

<http://ansinet.com/itj>

ITJ

ISSN 1812-5638

INFORMATION TECHNOLOGY JOURNAL

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Is It Appropriate to Apply Similar Patterns in Deploying IT-enabled Service Innovation? An Exploratory Study

David Chien-Liang Kuo

School of Continuing Education, Chinese Culture University, Taipei, Taiwan, Republic of China

Abstract: Although Information Technology (IT) is regarded as one of the key themes in service science, current literature provides little evidence in understanding the similarities of IT-enabled service innovation under different contexts. To bridge this gap, 39 projects in healthcare and banking industry receiving sponsorship from Taiwanese government during 2006 and 2012 are analyzed. Our findings show that most projects take into account the roles of new product/service development, business model design and commercialization issues, regardless innovation phases and service sectors they belong to. Meanwhile, new interface, new delivery system, new service concept and ecosystem design/alliance are spotlighted by most projects. The findings also show that those projects regarding IT as more strategic weapons do outperform than those regarding IT as passive facilitators in terms of short-term outcome. Finally, regarding differences amongst the observed projects, our findings show that features of service sectors and maturity of innovation themes do play much more important roles in determining design patterns of IT-enabled service innovation.

Key words: Service innovation it-enabled services (ITeS), service science, management, engineering and Design (SSMED)

INTRODUCTION

Importance of IT in service innovation: The significant contribution on GDP has made services dominate the economic landscape globally, thus offering tremendous potential for the growth and profitability of industries (Rust and Miu, 2006; Lin and Hsieh, 2011). Particularly, as IBM highlighted the importance of SSMED, an abbreviation of Service Science, Management, Engineering and Design, governments, industries and individual companies gradually spend their time and resources on innovation, especially on service innovation and information technology-enabled (or IT-enabled) innovative services (Lin and Hsieh, 2011).

Following this logic it has been undoubtedly transcended its traditional back-office role; IT has been evolving toward a strategic role with the potential not only to support chosen business strategies but also to shape new business strategies, instead (Henderson and Venkatraman, 1993). Therefore, in addition to process automation and procedure rationalization it does help business generate more value through Business Process Reengineering (BPR) or making business paradigm shift (Venkatraman, 1994; Laudon and Laudon, 2007).

Meanwhile, from the technology-service fusion perspective, how to deploy and manage the broader concept of service innovation has long been a vital issue. By considering how different innovation fusions can take

place from existing innovations to new innovations fused, Chang and Yen (2012) proposes a technology-service fusion innovation matrix which helps clarify four types of innovation fusions (i.e., traditional technology-fusion innovation, technology-servitization innovation, technology-enabled services and service integration innovation). Amongst them, the technology-enabled (or with much narrower focus on IT-enabled) services illustrate the use of technology to enable or to facilitate delivery of existing services with its great potential to benefit both customers and service providers (Chang and Yen, 2012).

Research goals and research questions: As mentioned above, the role of IT in business today do perform fundamentally different from its role in the 1990s. However, both innovation research and Information System (IS) research pay relatively less attention to patterns and factors that forming IT-enabled service innovation. Particularly, current literature provides little evidence in understanding the strategic roles and deployment differences of IT-enabled service innovations in different settings. In particular, the lack of understanding is especially significant in IT-enabled services (ITeS) and ITeS innovation (Chae, 2013).

It follows that less attention is paid on distinguishing between innovative IT-enabled applications and that of traditional service innovation. What is worse, from the

practical point of view, since there do exist significant differences amongst industries, technologies and application maturity, firms can hardly find reference models or practical guidelines in designing and developing innovative IT-enabled services successfully. Consequently it is of great interest in exploring the role of IT in service innovation and in distinguishing patterns of IT-enabled service innovation in different services sectors.

To fill this gap between theory and practice and to react to the development of SSMED, this paper puts its focus on whether the patterns of IT-enabled service innovation are similar for different service sectors. What IT truly serves in ITeS innovation is also explored.

In the next section, literature review on the current understanding of essentials of service innovation and roles of IT in service innovation is provided which helps highlight the potential research gap. Moreover, to offer supportive evidence and to provide practical implications, content analysis on cases belonging to two B2C service industries under the same context is conducted.

LITERATURE REVIEW

Essentials of service innovation: Service innovation plays an important role in economic growth. To spotlight the essentials of service innovation, key factors and components of service innovation are investigated.

The fundamental purpose of innovation, from its very nature, is to achieve personal, organizational and societal objectives through creating superior customer value for market segments by a sustainable strategy. Such purpose leads to more concerns of innovators on customer value creation through needs satisfaction; those customer needs neither efficient nor effective fulfilled are all covered (Anderson *et al.*, 2006; Smith and Colgate, 2007). Moreover, when the focus is on key successful factors of service innovation, current literature shows that, in addition to seizing on consumer demands and overall experience of users, successful innovative service design must address different demands and issues associated with stakeholders within the ecosystem and adequately set up its goal, type and viewpoint. However, customers may have problems articulating their needs; they can hardly imagine what they have not experienced and what they do not know (Mansury and Love, 2008).

To be in a nutshell, service innovation is extremely complex and warrants further consideration. Particularly, successful innovative service design must address different demands and issues associated with stakeholders within the ecosystem and adequately set up its goal, type and viewpoint. It follows that, how to

capture constantly changing priorities of consumers, how to design new services that incorporate new technologies and how to create new business models that generate new service value, become key issues for achieving successful service innovation.

Roles of IT in service innovation: In the context of technology-enabled services, of all technologies it is the most widely used technology by a variety of service sectors. Firms apply IT-enabled services not only to reduce labor costs and enhance service satisfaction but also to create value-added services, improve service quality and deliver services through new forms.

What is most evident is that IT has profoundly changed what customers interact with service providers. However, the role of IT does not stop here. For instance, Ashurst *et al.* (2012) argues that it is increasingly seen as an enabler of business innovation in addition to its contribution to cost savings and increased efficiency. To visualize how IT-driven innovation help differentiate the leaders from the laggards, Ashurst *et al.* (2012) identifies a number of practices from benefits-led approaches to IT that contribute to IT-enabled innovation. Simply put it is integral to a growing number of services or ITeS which is believed different from that of traditional IT services (Chae, 2013). In addition it-enabled business innovation represents a new paradigm in terms of the mindset and approach involved, thus resulting in a third IT paradigm (Ashurst *et al.*, 2012). Specifically, as Ashurst *et al.* (2012) remarks,

“The overall conclusion is that a focus on IT-enabled business innovation represents a new paradigm in terms of the mindset and approach involved. It amounts to a third IT paradigm, different from previous paradigms of technology implementation and a planned approach to benefits realization. Further work is required to explore this paradigm and how organizations make the ‘paradigm shift’ required.”

Therefore, how to see the strategic roles of ITeS, as well as how to capture the commonalities and differences of ITeS amongst contexts become unsolved but vital issues.

When the relationships between service innovation and IT are analyzed, the role of IT and patterns of service innovation may differ owing to contextual changes or different sector contexts, as argued by Santamaria *et al.* (2012). In addition to Chang and Yen (2012) technology-service fusion innovation matrix, the work done by Hertog (2000) and Froehle and Roth (2004) also provide insightful reference.

On one hand, as shown in Fig. 1, Hertog (2000) framework regards service innovation a combination of

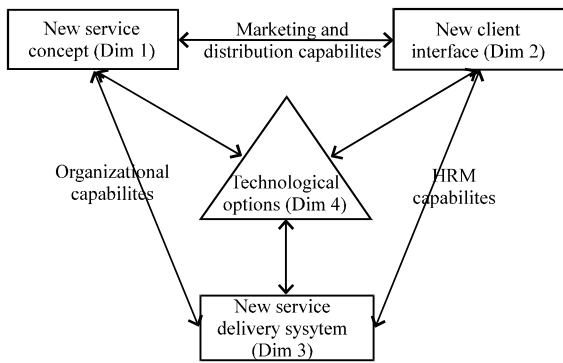


Fig. 1: Components of service innovation (Hertog, 2000)



Fig. 2: Conceptual archetypes of customer contact in relation to IT (Froehle and Roth, 2004)

four dimensions: New service concepts, new service interface, new service delivery system and new technology option. Based on this framework, service innovation is any combination of the above four. As for the role of IT, Hertog (2000) model shows that while IT would not be necessary for service innovation it itself indeed plays a crucial role in general.

On the other hand, Froehle and Roth (2004) identifies relationships between service system and IT by focusing on the context of technology-mediated customer contact. As seen in Fig. 2, Froehle and Roth (2004) regards this context as any of the following five distinct conceptual archetypes of customer contact in relation to technology: Technology-free customer contact (i.e., typifying traditional notions of face-to-face service encounters), technology-assisted customer contact (i.e., employing technology as an aid to improve the face-to-face contact while customers do not access to the technology), technology-facilitated customer contact (i.e., both the service representative and the customer access to the same technology during the face-to-face service encounter), technology-mediated customer contact (i.e., shaping a non-face-to-face contact service context) and technology-generated customer contact (i.e., technology is expected to replace the existing service provider, such as self-service technology).

RESEARCH METHODS AND FINDINGS

Research design: According to findings from Hertog (2000), Froehle and Roth (2004), Mansury and Love (2008), Rhee *et al.* (2010), Kuo *et al.* (2012) and Tso *et al.* (2013), the proposed model in telling key factors influencing the design and short-term outcome of IT-enabled innovative services can be drawn as Fig. 3 illustrated. Specifically, six factors are especially spotlighted and have been operationalized as following in this study: background of project initiator (i.e., whether this firm comes from IT sector), firm size (i.e., SME vs. large firms), category of service sectors (i.e., healthcare vs. banking and finance), focus of innovation stage (i.e., feasibility study/plan/proof-of-concept, POC vs. development/proof-of-business, POB), maturity of the theme (i.e., promoted by the government within 3 or over 3 years), approaches to realized ITeS (i.e., through alliance or not) and perceived role of IT on services (i.e., assisted, facilitated, or mediated).

Data source: Governments have realized that if the probability of market failure and investment uncertainties in technologies development can be reduced, the total social welfare can be significantly improved (Dolfsma and Seo, 2013). Consequently, many governments have developed a variety of policies (including funding, subsidies and brokerages) to stimulate successful innovations and technological development (Dolfsma and Seo, 2013). Similar practices can be also found in Taiwan. And, fortunately, many projects and firms receiving sponsorships from Taiwanese government outperform amongst firms and help generate new market potentials or so-called best practice, thus serving well as benchmarks and reference cases.

Owing to the above reason, this study selects the ITAS program, an abbreviation of "Innovative Technology Applications and Service Program", as the research target. This program, generally speaking, was initiated by Taiwanese government, started its sponsorship since 1999. Specifically, Taiwanese government promoted the importance of IT-enabled innovative services and transformation much more aggressively since 2005, themes relevant to innovative IT-enabled applications in service sectors are especially highlighted, including both B2B and B2C service industries.

For those firms which want to apply for the support, they have to submit their proposals depicting how they design and develop service innovation, identifying the uniqueness of this project worth benchmarked by peers, as well as (conceptually) proving how IT (or technologies,

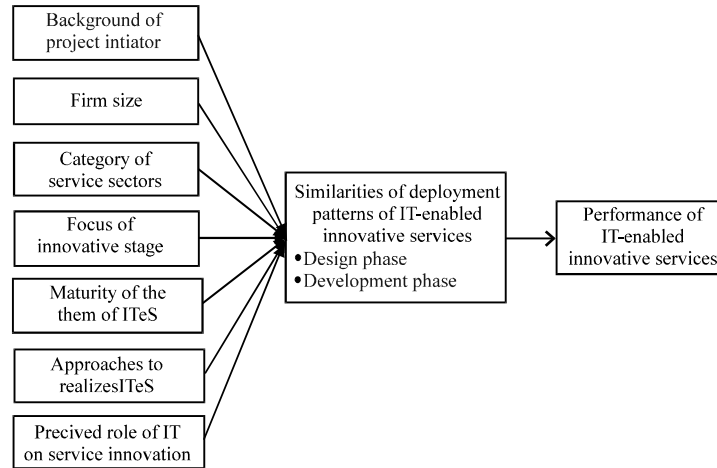


Fig. 3: Proposed research model

Table 1: Profile of the analyzed projects

	Healthcare sector		Banking and finance sector		Total
	POC	POS	POC	POS	
No. of projects					
2006-2008	11	2	8	0	21
2009-2012	1	13	0	4	18
Sub total	12	15	8	4	39
Project. Time-length					
2006-2008	8.2	24.0	5.6	0	8.7
2009-2012	18.0	21.7	0.0	13.3	19.6
Sub total	9.0	20.6	5.6	13.3	11.7
Project size (in thousand USD)					
2006-2008	71	1339	87	0	198
2009-2012	52	697	0	450	606
Sub total	69	783	87	450	386

more broadly) serves as strategic roles within projects first. These firms are then reviewed by the committee composed of business experts and academic professions. Only those firms believed technology intensive, innovative, feasible and having spilt-over effects will receive the sponsorship from government.

During 2006 to 2012, around 170 cases from 250 proposals submitted to ITAS program receive the sponsorship. Owing to the above information it is believed that projects receiving sponsorships from ITAS are representative targets for analysis.

This study selects those cases belong to healthcare sector and banking / finance sector as our target, owing to the following two reasons. First, these two service sectors are especially promoted by the Taiwanese government since 2005 when promoting the development of ITeS. Besides, these target sectors have been drawn their attention to current studies, such as Yang and Hsiao (2009) and Tso *et al.* (2013).

To answer the proposed research questions, profiles of projects, derived patterns of projects, as well as

patterns of ITeS are especially analyzed, based on the rich contents accessed from the ITAS website. Besides, owing to the limitations on the number and the distribution of available, representative project cases, cross-tab analysis is taken as the key analytical tool for content analysis and comparison.

Preliminary findings: Table 1 summarizes the profile of the observed cases. According to the information, for both healthcare and banking sectors, most projects (19/21 or 90.5%) in the early stage (2006-2008) belong to Proof-Of-Concept (POC) phase, a much less matured stage; whereas projects in the mature stage (2009-2012) are Proof-Of-Solution (POS) oriented (17/18 or 94.4%). The above pattern of project stage distribution significantly relates to the maturity/development path of innovative IT-enabled applications, in both service sectors, particularly the case of banking and finance sector.

In terms of project time-length and allocated budgets, the POC-oriented projects spend 9 months and USD 100,000 on average; whereas those POS-oriented projects

cost more time and budgets but with a huge variety, ranging from 13 to 24 months in time-length and from 450,000 to 1,340,000 USD in project size. Meanwhile, when analyzing the differences of cases between these two sectors it is found that investments of ITeS projects in healthcare sector are significantly bigger than that in banking and finance sector.

A further investigation on the background of project initiators, the projects belonging to these two service sectors are found performed significant differently. As seen in Table 2, in healthcare service sector, 80% (22/27) of the projects are initiated by service firms themselves, either in POC or in POS phase. In contrast, in banking and finance sector, most projects are all shaped by IT service providers indirectly, implying a typical ITeS pattern being applied herein. Meanwhile it is surprisingly found that those projects initiated by IT vendors tend to adopt more strategic roles of IT in deploying innovative ITeS. As for the firm size effects, our data shows that in both service sectors, SMEs tend to apply the conservative (i.e., the step-by-step) approach for deploying innovative ITeS, in comparison with the case of large firms.

Table 2 summarizes how each project reacts to dimensions relevant to service innovation proposed or highlighted by current studies on service design and deployment. First of all with respect to innovation dimensions it is found that most innovative IT-enabled applications covers more than two dimensions from the proposed four issues which echoes den Hertog (2000) argument that a typical service innovation calls for a combination of multi-dimensional design.

In addition it is found that new service/product design and new business model design are all taken into account in both POC and POS cases while new marketing model design is found less considered for both cases.

Meanwhile, when comparing the commonalities of projects between two service sectors, those projects belong to healthcare sectors are also found less sensitive to marketing model design, interestingly. Although it is believed such feature is highly correlated with two features of this service sectors in Taiwan (i.e., the non-profit nature and the policy-payment system), such a situation may lead to overlooking the in-depth understanding on (potential or unfulfilled) customer needs, therefore weakening the penetration speed of new ITeS applications.

Third, when the role of IT or the archetypes of IT-service innovation linkage is analyzed, according to Table 2, there is no significant difference between POC-oriented cases and POB-oriented projects. However it is clearly to see the differences between two service sectors. That is it-enabled service innovation projects in healthcare sectors tend to be more remote, platform oriented (i.e. it mainly serves as a facilitator); whereas those projects belong to banking and finance sectors are more relying on the direct support of IT (i.e. it serves as a mediator).

What is more with regard to the development stage, to efficient build the service eco-system, more than half (21/39) of the observed projects form strategic alliances or associations. Interestingly, in case of healthcare service sector, half of the POC-oriented projects (6/12) also regard forming strategic alliance as key issues. An in-depth analysis reveals that once the ITeS project has to develop new service concept or to explore into new markets, the importance of ecosystem design has been gradually aware and recognized by service firms in the very early stage. Finally, when the short-term outcome (or the goal setting) of these projects is analyzed, less than one-third (11/39) claims the benefit of cost saving while more than half of

Table 2: Analysis of the observed projects on different IT-enabled service innovation

Dimensions	Sub-dimensions	Healthcare sector		Banking and finance sector		Total
		POC	POS	POC	POS	
Initiator background	Initiated by IT service	4	1	8	4	17
	Initiated by SMEs	4	1	6	1	12
Supportive mechanism	Form strategic alliance	6	10	1	4	21
Archetypes/ role of IT	Assisted by IT	2	4	2	1	9
	Facilitated by IT	7	8	2	1	18
	Mediated by IT	3	3	4	2	12
Dimensions of Innovation	New services/products	12	15	6	4	37
	New business models	10	15	7	4	36
	New marketing models	9	9	4	4	26
	New in service concept	12	15	8	4	39
	New in customer interface	10	15	7	4	36
	New in service delivery system	10	14	8	4	36
Short-term outcome	New in technology selection	11	14	8	4	37
	Cost savings	3	5	1	2	11
	Acquiring new customers	9	8	1	4	22
	Generating more revenues	5	13	1	3	22
	Total	12	15	8	4	39

the projects (22/39) have preliminary success in earning new customer (or entering into new markets) and earning more revenues. An in-depth analysis shows that there is no significant difference between performance outcome of innovative ITeS projects within two service sectors.

CONCLUSIONS AND FINAL REMARKS

Conclusion and findings: As IT-enabled applications become key theme in service innovation, exploring the factors having significant influence in designing corresponding innovation patterns in service sectors become a vital issue. Undoubtedly, the initiation of SSMED by IBM has led governments, industries and individual companies gradually spend more time and resources on it.

However, both innovation research and IS research pay relatively less attention to patterns and factors that forming innovative IT-enabled applications. Less discussion is paid on the difference between innovative IT-enabled applications and that of traditional service innovation. As a consequence it is of great interest in exploring the role of IT in service innovation and in distinguishing patterns of IT-enabled service innovation in different services sectors.

By analyzing 39 cases in healthcare and banking industry receiving sponsorships from Taiwanese government during 2006 and 2012, the following findings can be identified. First of all, the findings show that most projects take into account the roles of new product/service development, business model design and commercialization issues, regardless innovation phases and service sectors they belong to. Meanwhile, new interface, new delivery system, new service concept and

ecosystem design/alliance are spotlighted by most projects. The findings also show that those projects regarding IT as more strategic weapons do outperform than those regarding IT as passive facilitators in terms of short-term outcome. Finally, regarding differences amongst the observed projects, our findings show that features of service sectors and maturity of innovation themes do play much more important roles in determining design patterns of IT-enabled service innovation.

Finally, based on the above findings, the study revises the proposed model as shown in Fig. 4. We wish such a conceptual model helpful in distinguishing patters of innovative IT-enabled applications in service sectors. We also wish such a concept model can be helpful serving as the starting point for further analysis for researchers in both IS discipline and innovation/ITeS domain.

Implications and applications: Based on the above findings, possible implications for ITeS innovation fusion and that for strategic IT management can be made as following.

First of all, according to our study it is found that the up-to-date IT-enabled service innovation replies much more heavily on IT which makes IteS itself different in its nature when comparing with what it had been proposed in the late 1980s. Therefore, to help service firms successfully leverage through ITeS, how to help service companies reshape the value position and corresponding business models and how to help them make new processes and patterns of delivery feasible and how to apply IT successfully, will become much more vital.

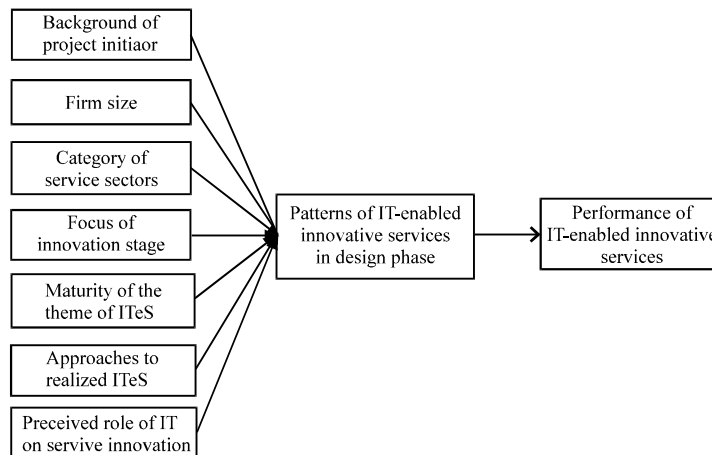


Fig. 4: Revised model

Second, this study helps distinguish differences between patterns of IT-enabled innovation in different service sectors, as argued by Chang and Yen (2012) and Dolfmsa and Seo (2013). Our finding is believed beneficial in helping governments which are interested in fostering industrial-wide development form corresponding policies to successfully promote IT-enabled service innovations for different service sectors.

Moreover it is argued that firms may apply similar patterns in developing IT-enabled service innovation, whereas they have to adopt design strategies based on contexts and their perceptions on IT. In other words, to realize the value of IT-enabled innovative services, contingent based design philosophy combined with clear development mechanisms is thus called for.

Finally, based on our findings iteS seems to follow the logic of strategic alignment while the role of IT and IT providers seem to form a new paradigm for IT-enabled business transformation. Therefore, from the strategic IT perspective, our finding is believed useful for senior IT managers forming new frameworks of strategic based IT-enabled service innovation for the forthcoming years.

Limitations and future research: Owing to limitations on data richness and representativeness (in terms of number of cases, coverage of service sectors, sources of nations and variety of data sources), as well as the rigidity of analytical techniques (in terms of coding approach, experiences of participants and number of participants) of this study, this study calls for further validation on the proposed findings. As well it is strongly suggested that future study can extend this research by resolving at least one of the limitations mentioned above for validation of the findings.

ACKNOWLEDGMENT

The author is grateful for the support from the National Science Council (NSC 100-2410-H-034-002), Taiwan, R.O.C.. The author would also like to acknowledge the comments from anonymous reviewers who have provided remarkable insights to improve the quality of this research.

REFERENCES

Anderson, J.C., J.A. Narus and W. van Rossum, 2006. Customer value propositions in business markets. *Harvard Bus. Rev.*, 84: 91-99.

Ashurst, C., A. Freer, J. Ekdahl and C. Gibbons, 2012. Exploring IT-enabled Innovation: A new paradigm? *Int. J. Inform. Manage.*, 32: 326-336.

Chae, B., 2013. A complexity theory approach to IT-Enabled Services (IESs) and service innovation: Business analytics as an illustration of IES. *Decis. Support Syst.*, 10.1016/j.dss.2013.07.005

Chang, Y.C. and H.R. Yen, 2012. Introduction to the special cluster on managing technology-service fusion innovation. *Technovation*, 32: 415-418.

Dolfmsa, W. and D. Seo, 2013. Government policy and technological innovation-a suggested typology. *Technovation*, 33: 173-179.

Froehle, C.M. and A.V. Roth, 2004. New measurement scales for evaluating perceptions of the technology-mediated customer service experience. *J. Opera. Manage.*, 22: 1-21.

Henderson, J.C. and N. Venkatraman, 1993. Strategic alignment: Leveraging information technology for transforming organization. *IBM Syst. J.*, 32: 472-484.

Hertog, P.D., 2000. Knowledge-intensive business services as co-producers of innovation. *Int. J. Innovation Manage.*, 4: 491-528.

Kuo, D.C.L., W.C. Hsu and C.C. Lin, 2012. Can governments apply manufacturing-oriented R and D mechanism in fostering innovations for smes in service sectors? Proceedings of the 5th ISPIM Innovation Symposium, December 9-12, 2012, Korea.

Laudon, J. and K. Laudon, 2007. *Management Information Systems: Managing the Digital Firm*. 10th Edn., Prentice Hall, New Jersey, USA.

Lin, F.R. and P.S. Hsieh, 2011. A SAT view on new service development. *Serv. Sci.*, 3: 141-157.

Mansury, M.A. and J.H. Love, 2008. Innovation, productivity and growth in US business services: A firm-level analysis. *Technovation*, 28: 52-62.

Rhee, J., T. Park and D.H. Lee, 2010. Drivers of innovativeness and performance for innovative SMEs in South Korea: Mediation of learning orientation. *Technovation*, 30: 65-75.

Rust, R.T. and C. Mitu, 2006. What academic research tells us about service. *Commun. ACM*, 49: 49-54.

Santamaria, L., M.J. Nieto and I. Miles, 2012. Service innovation in manufacturing firms: Evidence from Spain. *Technovation*, 32: 144-155.

Smith, J.B. and M. Colgate, 2007. Customer value creation: A practical framework. *J. Market. Theory Practice*, 15: 7-23.

Tso, C.Y., D.C.L. Kuo and T.K. Feng, 2013. Exploring the factors that influencing the design pattern of innovative IT-enabled applications in service sectors. *Res. Notes Inform. Sci.*, 14: 658-662.

Venkatraman, N., 1994. IT enabled business transformation: From automation to business scope redefinition. *Sloan Manage. Rev.*, 35: 73-87.

Yang, H.L. and S.L. Hsiao, 2009. Mechanisms of developing innovative IT-enabled services: A case study of taiwanese healthcare service. *Technovation*, 29: 327-337.