

Factors Impacting Innovation in New Service Offerings

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ABSTRACT

Factors that affect the level of innovation in projects to develop new service offerings are analyzed based on field research results from 84 service innovation projects. Personal characteristics of developers, process and customer type, and an important characteristic of their organization (i.e., whether or not they possess a strong Lean Six Sigma or similar process improvement orientation) are analyzed. It is shown that, although personal characteristics, process type, or customer type do not affect the level of innovation, organizations with a strong Lean Six Sigma orientation had a lower incidence of radical innovation recommendations.

Keywords: *Service Science, Service Innovation, Lean Six Sigma, Service Development*

1. Introduction

The ability of an enterprise to provide its customers with innovative products and services will be critical to sustainable success in the 21st Century [1,2]. This ability will be important for services provided to both external customers (in order to respond to market pressures) as well as internal customers (to stay competitive and retain knowledge workers). To better understand how organizations can foster the development of new services, a research project was initiated to study the effect of personal characteristics and organizational characteristics on an individual's ability to recommend highly innovative services.

The research is motivated by a degree of skepticism that exists regarding the ability of certain types of individuals and organizations to thrive in an innovation-intensive environment. For example, it has been postulated that, due to their extensive application of standard solutions based on highly structured analyses, organizations having embraced a formalized process or continuous improvement program (such as Lean Six Sigma) may have created an internal atmosphere that discourages innovation [3-5].

The research database consists of the results from 84 separate projects. In each project, a developer was asked to study a service and make a recommendation for an innovative new service offering. Each developer was supported with training and hands-on assistance. The

data were analyzed to determine if the level of innovativeness in the developer's recommendation was affected by: (a) the developer's personal characteristics, (b) the nature of the service process, (c) customer characteristics, or (d) whether or not the developer's employer had a formalized Lean Six Sigma or related program.

The remainder of the article is organized as follows. The first section provides background in the form of a literature review that places the research in its proper context relative to previously reported results. In the second section, the innovation projects that formed the basis of the research data set are described. The third section details the configuration of the resulting data set. This section is followed by the analysis of results, and the final section discusses the implications of these results.

2. Background

A variety of approaches to innovation have been proposed to address the challenges of a volatile, rapidly changing business world. Among the approaches are open innovation [6], innovative sustainability [7,8], integrated innovation chains [9], radical innovation agendas [10], and management innovation [11-13]. These approaches all seek to provide a framework for organizations to remain competitive in the 21st century. This research deals with the creation of new markets (i.e., expanding market spaces) by exploring factors that affect

the ability of developers (*i.e.*, individuals responsible for creating new services) to create innovative new service offerings.

Service innovation differs from product innovation because of the direct and significant intertwining of company productivity and customer needs, which may necessitate a new typology of service innovation [14]. The term service “offering” will be used to denote an additional solution that a customer did not previously receive. The additional offering could be an extension of the current service (e.g., when an automobile insurance company provides free rate quotes to a customer that includes competitors’ prices) or a new service for which customers did not previously ask (e.g., when an automobile insurance company provides its customers with repairs or a replacement vehicle).

Other terms have been used to denote a service offering. For example, Vermeulen [15] uses the term “product” to describe a service sold to financial customers. Similarly, Berry *et al.* [16] refer to the creation of new markets, and Panesar *et al.* [17] make use of the term service “content.” In all of these cases, successful service development will enable enterprises to increase business results by expanding their market space, rather than by increasing market share [18]. By innovating service offerings, customers benefit in the additional value they receive [19] and/or in enhancement of the service experience [20,21].

A number of approaches have been proposed to enable developers to understand the customer’s experience with the existing service in ways that support the development of innovative service offerings. Womack and Jones [22] proposed the use of consumption maps to document how the customer interacts with the service provider. Similarly, Bettencourt and Ulwick [23] recommend the use of an innovation map that focuses on what the customer is trying to accomplish (rather than their specific actions), and Morelli [24] suggests other displays that illustrate the service design. Ulwick [25] describes how a focus on outcomes, rather than inputs from customers, can help a developer create innovations that customers have not suggested explicitly.

It is well known that the ability of an organization to innovate is affected by its structural and cultural characteristics. Many organizations focus on customer-centered continuous improvement. This movement began in the 1970’s, when organizations began to actively embrace the teachings of quality and productivity pioneers that included W. Edwards Deming, Joseph Juran, Taiichi Ohno, and others. Total quality management (TQM) was arguably the first “program” that emphasized employee involvement in the organization’s quest to make everyone in the company responsible for customer satisfaction,

where previously this responsibility was given to the quality assurance department. Over time, similar programs followed, such as those based on the Malcolm Baldrige National Quality Award criteria, ISO 9000, and finally Six Sigma. Over time, these programs moved towards more structure when applying methodologies to improve customer satisfaction.

Lean production began to be widely adopted in the 1990’s after the publication of *The Machine that Changed the World* [26]. Lean production is based on the Toyota Production System and focuses on the elimination of wasteful activities during the creation of a product [27]. Over time, Lean began to be thought of a management approach because of its need to treat employees with respect and to create an alignment of all business functions [28]. Although originally applied to manufacturing, many service and governmental organizations have embraced both Lean and Six Sigma principles [29,30]. For example, from 2004 to 2008, the prevalence of articles reporting on the use of Six Sigma in services doubled to 40% of publications from 20% of publications [31].

Today, Lean Six Sigma (LSS) is often used to denote a program that makes routine use of the principles and techniques found under the Lean or Six Sigma umbrella. These organizations would possess common attributes, such as an emphasis on customer satisfaction, a culture of continuous improvement, the search for root causes, and comprehensive employee involvement. In each case, a high degree of training and education takes place, from upper management to the shop floor. Additionally, these organizations tend to employ a standard project management process in the management of improvement projects, such as the DMAIC approach of Six Sigma [32]. It has been argued that facets of Lean and Six Sigma are consistent with innovation [31,33], though perhaps they are better suited for incremental rather than radical innovation [33].

The effect that organizational characteristics have on the ability to innovate has been studied. Johnes and Storey [34] argue that the organization’s culture plays an important role in new service development. Similarly, Oxe [35] points to an ineffective development process as a barrier to service innovation. The barriers to innovation listed in Loewe and Dominiquini [36] include: a belief that innovation is risky, a lack of systematic innovation processes, and little or no reward for innovation. Among the barriers to innovation in financial services firms listed in Vermeulen [15] is a conservative organizational structure. Rivas and Gobeli [37] point to highly skilled people, interdisciplinary cooperation, and a support management structure as being critical to successful innovation at Hewlett-Packard. Finally, Blumentritt and

Danis [38] show that the innovation approach must be somewhat customized to the strategic orientation of the organization.

3. Innovation Projects

Field research was used to create a data set that formed the basis of the analysis. In total, 84 different services were included. For each service, the developer was a professional employee with precise knowledge of the service. The developer was asked to study the service and recommend an innovative service offering that would add value for customers. No single developer studied more than one service. Because innovation is enhanced by teams over individuals [14], each developer was assisted in this endeavor by 3 - 5 other trained individuals. However, the developer was rated on the effort and it was clear that the developer was solely responsible for ensuring the quality of their results.

Each service offering recommendation was based on a thorough evaluation of the service and interviews with customers. Prior to creating the new service offering recommendation, the developer was required to: 1) document the sequence of steps customers followed before the service was initiated, during the service delivery process, and after the service output was delivered (*i.e.*, activities that describe how each customer "consumed" the service, resulting in a consumption map); 2) evaluate how customers define value, including the many dimensions of performance [39] that customers considered when evaluating the quality of the service; and 3) document elements of the existing service offering that pleased customers and elements of the existing service offering that displeased customers.

The recommended service offering could be one that added value without a significant change to the nature of the existing service offering, one that supplemented the existing service with a related service, or one that created a totally new service offering. In each case, it was assumed that the service provider had the capability to deliver the new service offering, albeit with some additional resources and training. The 84 services covered a broad range of service types, but they did not constitute a random sample nor were they carefully selected in a controlled experiment. Although most of the services had customers who were internal to the organization, several studies have concluded that the management of services for internal customers differs very little from the management for services for external customers [40,41]. There was a definitive bias towards technology-oriented organizations and the developers were biased towards those with technical backgrounds.

The projects were designed so that more radical innovation recommendations were encouraged. The develop-

ers were told that their recommendation would be rated in part based on the level of innovation (e.g., higher ratings would be given to more radical innovations). In addition, a team of other trained individuals spent several hours working with each developer to brainstorm ideas for innovative service offerings. The brainstorming sessions were guided by a facilitator with expertise in this type of endeavor. Developers were told that, although they needed to estimate the cost and benefit of their recommendation, they would not be judged based on a financial justification (this was done to discourage low cost recommendations that added value but were not innovative). Finally, to further encourage radical ideas, none of the recommendations were required to be implemented as part of the project effort.

4. Data Set Description

At the end of each project, the service offering recommendation was rated as either an incremental innovation or a radical innovation. In order to differentiate innovations more precisely, a rating of weak, moderate, and strong was applied to the incremental category, and a rating of evolutionary or revolutionary was applied to the radical category. This rating system resulted in a total of 5 potential scores for each recommended innovation. The assignment of each rating was done by the author based on a set of precise definitions for each type of innovation that ensured objectivity.

Incremental innovations tended to be those that created additional value by means of an improvement to, or extension of, the existing offering. An example of a weak incremental innovation would be the implementation of a checklist or template so that the customer does not forget or provide incomplete information to the service provider. The new value would be the elimination of confusion or uncertainty regarding the format and content of the required information. An example of a strong incremental innovation would be a self service database that allows a division manager to retrieve health and safety information on an as needed basis, where previously the information was provided quarterly as a generic report. The new value would be the ability of the manager to address problems on a timelier basis and eliminating the need to either wait for new reports or use information from old reports.

Radical innovations would be those that created additional value by means of a new offering that would vary substantially from what customers expected from the existing service. An example of an evolutionary radical innovation would be the creation of customized financial reports that included new metrics specifically designed for each customer, where previously reports were sent to a variety of customers in a generic form. An

example of revolutionary radical innovation would be a self service dispensing machine for safety tools and related equipment in a manufacturing facility. The new value added would be improved availability of the equipment, but the offering would also add new value by providing management with the ability to account for equipment and charge relevant departments accordingly.

A database was created with one record for each of the 84 services that included the following fields: the name of the enterprise within which the service took place; a code signifying the type of service delivery process; an indication of whether or not the organization had a formalized LSS program; a brief description of the process; the primary type of customer (classified as internal or external); the age of the analyst; the gender of the analyst; the educational level of the analyst; and the innovation rating of the recommended new service offering.

5. Results and Analysis

Table 1 provides the distribution of innovation ratings for the 84 service offering recommendations. Interestingly, although radical innovations were encouraged with training, assistance, and personal incentives, only 6 of 84 (7.2%) of the recommendations were rated as radical. Similarly, almost one-fourth (23.8%) of the innovation ratings fell into the weak innovation category.

The prevalence of technical professionals among the developers may have contributed to the scarcity of radical innovations. Potential root causes include: (a) a disinclination among technical professionals to be creative (even with encouragement and training), or (b) a disinclination among more creative individuals to be employed by corporate organizations. The analyses, presented below, will determine whether certain personal characteristics of a developer or their organization influenced the level of innovation in subsequent recommendation.

In the analyses that follow, all radical innovations (evolutionary or revolutionary) are pooled. Polling of these categories was done to create a data set consistent with the assumptions necessary to perform the appropriate statistical analysis procedures.

5.1. Service Process Type

Table 2 shows the distribution of innovation ratings across six service process classifications. These classifi-

Table 1. Distribution of recommended innovations.

Innovating Rating	Number	Percentage
Weak Incremental	20	23.8%
Moderate Incremental	33	39.3%
Strong Incremental	25	29.8%
Evolutionary Radical	3	3.6%
Revolutionary Radical	3	3.6%

Table 2. Innovation ratings across process types.

Process Type	Incremental Innovation			Radical Innovation
	Weak	Moderate	Strong	
Analysis	2	2	3	0
Consultation	7	12	11	3
Evaluation	4	3	2	0
Gathering	2	1	4	0
Planning	4	11	4	1
Troubleshooting	1	4	1	2

cations, suggested by Maleyeff [41], are based on the activities performed during delivery of the service; they are not affected by the nature of the service offering. For example, written reports often constitute the service offering from different types of service processes.

An analysis of the data in **Table 2** concluded the following: The hypothesis that service process type affects the service offering innovation rating is not rejected ($p = 0.467$). That is, there is no evidence that specific types of tasks and activities that take place during the delivery of a service impact the ability of developers to create innovative offerings.

5.2. Customer Type

Table 3 shows the distribution of innovation ratings across two customer types. In cases where both internal and external customers existed, the developer was asked to focus on the service offering for one group—either internal or external. For example, an accounting statement may be used internally to make decisions and external to satisfy regulatory requirements. Because the value definition of internal customers would often differ from the value definition of external customers, a service offering change would likely be targeted to one type of customer over the other.

An analysis of the data in **Table 3** concludes the following: The hypothesis that customer type affects the service offering innovation rating is not rejected ($p = 0.851$). Although there is often a tendency for service providers to focus less attention on internal customers than on external customers [40], this result suggests that the development of innovative offerings is equally challenging whether the customer is internal or external.

5.3. Developer Characteristics

Although the detailed numerical summaries are not provided, three personal characteristics of the developers were analyzed to determine if any of them affected the rating of their innovation recommendation. These personal characteristics included the developer's age (also an indication of their level of professional work experience), gender, and educational level (highest degree earned).

Analysis of the personal characteristics of the devel-

Table 3. Innovation ratings across customer types.

Customer Type	Incremental Innovation			Radical Innovation
	Weak	Moderate	Strong	
External	4	4	3	1
Internal	16	29	22	5

oper concluded the following: (a) The hypothesis that the developer's age affects the service offering innovation rating is not rejected ($p = 0.213$); (b) The hypothesis that the developer's gender affects the service offering innovation rating is not rejected ($p = 0.844$); and (c) The hypothesis that the developer's educational level affects the service offering innovation rating is not rejected ($p = 0.939$).

The implication of these results may be important for practitioners who engage in team creation. It suggests that the assignment of diverse individuals (*i.e.*, in regards to age, gender, and education) to teams may not result in recommendations having a higher level of innovation. That is, the results suggest that team formation should consider factors other than personal characteristics of team members.

5.4. Lean Six Sigma Organizations

Table 4 shows the distribution of innovation ratings across two organization types. Here, the organization that employed the developer was classified as to whether or not it possessed a strong LSS or similar program. This determination was made based on knowledge of the enterprises that employed the developers and input from the developer in cases where the organization's orientation was not known.

An analysis of the data in **Table 4** concluded the following: The hypothesis that the likelihood that a developer within a LSS organization generates innovation ratings that differ from innovation ratings from a developer within other organizations is not rejected ($p = 0.081$). But, due to the low p -value and the small number of radical innovations, a follow-up analysis was performed using only the data for incremental innovations (*i.e.*, the columns labeled "strong incremental innovation" and "radical innovation" are combined).

An analysis of the data in **Table 4** (modified by pooling radical and strong incremental innovations) concludes the following: the hypothesis that the likelihood that a developer within a LSS organization generates innovation ratings that differ from innovation ratings from a developer within other organizations is rejected ($p = 0.035$). Further, there is higher prevalence of weak incremental innovations from developers employed by LSS organizations.

Table 4. Innovation ratings across organization types.

Organization Type	Incremental Innovation			Radical Innovation
	Weak	Moderate	Strong	
LSS	16	25	13	3
Other	4	7	12	3

6. Conclusions

A number of results contribute to the understanding of factors that impact the ability of developers to make innovative new service offering recommendations. Many of the results support a number of authors who stated that the nature of the organization, rather than the individual, plays an important role in new service development. Specifically:

1) LSS organizations may stifle the level of innovation. This conclusion supports the position of Hoerl and Gardner [33], that LSS may not be well suited for recognizing opportunities for radically new services. The utilization of highly structured projects and the focus on the implementation of standard solutions may contribute to this tendency.

2) Neither the nature of the service process nor whether or not customers are internal or external have an effect on the level of innovation in service offering recommendations. This result is consistent with the results of Maleyeff [41] who also found that many important features of services are common across a broad range of service process types and customer types.

3) Personal characteristics of employees (*e.g.*, experience, education, gender) have little or no effect on the level of innovation in their service offering recommendations. The organization is clearly more important than the individual.

An interesting result that deserves further exploration is that recommendations made by developers were on the whole conservative. This result may stem from a lack of confidence on the part of the developers regarding their creative abilities, especially given the bias towards developers with technical backgrounds. Alternatively, perhaps individuals drawn towards working for an enterprise may lack an entrepreneurial spirit that would impact their innovative tendency. Finally, it may be worth exploring whether or not very strong incentives need to be implemented in organizations to ensure that employees develop more radical innovations.

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