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Innovation value chain as predictors for innovation strategy in Malaysian telecommunication industry

Abstract

Innovation value chain is the end-to-end approach to generate, transform and disseminate knowledge and ideas. These new ideas may be incorporated in the system for novelty and creativity which simultaneously lead to innovation. The main purpose of this research is to empirically explore the influence of innovation value chain (idea generation, conversion, and diffusion) on innovation strategy in the service set-up. Further, it aims to examine the relationship between innovation strategy and innovation performance (service development and delivery process) in Malaysian telecommunication sector. A quantitative research approach is conducted with a purposive sample of 249 managers representing Malaysian telecommunication sector. The findings of the study reveal that the idea generation and diffusion are significantly influencing on innovation strategy. Innovation strategy has positive effect on service development and delivery process. The findings of this study suggest that in the formulation innovation strategy, service firms should seriously take into accounts idea generation and diffusion.

Keywords: innovation value chain, innovation strategy, innovation performance, telecommunication industry.

JEL Classification: L96.

Introduction

Today, service innovation is considered to be the major driver for organizational performance which acts as a modern approach of innovation and firm effectiveness to sustain and gain competitive advantage (Cetindamar & Ulusoy, 2008; Davila, Epstein & Matusik, 2004; Pawanchik, Sulaiman & Zahari, 2011). Similar to other service industries, telecommunication industry recognizes innovation as an effective business strategy to strive for cost reduction, and improve the overall performance, productivity, and growth (Taghizadeh, Jayaraman, Ismail & Iranmanesh, 2013). Malaysian telecommunication industry as the second largest mobile user among Southeast Asia after Singapore (Market, 2012), possess certain strategy which has been influencing the success of innovation. Thus, it would be significant to study the aspects of innovation strategy in the Malaysian telecommunication industry and understand factors that drive the innovation strategy. 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. Therefore, the primary purpose of the present study is to investigate the influence of innovation value chain on innovation strategy. Further, it aims to examine the relationship between innovation strategy and innovation performance in Malaysian telecommunication sector. The result of

this research may serve as a guide to the telecommunication industry in formulating innovation strategy which leads to innovation performance.

1. Literature review

1.1. 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, Ulusoy, Kilic & Alpkan, 2011). Tidd, Bessant & Pavitt (2001) observed 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 ideas including scoping, building the business case, developing, testing & evaluating, and launching. On the other hand, Sundbo (1997) classified innovation value chain in four stages including idea generation, transformation, development, and idea implementation. Sundbo (1997) has emphasized on individuals in the organization which plays a main part of the innovation as they get the new ideas from different quarters and bring it to the firms. If the idea is self 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 commercialized in the market place.

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However, the current study focuses 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). This model enables managers to find the company's weaknesses and be more aware to perceive which innovation approach to be implemented. Further, this brings in potential for different distributions of innovation activity within individual sectors and inter-sectoral comparison (Gamal, Salah, Tarek & Eng, 2011).

1.1.1. Idea generation. Idea generation is a mechanism that facilitates 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, 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 the literature, 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 (Hansen & Birkinshaw, 2007; Roper, Du & Love, 2008). Managers might seek inside the company's group to find out creative ideas or cross unit collaborations to develop new products and changes in existing services. The external linkage of idea generation might be promoted by the consumers feedback, competitors, universities, investors, suppliers, scientists and independent entrepreneurs (Hansen & Birkinshaw, 2007; Panesar, Singh & Markeset, 2008). In service industry, consumer involvement is a core source for new idea generation and the weak engagement of the consumer make it easy for competitors to imitate service product quickly (Sundbo, 1997).

1.1.2. 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 & Birkinshaw, 2007). The conversion involves knowledge transformation to develop 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 & Birkinshaw, 2007).

1.1.3. Diffusion. The spread of the idea across the organization determines how the firm is good in diffusing generated ideas. 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 & Birkinshaw, 2007). This stage includes different forms of consumer involvement as well as internal spending on branding and reputation for the use of intellectual property protection (Roper, Du & Love, 2006).

1.2. Innovation strategy. Innovation strategy is defined as time-cost-based strategic positioning and resource allocation in order to meet the firm's objectives (Davila, Epstein & Matusik, 2004). It involves decision about which market or technology is the best match with the organization's goals in order to deliver value and build competitive advantage. In other word, innovation strategy provides a method to identify and review new technologies, market developments, and innovation projects (Tidd & Bessant, 2009). Innovation strategy is different from the normal business strategy because it attempts to accommodate uncertainty and complexity of the environment (Dodgson et al., 2008). Uncertainty and complexity concern in the rate of change of product-markets and technologies, and also in the function of technological and organizational interdependencies (Isaksen & Tidd, 2006). As firms deal with the uncertainty and complexity, the management of innovation is required to understand and enhance the technological and market contingencies characterization that would bring an innovation opportunity.

Firms might be good at the different activities in managing innovation such as R&D, but usually they are less supported by a well-grounded innovation strategy (Dodgson, Gann & Salter, 2008). According to Oke (2007), innovation strategy delivers well-defined course of action and attempts to position the organization on a generic innovation goals. It has been apprehended that understanding the drivers of innovation needs to facilitate to develop the potentials and focal areas of innovation. Such understanding would drive towards formulating the innovation strategy (Oke, 2007).

2. Hypotheses development and research framework

Formulating innovation strategy is not a simple task to do; it requires a range of activities to be accomplished. Typically, the innovation strategy helps firms to get better performance in the competitive market. However, innovation cannot happen in standalone environment. Standalone environment indicates where companies limit

themselves within their organizational boundary, that just focus 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 firms in formulating innovation strategy which leads to performance improvement.

Without having an innovation value chain, it may be difficult for managers in designing innovation strategy. For instance, new idea can support innovation strategy if different sources are involved in sharing knowledge. Hansen & Birkinshaw, (2007) stated that a company should carry out innovation value chain in order to success in innovation and further ensure performance. Idea conversion focuses on selection and development can act as an instrument in articulating innovation strategy. Diffusion of idea which leads to get feedback from the stakeholder may bring the greater chance in formulating innovation strategy. According to the pervious study, the innovation process requires controls from management in a best way for new service development (Panesar & 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 & 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 worthwhile to test the following hypothesis:

H1: Idea generation supports firms positively in formulating innovation strategy.

H2: Idea conversion positively facilitates firms in formulating innovation strategy.

H3: Idea diffusion positively benefits firms in formulating innovation strategy.

Earlier researchers argued that innovation in organization directly and positively influence the improvement of business performance and growth (Tidd, Bessant & Pavitt, 2005). This performance and growth can be achieved by enhancements in effectiveness, productivity, quality, competitive positioning, and market share. Innovation as a firm's unique resource can lead to a sustainable competitive advantage (Barney, 1991). If the firms have highly focused on innovation, they are more successful in new products and services offering which results in greater performance improvement (Eisingerich, Rubera & Seifert, 2009) and contribute firms towards competitive advantages (Chapman, Soosay & Kandampully, 2003).

The current study is measuring innovation performance in terms of service development and delivery process. Tidd and Hull (2003) argued that innovation strategy increase the level of new service development and delivery process. Developing an innovation strategy improves a firm's performance (Hull & Tidd, 2003). In a well acknowledged study, Tidd and Hull (2003) found that there a significant correlation between innovation strategy and performance. Thus, the current study hypothesizes that:

H4: The higher level of practicing innovation strategy leads to more innovation performance.

Figure 1 shows the research model integrating innovation value chain, innovation strategy and innovation performance.

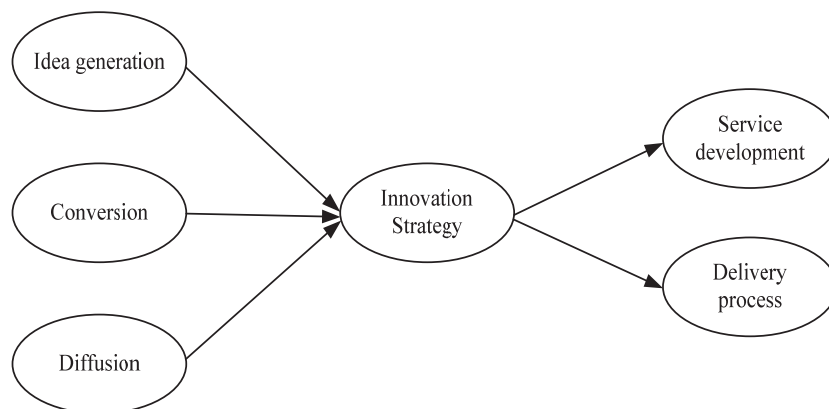


Fig. 1. Conceptual research framework

3. Research methodology and data analysis

The unit of analysis for the current study is telecommunication firm branches and outlets in Malaysia that are dynamic in terms of their service innovation orientation projects. 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 operating within the marketing departments of service firms are the target respondents for this research.

The inclusion criteria for respondents:

1. The respondents are all Malaysian citizens.
2. The unit of analysis is the branches and outlets of Telecommunication companies in the whole of Malaysia.
3. The respondents are currently having more than three years experience in the telecommunication industries in Malaysia. These industries are ranked within top-5 in the Malaysian innovative manufacturing or service sector.
4. The respondents are employees who are all managers from marketing, purchase, customer service, operations and R&D departments of the Telecommunications industry.
5. The respondents must have completed at least one innovative project in their current job at Telecommunication industry.

These five questions were used as the filtering questions in the questionnaire. Those respondents who are not qualified with the above five constraints were deleted for data analysis.

A total of 780 structured survey instruments were sent to the target respondents who were selected based on purposive sampling. After two follow-up a total of 258 questionnaires were returned of which 249 were deemed usable yielding a response rate of 33.07%. A five-point scale with 1 represents strongly disagree to 5 representing strongly agree was used to measure the study variables. All constructs and the items were adapted from extant literatures and were paraphrased to suit the purpose of this study. Innovation value chain related measurements were adapted from Hansen and Birkinshaw (2007), strategy from Hull (2004); Tidd and Bessant (2009); service development and delivery process from Hull and Tidd (2003). The structural equation modeling using partial least square (PLS) method has been employed as a statistical technique to analyze the data.

The descriptive analysis shows that the majority of the respondents 155 (62.2%) are from Kuala Lumpur followed by 33 (13.3%) from Penang. The other states participated in the survey are Ipoh, Johor, Kedah, Kelantan, Perak, Sarawak, and Selangor and their cities. Majority of the respondents' age are between 31-40 years (48.2%) followed by 21-30 years (30.5%), 41-50 years (17.3%), and 51 or above (4%). About 145 (58.2 %) respondents were male and 104 (41.8 %) respondents were female. In terms of education level, 145 (59.4%) respondents hold bachelor/honors degree, 43 (17.3%) with postgraduate/master degree, 4 (1.6%) with doctorate degree, and 54 (21.7 %) with other categories. Majority of the respondents' work experience in telecommunication sector were five years or less (41%) followed by 6-8 years (28.1%), 12

years or more (15.7%), and 9-11 years (15.3%). The working experience of the respondents in current company started from five years or less (55%), 6-8 years (22.9%), 9-11 years (6.4%), and 12 years or more (15.7%).

3.1. Results of measurement model. To ensure that there is no Common Method bias in the questionnaire survey, we performed Harman's single factor test. The result revealed that the first factor captured only 32.8 percent of the total variance which is far below 50 percent as proposed by Podsakoff, MacKenzie, Lee, and Podsakoff (2003) and therefore there is no response bias in the data. Further, the total variance explained by the 6 factors was 68.342 percent and is well above the prescribed specification of 50 percent. Since a single factor did not emerge and the first factor did not account for most of the variance, this study concludes that the common method bias was not a major concern in this study.

The testing and validation of the measurement model is reviewed. The research followed the guidelines proposed by Hair et al. (2013) in presenting the results. As shown in the Table 2, the convergent validity was examined. Convergent validity includes indicator loadings, average variance extracted (AVE), composite reliability (CR).

The question item with main loading value of 0.5 and above will be retained. The result shows that all the items have main loadings more than 0.6. While checking cross loadings, only one item of service development (SD5) was dropped since it has cross loading with other items. The AVE for each latent six variable was above 0.50. Further, the result shows that CR for each variable is more than 0.70. Hence the construct validity of the measurement model is fulfilled and is illustrated in Table 1.

Table 1. Results of measurement model

Construct	Items	Factor loading	AVE	CR
Idea generation	IG1	0.870	0.652	0.881
	IG2	0.880		
	IG3	0.804		
	IG4	0.657		
Conversion	CON1	0.769	0.586	0.849
	CON2	0.821		
	CON3	0.736		
	CON4	0.732		
Diffusion	DIF1	0.819	0.696	0.920
	DIF2	0.812		
	DIF3	0.860		
Strategy	STR1	0.667	0.566	0.866
	STR2	0.815		
	STR3	0.832		
	STR4	0.783		
	STR5	0.644		

Table 1 (cont.). Results of measurement model

Construct	Items	Factor loading	AVE	CR
Service development	SD1	0.809	0.698	0.902
	SD2	0.856		
	SD3	0.865		
	SD4	0.811		
Delivery process	DP1	0.803	0.690	0.870
	DP2	0.875		
	DP3	0.852		
	DP4	0.816		
	DP5	0.823		

Note: CR = composite reliability, AVE = average variance extracted. SD5 was deleted.

The discriminant validity is tested through cross loadings of correlations as proposed by Fornell and Larcker (1981) criterion. It was assessed by examining the correlations between the measures of potentially overlapping constructs. As shown in Table 2, this study presents that the square roots 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.

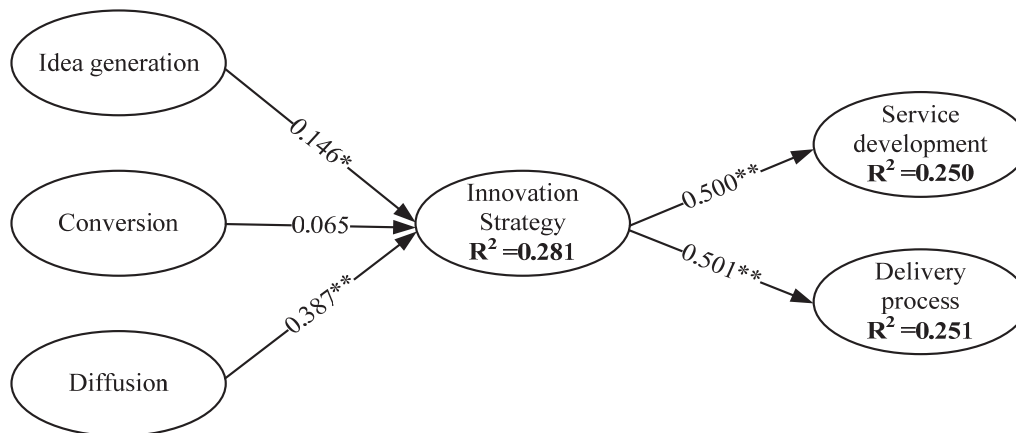
Table 2. Discriminant validity of constructs

	Conversion	Delivery process	Diffusion	Idea generation	Service development	Strategy
Conversion	0.765					
Delivery process	0.226	0.834				
Diffusion	0.681	0.260	0.830			
Idea generation	0.608	0.188	0.527	0.808		
Service development	0.235	0.660	0.244	0.170	0.836	
Strategy	0.418	0.501	0.508	0.390	0.500	0.752

Note: Diagonals (in bold) represent the squared root of average variance extracted (AVE) while the other entries represent the correlations.

3.2. Hypotheses testing. We proceeded with the path analysis to test the direct hypotheses generated in our study. Figure 2 and Table 3 present the

results. The R^2 value for innovation strategy is 0.281, service development is 0.250 and delivery process is 0.251.



Note: * $p < 0.05$, ** $p < 0.01$, bootstrapping ($n = 1000$).

Fig. 2. Results of the PLS-path analysis

The relationship of idea generation, conversion, and diffusion with innovation strategy has been tested (Table 3). The findings show that the idea generation influences positively on innovation strategy with $\beta = 0.146$, $p < 0.05$. Idea diffusion influences positively on innovation strategy with

$\beta = 0.387$, $p < 0.01$. While, there is no relationship between conversion and innovation strategy.

In relationship with performance, innovation strategy has positive influence on service development and delivery process with $\beta = 0.500$, $p < 0.01$ and $\beta = 0.501$, $p < 0.01$ respectively.

Table 3. Summary of path coefficients and results

Hypothesis	Path	Beta	Std. error	t-value	Decision
H1	Idea generation -> Strategy	0.146	0.150	2.023*	Supported
H2	Conversion -> Strategy	0.065	0.071	0.914	Not supported
H3	Diffusion -> Strategy	0.387	0.387	5.903**	Supported

Table 3 (cont.). Summary of path coefficients and results

Hypothesis	Path	Beta	Std. error	t-value	Decision
H4	Strategy -> Service development	0.500	0.502	9.753**	Supported
H6	Strategy -> Delivery process	0.501	0.504	10.866**	Supported

Note: * $p < 0.05$, ** $p < 0.01$, bootstrapping ($n = 1000$).

Discussion of results, conclusions and implications

This study looked at the relationship between innovation value chain (idea generation, conversion, diffusion) and innovation strategy. The influences of innovation strategy and innovation performance in terms of service development and delivery process are examined. The findings of the study reveals that two stages of innovation value chain namely idea generation and idea diffusion can support firms in formulating innovating strategy of Malaysian telecommunication industry. Details of the results show that the idea generation is significantly influencing on innovation strategy. The mechanism that enables 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 can influence to articulate prompt, unique, and novel services as part of innovation strategy. 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 innovation strategy. Diffusion benefits telecommunication companies in formulating innovation strategy. While the new ideas are transmitted across the stakeholders with acceptance, it is easy for the organization to chalk-out approaches for innovation. Surprisingly, idea conversion does not support firms in formulating innovation strategy. It could be due to the fact that the implementation of idea conversion leads to trial and error methods of experimenting immediate viable products and best practices which is challenging in terms of funding for any organization.

According to Gunday et al. (2011), innovation value chain is a fundamental instrument of growth strategies in an organization in order to increase the performance. In fact, in the innovation value chain, firm's culture makes it easy for people to put forward novel idea which supports innovation strategy in

service improvement and development. While firm penetrates all possible channels, it provides techniques to the firm to predict future threats and opportunity. 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 & Birkinshaw, 2007). Therefore, innovation value chain enables telecommunication companies to have a clear direction and focus on a common innovation goals.

In addition, results show that the high practice of innovation strategy increase the level of new service development and process delivery improvements. The positive influence of innovation strategy on operational performance has been confirmed in the previous study as well (Hull, 2003; Tidd & Hull, 2003). Service development and delivery process improvement can be achieved through innovation strategy in telecommunication companies. The standard practice of innovation strategy is to continue improvement in existing services through using updated information on dynamic customers' needs as well as developing novel services.

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 facilitators in formulating innovation strategy. The findings provide advantages to managers to find the company's weaknesses and be more aware to perceive which innovation approach to implement. It serves as a guide to the telecommunication 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 in examining across other innovative industries. The scope of the current research may be extended to a larger database comprising responses of managers representing a number of innovative industries such as bank industry and hotel industry.

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