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Innovation Value Chain as Antecedent of Service Innovation Management Practices: Experience from Malaysian Telecommunication Sector

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ABSTRACT

Hansen and Birkinshaw (2007) have quoted that the innovation value chain should be end-to-end approach to generate, transform and disseminate ideas. These new ideas may be incorporated in the system for novelty and creativity which simultaneously leads to innovation. Today, service industry dominates manufacturing industry in the world and service innovation should be a part and parcel of organizational performance. The primary purpose of the present study is to investigate the influence of innovation value chain on service innovation management practices as per SPOTS model (strategy, process, organization, tools/technology, and system), in the context of Malaysian telecommunication sector. A questionnaire survey was conducted with 249 respondents (high level employees) of major telecommunication sectors in Malaysia. The respondents were completed a minimum of one innovation project and have three years of experience in dealing with service innovation projects. The findings of the study revealed that the idea generation is significantly influencing on strategy and organizational innovations. Also, idea diffusion is a strong predictor of practicing all dimensions of SPOTS namely: strategy, process, organization, tools/technology, and system. Surprisingly, idea conversion is not influencing the SPOTS practices. It could be due to the fact that the implementation of idea conversion leads to trial and error method of experimenting immediate viable products and best practices which is challenging in terms of funding for any organization. Further, there are a few researches in the literature, testing the influence of innovation value chain on the practices of SPOTS practices, hence the present article would facilitates to understand the service innovation in a holistic way.

Keywords: Innovation Value Chain, Service Innovation Management, SPOTS Model, Telecommunication, Malaysia

1. Introduction

Today, service industry has taken over the manufacturing industry in the world and therefore the service innovation should be considered as a major driver for organizational performance. The service innovation acts as a modern approach of innovation and firm effective capability to sustain and gain competitive advantage (Davila *et al.*, 2004; Cetindamar and Ulusoy, 2008; Pawanchik *et al.*, 2011). Similar to other industries, telecommunication industry recognizes innovation as an effective business strategy to strive for cost reduction, and improve the overall performance, productivity, and growth (Taghizadeh *et al.*, 2013). According to the past studies, the growth and performance of any organization are related to the well managing of innovation 'best practice'(Tidd and Bessant, 2009; Lin *et al.*, 2010; Gunday *et al.*, 2011).

Being the second largest mobile user among Southeast Asia after Singapore (Market Watch, 2012), the Malaysian telecommunication industry possess certain features which has been influencing the

success of innovation management. Thus, it would be significant to study the aspects of innovation management in the Malaysian telecommunication industry and understand factors that drive the service innovation management practices. However, the questions arise on the type of activities and practices that facilitate management to successfully implement the innovation. According to Hansen and Birkinshaw (2007) company must follow the innovation value chain which brings the process of idea generation, idea conversion, and idea diffusion to signify the end-to-end process for new service development. These new ideas may be incorporated into the system for novelty and creativity which simultaneously leads in well managing of innovation. In service innovation management literature, SPOTS (strategy process, organization, tools/technology, and system integration) model has been identified as management best practices in service industries for new service development (Hull, 2003; Hull and Tidd, 2003a). Therefore, the primary purpose of the present study is to investigate the influence of innovation value chain on service innovation management practices in the context of Malaysian telecommunication sector. The result of this research may serve as a guide to the telecommunications industry on innovative practices and may be customized for the applications of other service sectors in Malaysia.

2. Development of key concepts

2.1. Innovation Value Chain

Innovation value chain is a fundamental instrument of growth strategies in an organization in order to increase the existing market share, compete in the market place, and enter new markets (Gunday *et al.*, 2011). Tidd *et al.* (2001) noted that an innovation process should be managed effectively from idea generation to commercialization. There are different classifications of the innovation value chain process in the literature. The pioneer of the innovation process model was Cooper (1988) who developed the Stage-Gate model as a blueprint for managing the new product process. In this model, there are five stages to discover opportunity and generate new idea including scoping, building the business case, developing, testing and evaluating, and launching. The Stage-Gate model is an operational roadmap for new product development from idea to launch which provides structure and discipline to facilitate the process of innovation, allows faster development of innovation, and provides gates to control innovation resource decisions.

On the other hand, Sundbo (1997) classified innovation value chain in four stages including idea generation, transformation, development, and idea implementation. Sundbo (1997) emphasised on individuals in the organization which plays a main part of the innovation as they get the new ideas from different parts and bring it to the firms. If the idea is matured, the top management makes a decision for processing and a project's group develops the idea into a prototype including the investigation of the potential market. After getting success in the potential market, the new service/product will be commercial in the market place.

However, the current study focus on the innovation value chain based on the Hansen and Birkinshaw (2007). comprehensive framework. The framework classifies the innovation value chain into three-phase process namely; idea generation (in-house sourcing, cross-unit sourcing, and external sourcing), conversion (selection and development), and diffusion (wide spread of the idea). The framework provides an end to-end view of the commercial benefits to the firm from accessing and creating knowledge, building innovation and commercializing. Hansen and Birkinshaw (2007) have argued, "rather than reflexively importing innovation best practices, managers should adopt a tailored, end-to-end approach and process for generating, converting, and diffusing ideas". This model enables managers to find the company's weaknesses and be more aware to perceive which innovation approach to implement. Further, it can be scaled with sectoral level. This brings in potential for different distributions of innovation activity within individual sectors and inter-sectoral comparison (Gamal *et al.*, 2011).

2.1.1. Idea Generation

Idea generation is a mechanism that facilitate in creating and sourcing new ideas from internal and external environment receptively in order to achieve competitive advantage of a firm in a market place. In other words it can be said that idea generation is a knowledge creating and sourcing activity. However, it is a prerequisite for the companies to be decentralized in order to adopt such activity for the innovation process. According to (Hansen and Birkinshaw, 2007; Roper *et al.*, 2008), idea generation or collaborative process of knowledge sourcing for the creation of innovation can happen inside a unit of firm, cross-unit, or from external sourcing. Managers might seek inside of the company's group to find creative idea or cross unit collaboration to develop new products and services. The external linkage of idea generation might be promoted by the consumer feedback, competitors, universities, investors,

suppliers, scientists, and independent entrepreneurs (Hansen and Birkinshaw, 2007; Panesar and Markeset, 2008). In service industry, especially, consumer involvement is a core source for new idea generation and the weak engagement of the consumer makes it easy for competitors to imitate service product quickly (Sundbo, 1997).

2.1.2. Conversion

After generating good ideas, it is important for manager to know how to handle them. Conversion is sub-categorized by selecting and screening the best idea and developing them to the practice considering budget criteria (Hansen and Birkinshaw, 2007). Conversion involves knowledge transformation to develop codified innovation like, new process, service or organizational forms. Based on Roper *et al.* (2008) this level may include the use of multi-skill teams and different forms of external partners in the process of building innovations. In addition, managers should consider company's tight budget, strict funding criteria, and traditional thinking in order to avoid shutting down the most novel ideas Hansen and Birkinshaw (2007).

2.1.3. Diffusion

The spread of the idea across the organization determines how the firm is good in diffusing developed idea. Companies should find the relevant communities in the organization to support and spread their new product/services, process, and practices across geographic location, consumer groups and channels Hansen and Birkinshaw (2007). This stage includes different forms of consumer involvement as well as internal spending on branding and reputation and the use of intellectual property protection (Roper *et al.*, 2006).

2.2. Spots Model

Scholars affirmed that although innovation management is complex and highly dynamic in nature, it demands effective managerial judgment and decision making (Milling, 1996). Literature on innovation reveals that the growth and performance of any organization depend on an efficient management of innovation in a competitive environment (Tidd and Bessant, 2009; Jiménez-Jiménez and Sanz-Valle, 2011). Tidd *et al.* (2001) observed that successful innovation management involves interaction between changes in technology, market and organization. Thus, Tidd *et al.* (2001) developed SPOTS model to measure management practices with regard to innovation. SPOTS stand for strategy, process, organization, tools/technology, and system integration. In this model, multiple functions in service development cycles are simultaneously integrated starts from the earliest stages of service development task using structured processes and facilitating tools for launching new services (Hull, 2003). Concurrent function reduce the time required for developing and launching new services which enhance service quality for ensuing firm competitiveness (Collins and Hull, 2002). This theoretical model enables firms to better compete in a competitive environment requiring innovative changes in services (Hull, 2003).

Strategy- Innovation strategy is developed based on the principles of rapid, reiterative, redevelopment (RRR) as well as novelty which is instrumental in driving the development of novel services for improvement of firms performance (Hull and Tidd, 2003b; Hull, 2004).

Process- Innovation process integrates and incorporates all organizational members that help firms achieve higher level of innovation (Damanpour *et al.*, 1989). Innovation process involves an organized and formal approach (Hull and Tidd, 2003a) which can be driven by the process of new service development.

Organization- In innovative organisation, people interact in a coordinated fashion from the upper to the lower steam along the value chain including the final clients (Hull, 2004). An innovative organization organize and integrate the collective efforts of a number individuals representing the various functional areas towards achieving a common innovation goal (Kotelnikov, 2001).

Tools/technology- Computer information technology (CIT) makes communication faster and effective by creating a congenial environment in which team workers feel free to communicate between themselves (Klein and Dologite, 2000). As a part of tool, CIT not only increase the frequency of cross-functional team member's communications in the value chain, but also continuously updates the process of product/service development cycle among cross-functional team members (Collins and Hull, 2002).

System- Innovative system integration enables firms to explore and design the new service/product base and respond to consumers dynamic needs (Hull and Tidd, 2003b). System integration comprises 'win-win' relationship with external parties for gathering detailed knowledge towards enhancing performance (Liker *et al.*, 1999).

3. Hypotheses Development and Research Framework

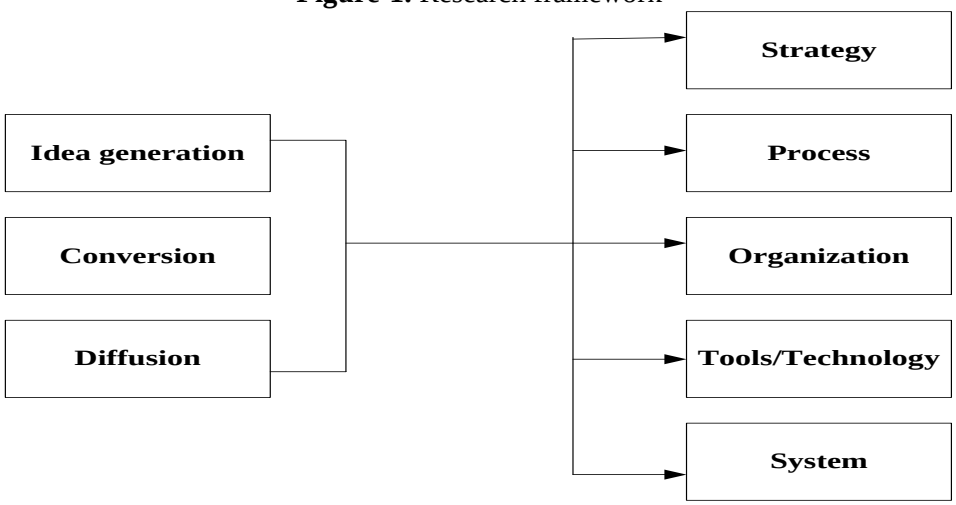
Innovation practice is not a simple task to do; it requires a range of activities to be accomplished during the practices and before starting such practices. If any company willing to adopt the innovation practices into their organization, what activities will drive them to institute innovation practices is a critical question. Typically, the innovative companies practice the SPOTS model to get better performance in the competitive market, however innovation cannot be undergone or happen in standalone environment. Standalone environment indicates where companies limit themselves within their organizational boundary, that just focusing inside the company, or rely on internal R&D. In today's competitive world, management must go beyond the own sphere and get connected with external environment more profoundly. This study suggests that the process of innovation value chain may facilitate the management practices (SPOTS) regarding to the new service development.

Without having an innovation value chain (idea generation, conversion, and diffusion), it may bring difficulty for managers in well practicing of SPOTS. For instance, new idea can facilitate SPOTS practices if different sources are involved in sharing knowledge. As Hansen and Birkinshaw (2007) stated that a company should carryout innovation value chain in order to success in innovation and further ensure market performance. Idea conversion which focuses on selection and development can act as an instrument for better SPOTS practices. Further, diffusion of idea which leads to get feedback from the stakeholder may bring the greater chance of best practices for new service development. According to the pervious study, the innovation process require controls from management in a best way for new service development Panesar and Markeset (2008). Manager's control in the process of idea generation to diffusion makes firms to be objective in prices, fact driven and methodical (Tidd and Bessant, 2009). Therefore, the process of transforming ideas into commercial outputs should view by management of the innovation as an integral part of innovation practices. Thus, based on the above discussion, it is worth to test the following hypothesis:

Hypothesis 1-5- Idea generaion has positive influence on SPOTS practices
Hypothesis 6-10- Idea conversion has positive influence on SPOTS practices
Hypothesis 11-15- Idea diffusion has positive influence on SPOTS practices

Figure 1 shows the research model integrating Innovation Value Chain on the SPOTS model.

Figure-1. Research framework



4. Research Methodology

The unit of analysis in this study is telecommunication firms in Malaysia. The reason for choosing single industry is based on the argument that such selection ensures depiction of an accurate representation of a specific context as suggested by Slater (1995). Managers in marketing departments are the target subjects for this research. A total of 780 structured survey instruments were sent to the target respondents based on purposive sampling. After two follow-up a total of 258 questionnaires were returned of which 249 were deemed usable. A five-point scales from 1 represented strongly disagree to 5 represented strongly agree was used to measure the responses. All constructs and the items were adapted from extant literatures and were modified to suit the purpose of this study. Innovation value chain with

total of 13-items are adapted from Hansen and Birkinshaw (2007). SPOTS related measurements with total of 26-items were adapted from Hull (2004); Hull and Tidd (2003a); Tidd and Bessant (2009). Partial Least Squares (PLS) structural equation modeling (SEM) were applied to estimate the measurement and structural model of this study using the software application SmartPLS 2.0 (Ringle and Wende, 2005). The results were presented in three steps. Firstly, the Harman single factor test was performed to test the existence of common method bias in the study. Secondly, the results of the measurement model were assessed and discussed. Thirdly, the results of hypothesis hypothesized in this study were assessed through the examination of the structural model.

4.1. Assessment of the Measurement Model

To ensure that there is no Common Method bias in the questionnaire survey, Harman's single factor test was performed which revealed that the first factor accounted for 31.7% of variance which is less than threshold level of 50% of total variance explained (Podsakoff *et al.*, 2003). To assess the measurement model, convergent validity and discriminant validity were examined. As shown in Table 1, the convergent validity that includes indicator loadings, average variance extracted (AVE), composite reliability (CR) were tested. Results show that indicator loading for all items exceeded the recommended value of 0.5 (Chin, 1998). AVE were in the range of 0.585 and 0.702 which exceeded the recommended value greater than 0.50, and the CR ranged from 0.849 to 0.934 which exceeded the recommended value of 0.7 (Hair *et al.*, 2010).

Table-1. Results of measurement model

	Variables	Items	Loading	AVE	CR
Innovation value chain	Idea generation	IG1	0.867	0.653	0.881
		IG2	0.874		
		IG3	0.808		
		IG4	0.664		
	Conversion	CON1	0.772	0.585	0.849
		CON2	0.828		
		CON3	0.726		
		CON4	0.730		
	Diffusion	DIF1	0.842	0.691	0.870
		DIF2	0.807		
		DIF3	0.845		
Service innovation management practices	Strategy	STR1	0.786	0.618	0.865
		STR2	0.867		
		STR3	0.811		
		STR4	0.667		
	Process	PRC1	0.728	0.618	0.890
		PRC2	0.763		
		PRC3	0.821		
		PRC4	0.820		
		PRC5	0.794		
	Organization	ORG1	0.794	0.648	0.902
		ORG2	0.863		
		ORG3	0.856		
		ORG4	0.798		
		ORG5	0.706		
	Tools/technology	TOL1	0.802	0.631	0.895
		TOL2	0.888		
		TOL3	0.834		
		TOL4	0.762		
		TOL5	0.670		
	System	SYS1	0.794	0.702	0.934

Continue

Variables	Items	Loading	AVE	CR
	SYS2	0.859		
	SYS3	0.859		
	SYS4	0.856		
	SYS5	0.820		
	SYS6	0.840		

AVE=Average variance extracted; CR= Composite reliability; One item (STR5) was deleted for cross loading.

The discriminant validity was then tested. It was assessed by examining the correlations between the measures of potentially overlapping constructs suggested by Fornell and Larcker (1981). As shown in Table 2, this study presents that the square root of AVEs are greater in all cases than the off-diagonal elements in their corresponding row and column, suggesting that the required discriminant validity has been achieved. In total, the measurement model demonstrated adequate convergent validity and discriminant validity.

Table-2. Discriminant validity of constructs

	IC	ID	IG	Organization	Process	Strategy	System	Tools
IC	**0.765**							
ID	0.677	**0.831**						
IG	0.613	0.525	**0.808**					
Organization	0.268	0.297	0.294	**0.805**				
Process	0.201	0.261	0.154	0.586	**0.786**			
Strategy	0.466	0.547	0.426	0.421	0.491	**0.786**		
System	0.213	0.303	0.151	0.476	0.520	0.475	**0.838**	
Tools	0.156	0.290	0.185	0.544	0.548	0.502	0.653	**0.794**

Diagonals (in bold) represent the average variance extracted while the other entries represent the squared correlations. IC= Idea conversion; ID= Idea diffusion, IG= Idea generation

4.2. Assessment of the Structural Model

We proceeded with the path analysis to evaluate the structural model. The primary evaluation criteria for structural model are the R^2 values and the level and significance of the path coefficients (Hair *et al.*, 2011). The R^2 value for strategy is 0.331, process is 0.069, organization is 0.115, tools/technology is 0.092, and system is 0.092.

The study hypothesized that idea generation, conversion, and diffusion have relationship with SPOTS, strategy, process, organization, tools/technology, and system (Table 3). However, the result shows that idea generation has positive relationship with strategy (β=0.154, $p<0.05$), and organization (β= 0.177, $p<0.05$).

Table-3. Summary of path coefficients and results

Hypothesis	Relationship	Std. Beta	SE	t-value	Decision
H1	IG -> Strategy	0.154	0.070	2.196*	Supported
H2	IG -> Process	0.009	0.097	0.096	Not Supported
H3	IG -> Organization	0.177	0.083	2.128*	Supported
H4	IG -> Tools	0.087	0.099	0.874	Not Supported
H5	IG -> System	-0.020	0.081	0.242	Not Supported
H6	IC -> Strategy	0.104	0.070	1.479	Not Supported
H7	IC -> Process	0.039	0.104	0.379	Not Supported
H8	IC -> Organization	0.040	0.098	0.402	Not Supported
H9	IC -> Tools	-0.116	0.130	0.892	Not Supported
H10	IC -> System	0.024	0.098	0.242	Not Supported
H11	ID -> Strategy	0.396	0.068	5.852**	Supported
H12	ID -> Process	0.230	0.091	2.520**	Supported
H13	ID -> Organization	0.177	0.093	1.915*	Supported
H14	ID -> Tools	0.323	0.083	3.887**	Supported
H15	ID -> System	0.298	0.085	3.490**	Supported

IG=idea generation; IC= idea conversion; ID= idea diffusion, * p<0.05, ** p<0.01, bootstrapping (n=5000)

Conversion does not have any relationship with SPOTS practices. In contrast, Diffusion has strong relationship with all five practices; strategy (β= 0.396, p<0.01), process (β= 0.230, p<0.01), organization (β= 0.177, p<0.05), tools/technology (β= 0.323, p<0.01), and system (β= 0.298, p<0.01).

5. Conclusion and Limitations

The presnt study looked at the relationship between innovation value chain and SPOTS practices which has never been explored in extant literature. The current study examined this relationship to assess the influence of innovation value chain on service innovation management practices in telecommunication sector. Literatures argue that the innovation value chain provides a structure for managers to sort out which approaches make the most sense for their companies to adopt (Hansen and Birkinshaw, 2007).

The findings of the study reveals that two stage of innovation value chain namely idea generation and idea diffusion, support the SPOTS practices in Malaysian telecommunication industry. Details of the results show that the idea generation is significantly influencing on innovation strategy and innovative organization. The mechanism that enable to create and source ideas from internal and external environment lead to formulate strategies which are competent for new service development. The approach of diversified ideas sourcing, influence to articulate prompt, unique, and novel services as part of innovation management practices. Thus, it is essential for the service industry to involve consumers as a core source for new idea generation. It is however, important to consider that weak engagement of the consumer would create scope for competitors to imitate the service product rapidly.

Further, idea diffusion is a strong predictor of practicing all dimensions of SPOTS namely, strategy, process, organization, tools/technology, and system. While the new ideas are transmitted across the stakeholders with acceptance, it is easy for the organization to chalk-out approaches for innovation, process for innovation, integration among functional areas, implementing tools/technology, and collaboration with external stakeholder. Surprisingly, idea conversion is not influencing the SPOTS practices. It could be due to the fact that the implementation of idea conversion leads to trial and error method of experimenting immediate viable products and best practices which is challenging in terms of funding for any organization.

To sum up, the above findings clearly show that an innovative service organization in a rapidly growing transitional economy such as Malaysia may not consider all three steps of innovation value chain as facilitator for SPOTS practices. The finding may provide advantages to managers to find the company's weaknesses and be more aware to perceive which innovation approach to implement. And it may serve as a guide to the telecommunications industry on innovative practices and may be customized for the applications of other service sectors in Malaysia. However, the paper is based on telecommunication industry in Malaysia which has the potential for limiting in examining across other innovative industries. This can be overcome by extending the scope of the research by using a larger database comprising responses of managers representing a number of innovative industries such as bank industry and hotel industry. Further, although this paper is based purely on quantitative methodology using established constructs, future study can be developed using a mixed methodology comprising of qualitative and quantitative approaches.

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