e.g. consultants, financiers, advisers, etc.) made up the study. There were 17 respondents from the GMPC network, 11 from ePerolehan and 12 from Telehealth.

The top management individuals had been involved in all aspects of the business; hence, the assumption that they possessed the necessary information of their organisations' strategy and administration. The other respondents shed light on the dynamics and administration aspects of their respective flagship networks.

Characteristics	Description
Compelling vision	Networks need members and leaders who can develop compelling visions, a strong sense of purpose, and trust and commitment among the members and their home organizations. A shared vision and sense of purpose is what holds the network together. It defines the problems to be addressed and the strategies to be used. It defines the scope of work, clarifies boundaries and helps to keep the network from straying off the original intent.
Strong and shared leadership	Network members need leaders who can portray their eagerness to develop a collaborative relationship and build a shared ownership of the problem and outcome. These leaders need to help the network develop the shared vision, see the potential for the network, address the different interests of the organizations and facilitate the management of boundaries and resources. Leadership of this nature will help the members understand and appreciate the different motivation and interests, concerns, and social and cultural norms of their network members and their home organizations. Leaders can instill trust at the onset of the relationship via various means: (1) involving others, (2) using input or opinions of the members, (3) demonstrating a willingness to explore new ideas, (4) being honest, (5) showing a willingness to exchange ideas, (6) exhibiting sensitivity e.g. toward cultural and emotional matters.
Shared problem definition and approach	Network members need to be involved in the initial definition of the problem being addressed. Agreements must be reached on the specific problem to be solved, the analytical framework(s) to be used to solve the problem and strategies for implementing the agenda. In order to create a shared definition of the problem, each member must make the effort to understand the problem from the other members' point of view. It requires time and commitment to learn how each member's culture (both organizationally and individually) and professional discipline shape its cognitive approach and contribution to the problem definition and implementation approach.
Power equity	All parties need to feel they are respected by the other members and that their contribution is valued. Each organization needs to feel it can influence the direction and focus of the of the network's vision and strategy. Often an organization can feel intimidated by other members' positions and affiliations. Some important behavioral factors to consider in creating power equity are: (1) active and full participation; (2) information sharing; (3) negotiate priorities; (4) clear assignment of roles and responsibilities; and (5) equitable distribution of funds and other resources. There also need to be a process whereby each member can freely express and discuss their organization's assumptions and then collectively agree on what each can expect from the relationship These discussions contribute greatly toward each member organization feeling empowered and valued.
Interdependency and complementarities	Members need to see their interdependency early or in the formation of the network. The interdependency is especially appropriate and necessary when the challenge being addressed is complex and requires a broad knowledge base, new technology and diverse expertise. Each member needs to bring skills, knowledge or resources to the network that complements those of other members. Members need to see that together the network will create new value – something they would not have been able to achieve alone. This is the essence of collaborative advantage. However, while bringing resources and expertise to networks is essential, it is also imperative that an organization feels the network will advance their own strategic positions.
Mutual accountability	Given the interdependency of inter-organisational networks, success depends on each contributing member fulfilling their responsibilities and commitments in a timely fashion. Those with agreed norms and sanctions and enough power and authority vested to exercise these sanctions have a greater ability to hold members accountable than those appealing to goodwill. Other actions can also inspire, motivate and sustain members' commitment regardless of their individual interests: (1) establishing milestones; (2) developing short and long-term indicators; (3) setting quality standards; (4) identifying and monitoring results; (5) celebrating small wins; and (6) according appropriate recognition and credit to all involved.
Attention to process	This means developing and reaching agreement on guidelines that help the network members' deal with the following: (1) communications between themselves; (2) decision making and approaches to solving problems; (3) cross-cultural and non-verbal communication; (4) resolving conflicts; (5) dealing with differentials; and (6) giving and receiving feedback. Institutionalizing the role of a neutral process expert as the facilitator and selecting a facilitator who is seen as fair and competent are important aspects of paying attention to process.
Communication linkage	It is necessary to create links between the members at the senior leadership level as well with the members at the operational level. These links establish a climate for frequent and in depth information sharing, increase understanding of the scope of talent and skill each member can contribute and allow for the exploration of other opportunities for future collaborations. Nurturing there inter-organisational relationships and building rapport and interest in learning help members discover what new value they can create together. Members must continue to keep the network organization informed of progress, placing emphasis in meeting by regular contact using the various communication channels available.
Explicit decision making process	Successful collaborations have clear agreements on how the members will make decisions. The decision-making process needs to allow for active participation and consensus building and at the same time, be efficient. Agreements need to be explicit regarding how much reporting and documentation need to occur, who needs to be involved in making decisions and how quickly decisions need to be made. Real or perceived power imbalances among members can aggravate conflict and need to be taken into account when designing decision making structures.

Figure 3 Network characteristics

Source: Spink and Merill Sands (1999:6)

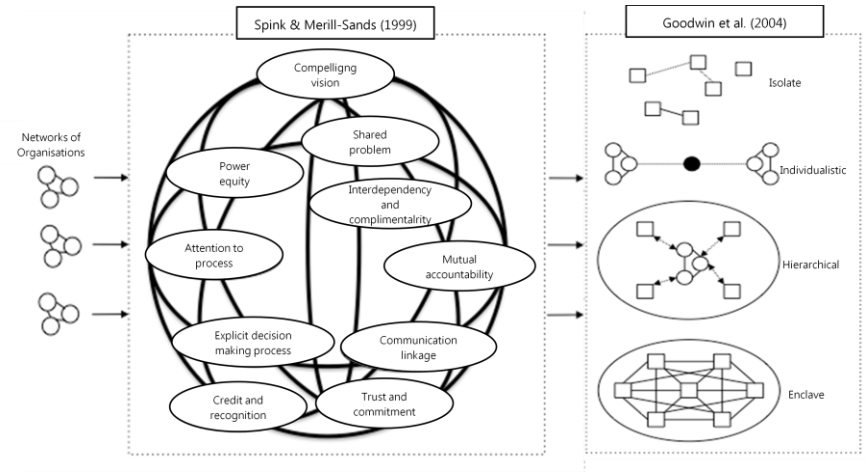


Figure 4 Research framework

The cases were analysed independently. Each network participant was an individual case study, in which evidence were derived and correlated to draw out conclusions. Distinctive behavioural patterns of each case study were drawn up using field notes and transcribed interviews. Similar patterns and conclusions were sought out in the other case studies for instances of duplication. Subsequent analysis included looking for cross-case patterns, which, in this case, among the network organisations serving the same network, and also across all networks.

As mentioned earlier, network structures of Goodwin et al. (2004) were used to map out the different inter-organisational networks in the three MSC flagship consortia and the network characteristics of Spink and Merrill-Sands (1999) to understand their dynamics. With that, a description of the MSC inter-organisational flagship consortia selected for study now follows in the next section.

V. Cases Selected from MSC Flagship Networks

The selected three MSC inter-organisational flagship consortia were the Government Multi Purpose Card (GMPC) Application (under the Smart Card Flagship), the Telehealth Application (under the Telehealth Flagship) and the Electronic Procurement (ePerolehan) Application (under the eGovernment Flagship). These three networks were selected due to public interest – where one was considered successful, the next fraught by setbacks and the third a failure.

1. GMPC Network

The Government Multi Purpose Card (GMPC) network focused on the development of the MyKad – Malaysia's national identification card. It possesses a embedded computer chip that enables applications like data processing and storage, and file management.

In May 1999, a group of organisations was awarded the contract to develop and deploy the smart card by the Malaysian. GMPC Corporation Sdn. Bhd., or the GMPC Consortium, was subsequently created, made up of 5 national and international organisations: UNISYS MSC Sdn. Bhd, CSA MSC Sdn. Bhd., EPNCR (M) Sdn. Bhd., IRIS Technologies Sdn. Bhd. and Dibena Enterprise Sdn. Bhd.

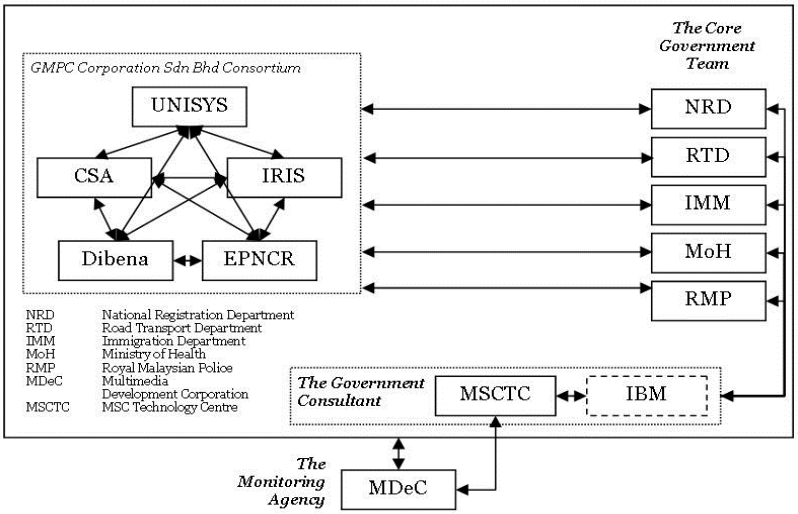


Figure 5 Mapping GMPC network

2. ePerolehan Network

The Electronic Government (eGovernment) MSC Flagship Application, launched by the Government of Malaysia, was aimed at employing multimedia technologies as mean to improve the way the Government worked. Government procurement activities were to be streamlined along with the improvement in the quality of service under the flagship's electronic procurement, or ePerolehan, project. Traditional manual procurement processes were to become electronic procurement processes on the Internet.

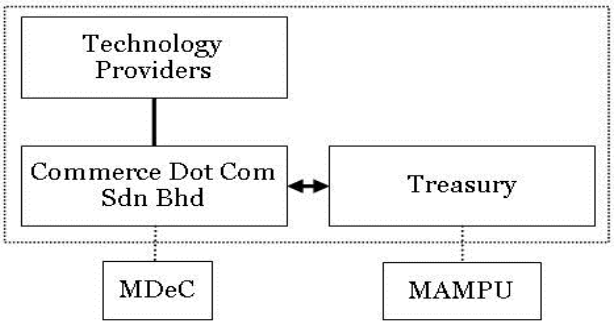


Figure 6 Mapping ePerolehan network

In 1999, Commerce Dot Com Sdn. Bhd became the appointed ePeolehan vendor. The Malaysian Administrative and Management Planning Unit (MAMPU) was the flagship lead agency and the ePerolehan Unit, under Treasury, became the lead implementing agency. MDeC was the monitoring agency.

3. Telehealth Network

The Telehealth flagship was launched in 1997. The lead agency for the Telehealth flagship had been the Ministry of Health (MOH). "*The primary objective of the flagship had been to enable the establishment of a healthcare system that leveraged on advanced information and multimedia technologies to deliver previously unattainable healthcare services at the levels of individual, family and community*" (Syed, Goh and Zaharin, 1998: no page). The application was designed to encompass four key pilot projects i.e. (1) Customised/Personalised Health Information and Education (MCPHIE), (2) Continuing Medical Education (CME), (3) Lifetime Health Plan (LHP) and (4) Teleconsultation.

The first two were to be essentially informational and educational services

respectively targeted at the general public and the healthcare community, with major advancements anticipated in terms of services/information delivery system technology. The LHP was meant to keep a person's comprehensive medical records in databases. Teleconsultation was to cover multimedia connectivity between healthcare service providers with the objective of enhancing and extending basic work processes.

The Telehealth project commenced for open tender in early 1998. Three of the applications, namely the MCPHIE, the CME and the LHP had been awarded to one organisation – Medical Online Sdn. Bhd – which has since gone into receivership due to problems incurred while on the project. The fourth application – Teleconsultation – was awarded to Worldcare Health (M) Sdn. Bhd. MSCTC, as it had been with the GMPC network, was the appointed government consultant, with MDeC as the monitoring agency. The Ministry of Health was the lead implementing agency for the flagship.

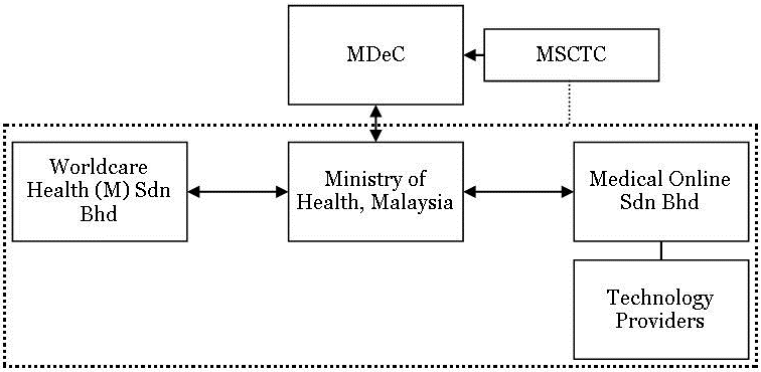


Figure 7 Mapping Telehealth network

In summary, the three consortia were formed through invitation or by the efforts of the government. On one hand, it can be understood that the dynamics involved could be different given that different products/services had been involved but, on the other hand, superficially, without an investigation, all three consortia appeared to be similar in terms of the organisations involved and the goals to deliver certain objectives. Each consortium involved some (local and foreign) business organisations, government departments and a cluster development agency. Interestingly, at the time of the investigation, press reports regarding each of the consortia had been very different.

The GMPC consortium seemed to be very successful with the product ready for market, while ePerolehan was not doing too well and Telehealth has several negative reports. The following section provides an understanding of the structural issues based on information gained from the interviews using this

study's research framework.

VI. Findings from Three Selected MSC Flagship Networks

The analyses of the three MSC flagship networks revealed a mixture of Goodwin et al's (2004) types of networks – more concisely, hybrids across the enclave, hierarchical, individualistic and isolate dimensions reflecting the dynamics of the respective network environments. The following sections are findings from the three selected MSC flagship networks, where quotes from the transcribed interviews conducted have also been inserted for descriptive purposes.

1. GMPC Network Structure and Characteristics

The GMPC network exhibited a even-handed enclave and hierarchical hybrid (see Figure 6). It depicted a "hierarchical" network in a wider context, indicated by the strong presence of the core government team and MDeC steering the GMPC consortium with singular emphasis given by the Director-General of the NRD, the lead implementing agency. The GMPC consortium also displayed certain characteristics resembling that of the "enclave" network in an inner context i.e. a densely knitted group with high equality among members. An indicator of this was the 20 percent equity held by the consortium members. At the same time, it was perceived that there were two nodal firms in the consortium i.e. Dibena as the appointed chair organisation and UNISYS as the project manager.

An enclave-hierarchical hybrid like the GMPC network, as the interviews indicated, was likely to display a clear understanding of its objective motivated by shared leadership and a common goal - "*the project must succeed for no other reason but for the Government ... other countries will be closely observing Malaysia in her attempt to pioneer the project as such a scale*". Its reporting structure was strictly adhered to by network members, despite initial protests of "*too many meetings*".

A Project Management Office was likely to enable the development of standard operating procedures and a decision-making process to be complied by the organisations - "*issues were dealt with constructively and openly*". It indicated to have had a contractual stabilising force within the network to assure the Government and the network facilitator that they did not have to be overly concerned with unnecessary power struggles – "*a forced marriage somewhat*".

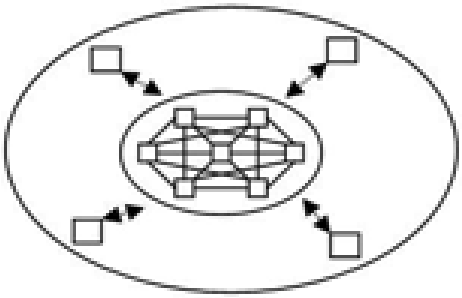


Figure 8 Enclave-hierarchical hybrid

This was a network that presumed a structure that motivated inter-dependency and complementarity - "*the GMPC consortium ... was meant to enable a cohesion of different capabilities and expertise*" - and, in turn, encouraged mutual accountability amongst the network members - "*the long term benefits of the network were what that attracted the organisation[s] to be involved and to contribute to it*". Trust and commitment were effectively developed over time and strengthened by the sharing of credit and recognition amongst themselves.

Overall, the network insinuated strong characteristics of compelling vision, a shared problem definition and approach, interdependency and complementarity, and decision-making and power equity while, notwithstanding, the other characteristics stood robust.

2. Telehealth Network Structure and Characteristics

The Telehealth network displayed a hierarchical and individualistic hybrid (see Figure 7). Individualistic networks when a single individual or organisation associates with others to do a certain task. Such networks can fail due to high transaction costs or conflict between agencies. This would describe the environment of the network organisations involved in the Telehealth project. The Ministry of Health represented the single organisation that developed an association of affiliates in Medical Online and Worldcare.

In addition, interviews indicated that the appointments of Medical Online and Worldcare Health had been emphasised by economic exchange, which meets definition of Goodwin et al. (2004) of individualistic networks. Since the project had been actively being facilitated by MDeC and led by the Ministry, this gave it a hierarchical dimension to the network. Indications pointed to the network being constrained by over-bureaucratic procedures and overregulation – indications highlighted by Goodwin et al. (2004:6) that "*can limit the ability*

to innovate and/or demotivate its membership". This was perceived to be very much the case of Telehealth, a "hierarchical" and "individualistic" hybrid.

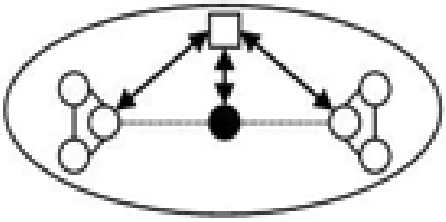


Figure 9 Hierarchical-individualistic hybrid

Hierarchical networks may be the archetype for integration but as indications revealed in the Telehealth network, they tend to be over-bureaucratic and controlling at times. However, a regulatory mechanism can obviate sub-optimal outcomes, especially in policy-driven inter-organisational networks like the MSC flagship networks, by linking network priorities directly to the priorities of the network members and subsequently fortifying interdependency among them, as suggested by Goodwin et al. (2004). It must have the aptitude to persuade network members that participating in the network will reward their time and investment within it.

The Telehealth network, a hierarchical-individualistic hybrid, had compelling vision to begin with - "*once everybody took off their company hats and started thinking as intellectuals, as people who have a contribution to make to the world of the future and to the health business of the future, we became a team*" - but eroded over time, exacerbated by a futile leadership and an unclear objective - "*the Ministry might not have understood the transformational process of the Telehealth project and the direction that it should have been heading*".

Communication channels were neither sufficiently robust nor distinct – "*I had to report to a number of parties*" – and subsequently hampered the decision-making process - "*too many stakeholders were involved in the project which itself was already a complex decision-making structure*". There was intense conflict amongst the network members irritated by the imposition of over-bureaucratic measures - "*the contract did not say that they would provide assistance but it would have helped if somebody had listened*" - which seriously impeded the evolvement of interdependency and complementarity. There were indications of a nonchalant Government that induced a lack of accountability – "*it was much easier to say that the contractor did not deliver*". Trust and commitment were likely retarded by self-interest and consequently eroded over time.

Overall, the network displayed adequate interdependency and complementarity but lacked strength in the other identified characteristics. Change management and more effective governance mechanisms should be given necessary focus instead.

3. ePerolehan Network Structure and Characteristics

The ePerolehan network offered an isolate and individualistic hybrid (see Figure 8). Individualistic networks are when a single individual or organisation associates with others to do a certain task. Procuring a 'network' of service providers through contract negotiation is an example of this. The network positions of the organisations involved in the ePerolehan initiative represented the only aspect that closely resembled an individualistic network.

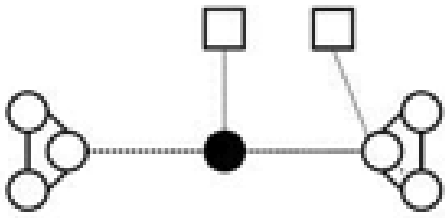


Figure 10 Isolate-individualistic hybrid

Treasury, under the Ministry of Finance, via the ePerolehan Unit, represented the organisation, which developed an association with Commerce Dot Com, a service provider, to realise the ePerolehan project. Perceptions indicated that, while MDeC outwardly facilitated the project, the Government played a far more active role in contributing to the development of the project and represented the controlling member in the network.

Goodwin et al. (2004) describe isolates to be strong at regulation but weak at integration; they also tend to not be accountable to the other network members. This description resembles the ePerolehan network where the network members were aloof towards each other and possessed a minimal sense of network camaraderie.

An isolate-individualistic hybrid in the ePerolehan network, it initially displayed a lackadaisical attitude – "*they were not concentrated on the project*" - appended by an ambivalent sense of vision - "*project organisation within specific tasks was not made known to the parties involved while common cross organisation-related projects/systems was not clearly defined and shared by all parties*". The lead agency exhibited signs of lacking in capacity. Communication linkages were under-utilised - "*continuous efforts to sustain*

and boost the level of cooperation, coordination and communication had been given low priority" - and added by an indifference to process - "*standards and procedures that were to have been mandatory to ensure smooth implementation had not been developed*" –mitigated the influence of power between the organisations and exacerbated what had been an already-weak decision-making process. The role of the network facilitator was relegated to being non-consequential - "*the parties do not regard MDeC as value-added*"- which denoted a lack of interdependency and complementarity culminating into minimal bonds of accountability - "*parties were left to their capability and experience to draw up or suggest solutions*".

Ultimately, due to unnecessary competition and conflict between the network members, the capacity and motivation for joint innovative working was resisted, which resulted in insufficient trust and commitment. Nevertheless, such a network's circumstances could be greatly improved if the Government and the network facilitator had been open to introducing aggressive change management tactics, improved contractual terms and conditions and more proficient communication channels. It is possible that an institutional mechanism can fail to preserve such a network structure and instead be relegated to an almost negligible role – a role which can effect better results if a mandate is strictly exercised to administer the network organisations based on mutual accountability. In such a network, the network members tend to not be sufficiently motivated by regulation and governance in their network – instead, according to Uzzi (1996), motivation is likely to come from the original reason of the exchange. Overall, in the ePerolehan network, characteristics of compelling vision and, interdependency and complementarity were prevalent. The other characteristics stood adequate.

4. Summarising Three Cases

Summarising, while the GMPC network displayed predictable characteristics in lieu of a stable network structure, the ePerolehan network only began to possess significantly positive characteristics after it overcame project obstacles. On the other hand, the Telehealth network had commenced operations impressively but deteriorated over time, resulting in a major restructuring of a bulk of the project deliverables and winding-up procedures for one major service provider. Figure 11 below illustrates the overall findings.

It is perceived that these were very difficult challenges to effective collaboration – because of strong interpersonal, leadership and management skills, a desired collaborative advantage can be unlikely to derive out of the collaborative relationship (Spink and Merrill-Sands, 1999). This follows that different networks function on different portfolios of network characteristics

but on a common note, a foundation of the characteristics has to exist before a climate of joint innovative working can develop within the networks.

It is also perceived in this study that the network manager, despite being one and the same for the three selected flagship networks, played substantially different roles respective to the networks it served. For the GMPC network, the respondents highlighted the active role played by MDeC in managing the network. Respondents perceived that MDeC succeeded, as a network manager, in being committed to the network. In the ePerolehan network, respondents highlighted that the network manager lacked responsibility. Respondents observed that the network gradually discounted MDeC over time. As for the Telehealth network, respondents highlighted about how "*MDeC did not take a proactive role*". They perceived MDeC, as network manager, had been ambiguous to the network.

VII. Conclusions

The analyses of the three MSC flagship networks revealed a hybrid of Goodwin et al's (2004) networks – combinations of the enclave, hierarchical, individualistic and isolate forms resulting from their respective network dynamics. The GMPC network exhibited the enclave-hierarchical hybrid, the Telehealth network a hierarchical-individualistic hybrid and the ePerolehan network an isolate-individualistic hybrid.

The most significant discovery had been that network types only began to take shape after the organisations became accustomed to their roles in their respective networks. This had been evident in the three flagship networks. This was perceived to be the reason why the networks initially found it difficult to synchronise the availability of human and material resources with the requirements of the networks' various tasks. Acknowledging the network type can lead to defining a better network structure for organisations to leverage on. An illustration of the networks in Figure 11 denotes the difference among the three MSC Malaysia networks.

Different networks exhibit different characteristics. In addition, the study offers evidence that networks need to be managed to ensure that prime results can be achieved and it is especially significant for policy-driven networks where national initiatives and policies are imperative. This brings to mind the role of a network manager. Such an individual (or organisation) will be able to administer the social organisation of the network. It is suggested that the network manager will be the one to put into place the foundation elements necessary for a network to develop the characteristics towards creating an environment that is conducive for the network members to learn and benefit. Thus, both the network manager and the network (including its members) must

be committed to the norms of cooperation and must work towards accomplishing network and organisational goals (Human and Provan, 1997).

As a final word, from literature's point of view, the paper provides an application of a framework that combines network structures of Goodwin et al. (2004) with Spink and Merrill-Sands' (1999) characteristics that can be useful to identify and analyse the types of network structures that emerge in inter-organisational projects. The paper has the obvious limitations of the case study methodology. The paper is based on three cases, all from the MSC Malaysia initiative and related to the Information and Communication Technology (ICT) cluster. Nonetheless, the findings from these cases can be seen as indicative and are hoped to provide lessons for other emerging countries that are embarking on similar projects i.e. cluster-oriented developments with policy-driven inter-organisational networks. These findings are seen as particularly useful when emerging countries invest in technology-related projects and invite multinational companies to work together with local firms.

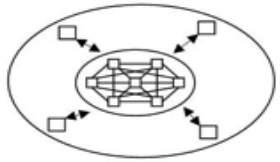
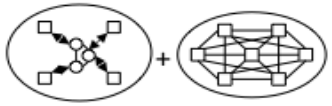
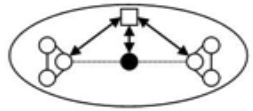
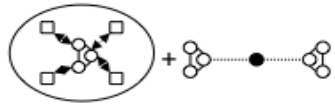
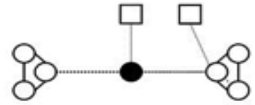
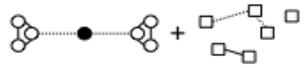
Network structures / Characteristics	 GMPC network  Hierarchical + Enclave	 Telehealth network  Hierarchical + Individualistic	 ePerolehan network  Individualistic + Isolate
Compelling vision	★	✔	≈
Shared problem	★	=	✖
Shared leadership	★	=	✖
Interdependency and complementarity	★	✔	=
Mutual accountability	★	=	≈
Explicit decision making process	★	=	✖
Communication linkages	✔	=	✖
Power equity	★	=	✖
Attention to process	✔	=	✖

Figure 11 Research framework

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