



The Role of E-Service Capability and Research and Development Capability in Organizational Performance

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ABSTRACT

The purpose of this study is to investigate the capability of e-service innovation, research and development capability and its impact in a firm's performance outcomes. Data were collected from 120 manufacturing managers working in the industrial estates of Guilan (located in North of Iran) and analyzed using a structural equation modeling methodology. The results show that there is a significantly positive relationship between e-service and R & D capability and incremental service innovation, which, in turn, leads to new service innovation. Our analysis shows that the impact of e-service innovation on firm outcomes begins with e-service and R & D capabilities and these factors positively influences organizational outcomes. But, the results don't show a positive relationship between e-service and R & D capability on radical service innovation.

Keywords: E-service capability, E-service innovation, R & D capability, Incremental service innovation, Radical service innovation.

1. INTRODUCTION

In today's intensive competitive environments the design and delivery of innovative, flexible, and effective services is of paramount importance for business success. The term "service" has many different meanings depending on the field of expertise and the perspective it is considered from.

The growing significance of services places increased emphasis on the need for a service-centered approach to value creation. E-service is a key component of effective customer service and the significance of its impact on firm value depends on e-service innovation. E-service is "the use of new information technologies via the internet to enable, improve, enhance, transform, or invent a business process or system to complete tasks, solve problems, conduct transactions, or create value for current or potential customers" (Benaroch & Appari, 2011). During the last ten years a large amount of services have been

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launched to electronic markets and the same kind of development will certainly continue.

In many cases traditional services have simply moved to electronic environment and human work is partly substituted by computers and software. This was predicted to revolutionize the way of doing marketing in a short period of time. However, the development has been slow, but the trend towards e-services is clear. As Lovelock et al. point out Internet Revolution is still in its early stages. Electronic services are likely to strengthen the competitiveness of organizations as these technologies may change the relationship with clients by creating a stronger connection between organizations and its customers (Taherdoost, 2012). Although in terms of electronic services, there is no unique definition and scholars have been viewed it from various perspectives, thus they define e-service in a variety of ways.

Service innovation improves overall firm performance and is an important source of competitive advantage (Salunke et al, 2013). Service innovation is distinct from manufacturing innovation (Gallouj & Windrum, 2009), with important differences between the two. For instance, the incremental and continuous nature of service innovation and the absence of “developmental stages” and R&D departments in service firms indicate that service innovation is inherently different from manufacturing innovation. Service innovation research suggests that integrating customers, employees, suppliers and partners in the innovation process is beneficial to service firm performance.

According to a review of the literature related to information systems (IS) and strategic management, previous studies have explored innovation by focusing on the conceptual basis of successful e-service implementation (Michalski, 2003) and how e-service innovation is affected by cooperation capability (Tsou & Chen, 2012) and technology-integration mechanisms (Tsou, 2012). A few empirical studies have examined the role of R&D capability on e-service innovation (radical or incremental).

This paper examines the role of e-service and R & D capability in the service innovation (radical and incremental) and organizational outcomes.

The remainder of the paper is as follows. First, the paper provides a review of the literature on service innovation-based performance; second, a presentation of the conceptual model and hypotheses; third, a discussion of the research method and key findings; and finally, the paper presents the conclusions and implications for theory and practice.

2. THEORETICAL BACKGROUND

2.1 E-service capability

E-service capability, therefore, is viewed in this study as an internal driving force that enables firms to better understand its customers, improve its service delivery, and respond to customer needs. This study broadly defines e-service capability as a firm's competence in using internet technologies to complete tasks, solve problems, or create value for current or potential customers. E-service technologies extend internet-based services by incorporating technologies that support several service functions, including organizational service management, collaboration management, customer service support, as well as service research and planning (Loukis et al., 2012). The characteristics of e-service are listed below (Taherdoost et al, 2014):

1. Intangibility
2. Process nature
3. Heterogeneity
4. Inseparability which is the simultaneousness of consumption, production and marketing
5. Perishability
6. Ownership
7. Interactive nature
8. Self-service
9. Non-rival

When the Internet emerged in the late 1990s, electronic commerce developed in several kinds of businesses, including: Internet, Internet portal services (e.g., AOL), Communication services (e.g., AT&T), Retail, Consumer products (e.g., Amazon, CD now), Markets, Commercial supply businesses (B2B), Auctions (e.g., eBay), Materials trading markets (commodity products), Finance, Financial trading markets (stocks and bonds), Financial, services (banking, credit, mortgages, etc.), Information, Reservations (e.g., travel, hotels, etc.), Query and search (e.g., Google), Entertainment, News, music, TV, etc., Education, Higher education (e.g., UMUC), Executive or industrial training (e.g., IBM), Social networking, Virtual sociology (e.g., Face book, Twitter)

In each of these business applications, information strategy differed according to the customers and value-adding operations of the businesses. Using the Internet, a business model for services required identifying (1) customers, (2) customer needs, (3) products/services to satisfy their needs, and (4) channels of reaching customers.

- ***Attracting***

Information strategy is important to assist the finding or searching or exploration activities of customers to reach a website. A customer must take a positive action to *find* the business on the Internet. The customer may find the website through advertising or word-of-mouth or searches or references. Progress in information technology about the kind and nature of the search engine a customer uses to find sites is important.

- ***Informing***

The next issue is to get the customer to stay at a website—informing a customer. Once the customer has found the business's website, the website must be immediately relevant to the customer's needs for the customer to remain and use it. The first condition of a website is that it must appear instantly *interesting* to the viewer. An important characteristic of the Internet medium is that it combines information, entertainment, and communication. To explore a site, logical *clarity* is important. This is where an understanding of the kinds of customers and their needs and desires is essential to a proper design of the organization and maneuvering paths through the site. How a site encourages a viewer to maneuver through the site must be guided by having the viewer learn how needs can be met by information at the site. The site should show the *products/ services* available at the site. They should be presented in a way to show an obvious means to satisfy the customers' needs—matching products and services to needs.

- ***Adding Value***

Next, a customer must find value in the site to use it and to return to it. A customer must be able to adequately inspect the goods or services offered at the site. Inspection may be easy or difficult. Progress in information technology through adding multimedia perceptive experiences—such as immersive multimedia (3D sight and sound and touching)—is valuable to the inspection of products/services sold over the Internet.

- ***Profiting***

The next challenge is to determine how profits are made from the website. Revenue sources can come from membership fees, sales, commissions, advertisements, or a combination of any of these. The pricing of products or services sold on the Internet is an important decision.

On the Internet, prices can be easily compared. Also, costs must be determined for profitability. The e-commerce channel excels as scaling in volume—so that business strategies to increase volume of site usage are important (Betz, 2011).

2.2 R&D capability

The influence of research and development (R&D) capability and market position on business performance is widely recognized and well explored. For instance, when financial analysts appraise an organization's earnings prospects, they routinely evaluate expected numbers of new products, business growth, and market share. These factors and others, which are more industry specific, are known to affect the profitability of all organizations in a particular product market (A.Lukas & Bell, 2000). a firm's ability to integrate R&D strategy with the organizational vision and mission, level of R&D investment, project implementation and portfolio management as the components of R&D capability result in the accumulation of new technological knowledge. Firms rely on their R&D capability in order to access external as well as internal sources of knowledge (Lieberman and Asaba, 2006). According to a previous research which investigates the role of R&D in organizational learning, Cohen and Levinthal (1989) suggested that R&D is the main determinant of new knowledge acquisition, assimilation, transformation and utilization for firms which is conceptualized as the learning or the absorptive capacity of firms. Accordingly, R&D capability of firms lead to organizational knowledge creation in specific areas of science and technology through experimentation and exploration based learning, and facilitates the identification and association of the externally encountered knowledge with the firm's operations, products and processes (Lane, Koka and Pathak, 2006)

2.3 E-service innovation

Service innovation can be regarded as the set of improvements in service processes or service-logic innovation. It may be regarded as the development of new processes for the delivery of core products and services. This requires partnering and cannot be realized by an individual organization. Hinnant and O'Looney used institutional and environmental factors to develop a model of e-innovation to characterize it in terms of perceived need, technical capacity, and risk mitigation (Tsou & Chen, 2012). The competition in providing a service depends on having the ability to deliver a service's function—its performance. The following service factors provide the sources of differentiating competitive factors between service providers (Betz, 2011).

Effectiveness - How well the function provision meets customers' needs.

Efficiency - how much resources are consumed in delivering a service.

Capacity - the service provider's capability of delivery services to many customers.

Price - the service provider's valuing of the service to the customers.

Staff - the competency, dedication, and responsiveness of the service provider's employees in serving customers.

Costs - the cost of providing a service.

Margins - the difference between the price and costs of a service.

Reputation - the customers' perceptions of the reliability and quality of the service provider

2.4 Incremental service innovation & Radical service innovation

Incremental service innovation is related to customer-led strategies that focus on manifest needs and is posited to be the most common form of innovation. In addition, the development of incremental service innovation tends to limit the range of potential service innovation, because it relies on customers' current view of the service market. On the other hand, radical service innovation is defined as fundamental changes in new services that represent revolutionary changes in service benefits to sum up; incremental service innovation describes a new value creation through the incremental addition of existing values, while radical service innovation creates brand new values through innovative concepts (C. cheng & Krumwiede, 2012).

3. HYPOTHESES

E-service capability and service innovation

A firm can achieve innovation by exploiting its internal organizational capability (Leskovar-Spacapan & Bastic, 2007), knowledge, and IT (Chapman & Soosay, 2003). Firms with more service innovations frequently require new information technology-based applications to analyze and identify the needs and preferences of their customers. E-service capability emphasizes a firm's ability to access and integrate customer information through customer-facing technology and processes; therefore, firms possessing such a capability are more effective in leveraging this information to improve service delivery and match customer needs. The dynamic-capability view (DCV) emphasizes that internal and external sourcing are complementary innovative activities and firms can adapt the internal-external driving forces to reconfigure resources and coordinate processes promptly and effectively to meet new information technology environment (Gibson & Birkinshaw, 2004).

H1. E-service capability is positively related to e-service innovation.

H2. E-service capability is positively related to incremental service innovation.

H3. E-service capability and radical service innovation

R & D capability and service innovation

The key success factor competitive advantage company is created through its own capability that representing core competence. Core competence consist of technology that representing tangible asset, while technical skill and R&D capability representing intangible asset. Technology describes as main sources in providing product or services within a high technology business, which is operated by superior technical skill and supported by highly R&D capabilities. The own distinctive resources companies including of technology, technical skill, and R&D capability will influence the performance that have an impact on improving profitability of companies (Chumaidiyah, 2012). Innovation is an effective way to accelerate growth and profitability in service firms, contributing to novel ways of value creation, both for the firms and their customers. While prior attempts to conceptualize service innovation examine service innovation dimensionality as well as the type and degree of service innovations, the manner in which service firms create value for themselves through innovation, that is, customer-centric, receive scant empirical attention (Salunke et al, 2013).

H4. R & D capability is positively related to e-service innovation.

H5. R&D capability is positively related to incremental service innovation

H6. R&D capability is positively related to radical service innovation.

Service innovation and organizational outcomes

It is argued that service innovation is not an end unto itself. Rather, its value is in the facilitation and generation of outcomes that benefit new service performance regardless of financial rewards or market positions (Benner and Tushman, 2003). Specifically, the way for service innovation to contribute to new service performance is through new benefits to existing customers, creation of new markets through an incremental addition of existing service values, or radical creation of brand new service values. In other words, service innovation, regardless of whether it is incremental. Past research suggests that although sustaining competitive advantages in volatile environments is difficult, competitive advantage in stable business environments can be sustained (e.g., Eisenhardt & Martin, 2000). While researchers discuss “mobility barriers”, “imperfect factor markets” and isolating mechanisms as means to sustain competitive advantage, limited research exists that empirically validates whether factors that generate superior economic performance sustain over time. A key factor that leads to the sustainability of a competitive advantage is the inability of competitors to imitate the innovation based value configuration that produced the advantage.

- H7. E-service innovation is positively related to organizational outcomes
- H8. Incremental service innovation is positively related to organizational outcomes
- H9. Radical service innovation is related to organizational outcomes.

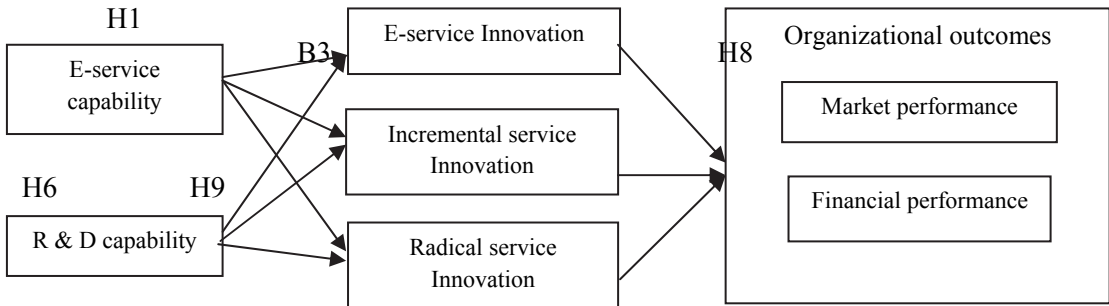


Figure 1: Research Model

4. METHODOLOGY

The research model is shown in Fig.1. The nine hypotheses build up the model, e-service capability, R & D capability, E-service innovation, incremental service innovation and radical service innovation with organizational outcomes.

The data used to test the hypotheses are drawn from a varied industrial estates of Guilan (located in north of Iran). Data were collected from a sample of managers working for manufacturing companies via questionnaire during the summer of 2015. Finally, 120 managers of 33 companies were selected. Information of respondents is displayed in Table 1.

Table 1: Sample information

Topic	Frequency	Percent
Gender		
Female	25	0.20
Mal	95	0.79
Education		
Diploma	23	0.19
AM	68	0.57
MS	20	0.17
PhD	9	0.070
Job statues		
R&D manager	22	0.18

Innovation manager	20	0.17
Marketing manager	25	0.21
Service manager	29	0.24
Technology manager	24	0.20
Years of firm activity		
X<5	5	0.15
5<X<10	8	0.24
X>10	20	0.61

5. DATA COLLECTION

The study was conducted in the form of a survey with data being gathered via questionnaire. All the items were assessed on a five-point Likert-type scale. To enhance the content validity of the measurements, a number of steps were taken. First, we went through an intensive literature review to identify valid measurements for the related constructs. Wherever possible, existing measures that had been used in previous studies were adopted. Second, several professors with expertise in e-service and innovation reviewed the preliminary instrument. Third, the instrument was subject to focus group discussion with three managers who were in charge of e-service and R&D in two manufacturing firms. Finally, we also performed a pilot study to validate the measures. Based on the feedback from professors, managers, and pilot study, we further revised measures to make them more understandable and valid. Also, the Cronbach's alpha was used to evaluate the reliability. If the coefficient alpha greater than 7/0, the test of reliability is acceptable.

5.1 Measurement model assessment

The measurement model fit is supported by the values of the following fit indices: The ratio of (462.51) to degrees of freedom (268) is less than the recommended value of 3.0 for satisfactory fit of a model to data. In line with the prescriptions, the fit indices (NFI= 0.90; NNFI= 0.91; CFI= 0.91) and the Root mean Square Error of Approximation (RMSEA= 0.067) are deemed acceptable. Based on these results, we argue that the model fit is sufficient to support testing of the study hypotheses.

5.2 Structural equation modeling results

Structural equation modeling (SEM) was used to test the proposed model. Compared with multivariate procedures, SEM is a more powerful alternative that takes into account the correlated independents, measurement error, and multiple latent independents. SEM generally has two steps, validating the measurement model and fitting the structural model. The measurement model specifies the

relations between measured variables and latent variables. The validation of measurement model is accomplished through confirmatory factor analysis (CFA). In contrast, the structural model specifies the causal relations among latent variables. Fitting structural models is accomplished through path analysis (Byrne, 2000). Table 2 shows the results of the structural equation modeling analysis.

Table 2: Measurement Scales

hypothesize	t-value	Standard. Co
E-service capability---- E-service innovation	2.21	0.89
E-service capability---Incremental service innovation	2.03	0.84
E-service capability---Radical service innovation	-0.30	-0.16
R&D capability---E-service innovation	2.90	0.85
R&D capability----Incremental service innovation	2.93	0.92
R&D capability---Radical service innovation	-0.42	-0.17
E-service innovation---organizational outcomes	2.24	0.88
Incremental service innovation---organizational outcomes	2.14	0.80
Radical service innovation---organizational outcomes	-0.12	-0.25

H1, H2, H4, H5, H7, H8 are supported with positive and significant standardized coefficients. E-service capability is positively associated with e-service innovation with a coefficient of 0.89 and an associated t-value of 2.21. E-service capability is positively associated with incremental service innovation with a coefficient of 0.84 and an associated t-value of 2.03. R&D capability is positively associated with e-service innovation with a coefficient of 0.85 and an associated t-value of 2.90. R&D capability is positively associated with incremental service innovation with a coefficient of 0.92 and an associated t-value of 2.93. E-service capability is negatively associated with radical service innovation with a coefficient of -0.16 and an associated t-value of -0.30. R & D capability is negatively associated with radical service innovation with a coefficient of -0.17 and an associated t-value of -0.42. Also, E-service innovation is positively associated with incremental organizational outcomes with a coefficient of 0.88 and an associated t-value of 2.24. Incremental service innovation is positively associated with incremental organizational outcomes with a coefficient of 0.80 and an associated t-value of 2.14 but radical service innovation is negatively associated with organizational outcomes with a coefficient of -0.12 and an associated t-value of -0.25. Table 3. shows the results of hypotheses.

Table 3: Structural model results

hypothesize	Results
E-service capability---- E-service innovation	Confirmed
E-service capability---Incremental service innovation	Confirmed
E-service capability---Radical service innovation	Not Confirmed
R&D capability---E-service innovation	Confirmed
R&D capability----Incremental service innovation	Confirmed
R&D capability---Radical service innovation	Not confirmed
E-service innovation---organizational outcomes	Confirmed
Incremental service innovation---organizational outcomes	Confirmed
Radical service innovation---organizational outcomes	Not confirmed

6. DISCUSSION AND CONCLUSIONS

Modern history, as we have emphasized, is very much a story of new technologies changing economic history. The twentieth century was revolutionized by physical technologies— the new industries of automobiles, airplanes, telephones, radio, polymers, and so on. Now in the twenty-first century economic history is being revolutionized again, but principally by information technologies coupled with communication technologies— computers, Internet, cellular communications. These have been and continue to, change everything! These are focusing businesses toward providing Internet delivered services. Information and communication technologies are integrating business strategies between manufacturing and software—toward the delivery of services.

In this study, we investigated the role of e-service capability in organizational performance, the results showed that e-service innovation is affected e-service capability and it could have significant impact on organizational outcomes. In fact, as the firm has essential ability, knowledge and skill for providing service in electronic context, so it can be innovative in this field. Chuang & Lin (2015) showed that e-service innovation is affected e-service capability. Also, we showed that e-service capability has positive impact on incremental service innovation but it is not true about radical service innovation. It is seemed that firms which to participated in our study to have knowledge and necessary experience for incremental service innovation but do not have interesting for radical service innovation. Maybe, successful radical service innovation takes more time and firms often followed more profit in less time. This relationship is investigated for the first time.

In this paper, we showed that R & D capability have positive impact on e-service innovation and incremental service innovation but do not see significant relationship between R & D capability and radical service innovation. We know that R & D is essential base for innovation. Firm that have research and development unit, it can better find creative ideas. This firm obtains these ideas by searching market and customer and uses them for providing new service to customers. But we did not see positive impact of R & D capability on radical service innovation because firms which participated in our survey to prefer to provide service that less different with others, they believed that others have more power in e-service industry and our equipment is not enough for being leader in this field.

The following recommendations are provided as a reference for practitioners. In the dynamic internet environment, business managers must continually reconfigure and cultivate resources to form new capabilities, thereby establishing a sustainable strategic position. Managers can scan for opportunities to provide new services while identifying which capabilities can enable firms to develop strong and competitive services. We recommend that firms can improve their service delivery functions and meet customer needs by using NIT-enabled service initiatives.

The findings have important implications for managers of service firms. First, service firms seeking competitive advantage through the delivery of innovative services should adopt an entrepreneurial posture in their strategic decision-making. While innovativeness, proactiveness and risk-taking are important ingredients in this behavior, service firms in particular should display adaptiveness at the customer interface. Second, service firms should persist with value creation initiatives through new and improved service offerings, given that innovation is critical to outperform rivals. First, this study highlights the importance of managerial emphasis on the creation of a market oriented business environment and encouragement of innovative activities. Given that market orientation helps managers to be more connected to the business environment (e.g., focuses of customers and competitors), such dimensions of market orientation appear to play an important role in allowing service industry firms to devise innovative solutions to business problems. Second, management should plan and implement radical innovation within the frame- work of competitor orientation and inter-functional coordination. Third, having innovative activities in market orientation may be very important when customers' preferences and industrial com- positions are changing rapidly. This is because such conditions can force service firms to innovate their services more often than when they operate in a stable market (Cheng & Krumwiede, 2012).

Our limitations are that we have to rely on a relatively short time period. There are advantages to having panel data to help unravel some of these relationships

that cannot be accomplished with the type of data we have. Further work also needs to be done to improve the measure of marketing innovation linking this to goals and specific decisions as a way to improve the overall measure. Further, data from other countries at different stages of economic growth and types of industries would add to the generalize ability of the results. Some limitations must be acknowledged here. First, the cross-sectional survey design limits the inferences drawn about causal it between the variables of interest. In the absence of longitudinal data, the manner in which firms create new value and outperform competitors over time is not captured. While this limitation presents opportunities for future research to investigate the temporal effects associated with this phenomenon, the approach is not dissimilar to prior service innovation studies that are based on cross-sectional samples.

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