Co-creation of Value in Digital Ecosystems: A Conceptual Framework

Full Paper

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Abstract

The aim of this paper is to integrate the concept of co-creation of value with digital ecosystems and propose the impact of this integration on aspects of firm performance. The focus of the paper is on platforms that exist within digital ecosystems and the consumer-firm interaction under co-creation of value. Digital ecosystems are divided into four types of platform ecosystems based on the underlying theoretical foundation – goods dominant (GD) or service dominant logic (SD), and the source of innovation – customer or organization driven. The conceptualized propositions suggest that co-created digital ecosystems have a direct positive impact on customer satisfaction, sales, and market growth, reduce the risks associated with product development and necessitate a change in the roles and responsibilities of the sales & marketing department. This paper contributes to the literature on co-creation of value and digital ecosystems.

Keywords

Digital Ecosystems, Platforms, Co-creation of value, SD logic, customer-centricity

Introduction

In today’s markets, the rapid advancement of communication technology has empowered consumers with access to abundant information and networking abilities to connect with others. This has provided them with a sense of “power” to command a superior role in exchanges with firms (Ernst et al., 2010). Customer and firms are trying to solve different problems, which sometimes necessitate firms to devote inordinate amount of resources servicing customer demands. When these demands aren’t met, the customer is left feeling dissatisfied and underwhelmed. An important outcome of this change has been a stronger desire of customers to play a greater role in the process of value creation. This process is referred to as co-creation and can occur in various environments (Bolton & Saxena-Iyer, 2009; Hoyer et al., 2010) and incorporates its own level of complexities. The customers now demand a superior role in the implementation and design of organizational strategies. Companies such as Best Buy, Royal Bank of Canada and Seven-Eleven Japan closely observed these business-to-consumer relationship trends to develop a customer centric strategy. Their customer-centric approach has enabled them to gain knowledge that is opaque to competitors and successfully introduce new products and services by understanding and addressing customer needs thus leading to higher customer satisfaction and profit margins (Selden and MacMillan, 2006).

Value co-creation occurs in many aspects of business; in this paper, we focus on product development and examine how this business process is transforming from a trial and error approach to developing products to a value co-creation approach to providing services. Trial and error starts with the firm creating a prototype based on limited customer information and sending it out to a target segment of the market. Target customers provide feedback and the firm makes the necessary corrections. This process is cyclically
repeated until a satisfactory solution is reached. Trial and error consumes a large amount of time, revenue and effort (Thompke and Hippel, 2002). A value co-creation approach bypasses these hurdles by enabling the customer to design their own products under certain imposed restrictions. This strategy is progressively being adopted by many service-providing organizations, who are making considerable profits through its integration with digital ecosystems; an environment which we refer to as co-created digital ecosystems. Consider Apple’s iPad. Apple provides its customers with a platform (iPad) and allows them to create their own suite of apps for personal use. In this approach, customers only purchase the apps they need. This shows a gradual shift in the software market from developing expensive software packages (i.e., goods) towards the development of productivity apps that aim to service varying customer needs. Limited research has focused on analyzing the intricacies of the success of these service-oriented IT firms hence making the understanding of this approach essential for us as researchers. Our work is motivated by the growth of customer centricity and the use of value co-creation within the IT domain. Fader (2012) discusses a prioritizing approach to customer-centricity that advises organizations to focus on making profits from selected customers and ignoring the rest. Customer involvement in the IT sector is thus a complicated mechanism that deserves more attention. Our objective is to contribute to this growing literature. We hope that the concepts presented in this work will drive similar research in other fields. This discussion brings us to our research question.

**RQ: How does the use of co-created digital ecosystems benefit service-oriented firms?**

In this paper, we examine the role of value co-creation in digital ecosystems; a system of interdependent components, built on top of the platforms that enable industries to offer a variety of products and services (Chang and West 2006). Platforms, such as the Apple iPad are an integral part of digital ecosystems. Through an extensive review of literature in information systems and marketing, we introduce a framework that divides digital ecosystems into four types of ecosystem platforms and amalgamate the notion of co-creation of value to propose the impact of this integration on aspects of firm performance. The next section covers the literature on co-creation of value and digital ecosystems followed by the theoretical foundation of the goods and service dominant logics. Next, we provide four propositions on co-created digital ecosystems, which are followed by the implications, limitations and conclusion.

**Literature Review**

The advancement in digitalization, intelligent systems and the rapid growth in the use of the Internet along with deregulation, ubiquitous connectivity, and globalization have led to a shift in how firms think about value creation. Firms have realized the limitations of creating value through a company-centric, product oriented approach and are moving towards involving customers in the value creation process. Customers have unprecedented access to information to make knowledgeable decisions and there are networked consumer communities in which people share and discuss their experiences of different products and services (Prahalad & Ramaswamy, 2004a). Customers provide feedback to firms and when firms learn to listen, they can improve their range of products and services in order to remain competitive. Altogether, the consumers are now more actively involved than before. They have a larger say in what they want and have had a greater impact on the market (Prahalad & Ramaswamy, 2003).

With the proliferation of internetworking technology, multiple firms are collaborating and collectively leveraging IT to achieve their goals. They are able to address a wider range of issues through the powers of collaboration (Grover and Kohli 2012). Different firms exploit their IT through different approaches. When these firms collaborate, they share their best IT practices to achieve specific objectives, which would be difficult to achieve independently. This has led to an expansion of ways in which value can be created. It has encouraged researchers to explore different methods of co-creating value from IT in multi-organizational forms (Dhar and Sundararajan 2007). Companies are searching for other companies with whom they can collaborate and form alliances to co-create IT-enabled products and services (Barrett et al. 2011) thus generating a competitive advantage in terms of combined technology use and market share.

Most of the research on the co-creation of value in the IT domain has focused on a business-to-business dimensionality analysis (Rai et al, 2012, Ceccagnoli et al 2012, Han et al, 2012). There is a clear gap in the literature when it comes to analyzing the business-to-consumer impact of the co-creation of value. This paper attempts to address that gap by fixating on the firm-to-customer interaction through the lens of digital ecosystems.
The concept of digital ecosystems emerged from the policy to support small & medium sized enterprises (SME’s) through an approach focused on a particular context, aimed at constructing environments favourable to SME’s business and networking (Nachira et al. 2007). The economics perspective defines digital ecosystems as, “A useful metaphor for understanding the dynamics of business networks at the regional and sectoral levels and their interaction with and through Information and Communication Technologies (ICT’s)” (Dini et al, 2005, p.3). The technical view suggests that they are digital counterparts of biological ecosystems that are robust, scalable and self-organizing architectures capable of solving intricate, dynamic problems (Briscoe & De Wilde, 2007). The ecological perspective defines it as “A digital environment populated by digital species or digital components which can be software components, applications, services, knowledge, business processes and modules, training modules, contractual frameworks, laws etc.” (Fu, 2006, p.143). A digital component in this context is any idea, digitalised and propagated through the system that is processable by computers or humans (Li et al, 2012).

In this paper, we adopt the ecological perspective as it effectively incorporates the concepts of platforms, species and the interaction between firms and consumers in its definition as explained later. Chang and West (2006) defined digital ecosystems as a new-networked and collaborative environment that tackles key issues of client-server, peer-to-peer, grid and web services. They established four “essences” of ecosystems: Interaction and Engagement, Balance, Domain Clustered and Loosely Coupled, Self-Organisation and two key elements: Species and Underlying Technology. Species are categorised in terms of biological, economic and digital species that co-exist and interact amongst each other to formulate a complex and dynamic digital environment. The underlying technology can be considered as the platform that provides the products and services. In ecosystems, value co-creation is instantiated in cloud-based ‘as-a-service’ models. Beimborn et al. (2011) labelled Platform as a service (PaaS) as an extension of the software as a service (SaaS) specifically designed for the platform provider (firm). They believed that the platform offered all the functionalities for Independent Software Vendors (ISV’s) to develop, test and deploy their application, which again accentuates the importance of platforms within digital ecosystems.

These concepts have been integrated into Figure 1 to reflect a model of digital ecosystems. This is similar to the model proposed by Beimborn et al. (2011, p. 383). Customers are viewed as the biological species, the other organizations and platform owner as economic species and the hardware and software used between them as the digital species. The bi-directional arrows represent a continuous dialogue and interaction amongst all the species. The platform is the underlying technology used which offers the products and services. Consistent with Chang & West (2006), the locus of interaction in our model is the platform, which is well connected to all of the units. It is central to the success of the digital ecosystem.

Before moving on, it is important to clarify that the example of the Apple iPad discussed earlier is different than the more popular PaaS examples such as Amazon Web Services (AWS) or Salesforce.com. Apple iPad is an example of an external platform where one or more firms serve as foundations for other firms and consumers to build their complementary products and services. Gawer & Cusumano (2014) differentiate external from internal platforms that are used for new product development by modifying, adding, or substituting different features (Wheelwright and Clark, 1992) enabling firms to perform “mass customization” (Pine, 1999). Some examples of firms using internal platforms for product development include Sony, Boeing, Honda, and Rolls Royce. The major difference between the external and internal platforms is the “degree of openness” (Gawer & Cusumano, 2014). Internal platforms are fairly restricted to the parent company while the external platforms are solely built as a foundation for other companies to work on. This study focuses on external platforms since they are specifically designed to interact with the external environment, in our case customers. Other examples of external platforms include Microsoft Windows, Linux OS, Intel and ARM microprocessors, Apple’s iPod, iPad designs with the iOS (Gawer & Cusumano, 2014).
Platform Ecosystems

To conceptualize the difference between types of platform ecosystems, we draw on two theoretical foundations: value co-creation and sources of innovation. Researchers have shown that contesting through service can enhance the competitive advantage of a firm (Karmarkar 2004), and that there is a direct link between competitive advantage and superior performance (Barney, 1992; Porter, 1985). This understanding led to the emergence of the service-dominant (SD) logic; the alternative to goods-dominant (GD) logic where units of outputs are viewed as the central component of exchange. Table 1 provides a summary of the differences between the logics from marketing literature.

Figure 1. Digital ecosystem model
Co-creation of Value in Digital Ecosystems

Table 1. Difference between GD and SD logic. (Adapted from Vargo and Lusch (2004) p. 7)

<table>
<thead>
<tr>
<th>Primary unit of exchange</th>
<th>GD logic</th>
<th>SD logic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy used</td>
<td>Market to/ To market</td>
<td>Market with</td>
</tr>
<tr>
<td>Role of customer</td>
<td>Acts as an operand (resource that is acted on)</td>
<td>Acts as an operant (capable of acting on other resources)</td>
</tr>
<tr>
<td>Determination of value</td>
<td>By the firm</td>
<td>By the consumer, the firm can only make value propositions</td>
</tr>
<tr>
<td>Perception of the external environment</td>
<td>Uncontrollable. Need to adapt to change.</td>
<td>Opportunities to collaborate with others</td>
</tr>
<tr>
<td>Firm-customer interaction</td>
<td>Minimal.</td>
<td>Active involvement of customers in the co-creation process.</td>
</tr>
</tbody>
</table>

SD logic focuses on value generated through collaborative processes involving customers, partners, and employees. SD logic encourages the customer to be a collaborative partner in the co-creation of value process with the firm and promotes a “market with” philosophy. It actively engages the customer in the value creation process, thus building a strong customer-firm interaction. The value determination of the product or service lies in the hands of the customers as opposed to the firm in the GD logic (Vargo & Lusch, 2004). Additionally, it perceives the external environments as resources the firm draws upon for support by overcoming resistances and proactively co-creating these environments. It views these environments as opportunities to co-create value in collaboration with others (Lusch et al 2007).

Sources of innovation in the form of products and services is an execution of the knowledge of the customers (Desouza et al., 2008). The firms interpret the data extracted through customer insights, ideas, thoughts and suggestions to develop their products and services. This is based on the principle that successful product innovation ideas are most likely to come from the end users (Mazur and Archakova 2011). This empowers the customer with a more authoritative position in the innovation process. An example is Dell’s direct model, wherein the company decided to design a value chain that allowed direct interaction and customizability options to the customers who were found to be well acquainted with the sophisticated technical knowledge of the firm’s PC’s (Desouza et al., 2008).

Organization driven innovation on the other hand places more importance on organizations as the driving force. Products and services are designed keeping the requirements of the recipient firms in mind. This innovation targets a group/firm level operation rather than the individual level approach of customer-driven innovation. The firm can be thought of as providing the beneficiaries with primary product and services to improve their management practices or as resources to build complementary products and services on. Examples include Enterprise Resource Planning (ERP) and web services, which are explained later in the paper.

Using these two theoretical foundations, we defined four types of platform ecosystems (Table 2): Product software implementation, Web Services, End-user computing, and Co-created digital ecosystems. The following section defines these platforms in detail.
Source of innovation

<table>
<thead>
<tr>
<th>GD logic</th>
<th>Customer Driven</th>
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<tr>
<td></td>
<td>End User Computing</td>
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<td></td>
<td>Co-created digital ecosystems</td>
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<tr>
<td>SD logic</td>
<td></td>
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<td></td>
<td>Web Services</td>
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</table>

Figure 2. The four types of platform ecosystems

Types of Platform Ecosystems

As the focus of this paper is on co-created digital ecosystems, the other quadrants in the model will be briefly discussed essentially describing how they differ from each other. We focus on this quadrant as the literature has focused predominantly on the role of the firm as the source of innovation in value co-creation leaving a gap in the roles of the customer.

Product Software Implementation

This refers to a systematic approach to effectively integrate a software-based component into the workflow of an organization. It primarily focuses on the process modelling aspect of software (“Product software implementation method”, 2014) and the source of innovation is organization driven. It is based on the GD logic, as the final output is a software product that is used by the recipient firms in an attempt to improve their management practices. One example is Enterprise Resource Planning (ERP). Some of the essential research work in this field has concentrated on the critical success factors of ERP (Hong and Kim 2002), formulation of an integrative framework (Al-Mudimigh, Zairi, and Al-Mashari 2001) and role of the CIO (Willcocks and Sykes 2000). Other examples include customer relationship management, supply chain management, and human resource management systems.

Web Services

Businesses previously interacted using ad hoc approaches that utilized only the basic Internet structure. Web services have now emerged providing a systematic and extensible framework for application-to-
application interaction based on open XML standards (Curbera et al. 2002). They have the potential to enable smooth business-to-business interaction (Agarwal et al. 2005) and e-commerce applications (McIlraith and Son 2001), thus making them organization-driven. They are based on a service-oriented architectural framework that affords an appropriate technical platform for the accessibility of business processes within and across enterprises (Leymann, Roller, and Schmidt 2002). They are derived from the SD logic and enable firms to interact with other businesses irrespective of the systems that they run on. For example, consider that you are visiting a new country, and your travel agent is required to book your flight tickets, accommodation, car rentals etc. according to your requirements. To get the best deal, he/she would have to poll different companies that might be utilizing different, incompatible applications for pricing and reservations. Web services simplify this by building a standard mechanism (platform) to enable dynamic cross-application communication (Curbera et al. 2002). The agent can also add value added services to your travel package through the same mechanism by polling more companies. Businesses use a similar platform to conveniently find resources utilizing the cross-application communication provided by these web services.

**End User Computing**

The emergence of End User Computing (EUC) is attributed to progress in hardware/software and information processing technologies, user-friendly software & languages, and computer literacy of the users in the 1980’s. Customers were gradually becoming aware of the sophisticated technology in use then and were requesting applications that could be tailored to their personal needs. They were demanding applications that could be customized to assist problem solving in different sectors. Various firms used this opportunity to design software applications based on their customer insights. This implies the use of a customer-driven strategy from our earlier discussions. The developed software applications can be considered as the delivered end products designed specifically to meet customer demands implying the use of GD logic and customer-driven source of innovation. Branchecau & Brown, (1993, p. 439), define end user computing (EUC) as “the adoption and use of IT by personnel outside the IS department to develop software applications in support of organizational tasks.” Alavi (1985) and Davis et al (1988) analyzed the conditions that led to the rise of EUC. Many researchers in the 1980’s focussed on analyzing the critical success factors of EUC (Rivard and Huff 1988). Examples of some EUC applications are Excel spreadsheet, office software, end-user scripting for functions in web sites, and development of complex systems through C++ and Java languages. (Fischer et al. 2004)

**Co-Created Digital Ecosystems**

These are the platform ecosystems based on the SD logic. The value in these platforms is produced through a collaborative co-creation process between the firm and customer. It encourages an active interaction, wherein the customer plays a pivotal role in the product innovation. Note that the focus of this paper is on the interaction between the firm and customer in co-created digital ecosystems.

The platform here acts as the operand (the resource to be acted upon) while the knowledge, experience, and skillset of the customer is the operant (a resource that can act on other resources) (Lusch et al., 2007, p. 8). Value in the system is only created once the operant operates on the operand. The operand has minimal utility and value without the action of the operant on it. For example, consider any computer tablet that is available in the market today. Just the tablet on its own has minimal value, as it has a limited functionality. The additional value for the tablet is generated through the creation of a dynamic application market serving multiple requirements. The onus here though lies on the customers to develop the applications.

Firms can provide simple development tools to the customers to enable them to design customised applications. These applications will be crafted according to the customers’ own needs and can be shared in the application market making them accessible to everyone. Firms can also provide the customers with basic designing tutorials to encourage rapid development. An important principle of the co-creation of value is that it should be different from a completely customisable process, which gives a disproportionate amount of power to the consumers in the process of value creation (Prahalad & Ramaswamy, 2004b). To ensure that the firms have adequate amount of control over the co-creation process, certain restrictions are imposed. These controls include regulating the operating system kernel, low-level drivers and utilities, and the graphical user interface (GUI), etc., the precise set changing with respect to time and systems.
(Boudreau 2007). By allowing the customers to only build on these parameters, the platform suppliers can retain some control. Maintaining a balance between these flexibilities and restrictions differentiates the co-created process from a completely customisable one.

**Research Propositions**

The purpose of these propositions is not to extend theory but to scope a research domain to examine the role of customer innovation in value co-creation. We developed these propositions based on conceptual logic generated from literature. We offer two general propositions (P1 and P2) that link the role of customer-driven services on dimensions of firm performance and two propositions that relate to internal organizational factors that we expect will influence the firm’s ability to co-create value through customer innovation.

Consistent with the shift toward customer-driven, service dominant product development discussed earlier in this paper, the remainder of this paper introduces research propositions that examine co-created digital ecosystems. Consumer-to-consumer interaction, dialogue and word-of-mouth marketing afford the customers with an alternative source of information and perception. They aren’t completely dependent on the firms for providing information and have the freedom to select the firm that they want to build a relationship with (Prahalad & Ramaswamy, 2004a). By providing the customers with the necessary development tools, the firms can reach out to a wider range of customers that weren’t accessible earlier (Thompke and Hippel 2002). For example, an individual comes to know through friends or other means of word-of–mouth communication of a platform that enables him/her to build his/her own applications. He/she then uses the firm’s tools to create an application. Restrictions are imposed in such a way that the utility of the application can be only obtained on the firm’s platform system. This way the developer is enticed into buying the particular platform. There is a strong possibility of him/her propagating his/her experience to other prospective buyers. This would expand the existing market of the firm and also simultaneously increase its sales.

**Proposition 1:** *The greater involvement of customers in the co-creation process will expand a firm’s customer base and in turn increase the sales of the firm.*

The co-creation of value process can be divided into different “degrees” based on their intensity and scope (Ernst et al. 2010). Customers can get a range of benefits through the co-creation of value process including monetary gains, information acquisition and learning (Nambisan and Baron 2009), pride of accomplishment (Franke, Schreier, and Kaiser 2010), creating social contacts and enjoyment (Etgar 2008). Customer satisfaction is directly linked to the benefits a customer receives. The higher the degree of co-creation, the more benefits the customer can extract from the process. Empirical observation within the travel industry has suggested that the co-creation of value has a direct influence on customer satisfaction (Grissemann and Stokburger-Sauer 2012). Since both the travel industry and co-created digital ecosystems involve a high level of customer-firm interaction, we can extend the observation to present the final proposition.

**Proposition 2:** *The greater involvement of customers in the co-creation process will increase customer satisfaction with the firm.*

Co-created digital ecosystems as described earlier involve a high level of consumer-firm interaction. By transferring the power of designing applications to the consumers, firms mitigate risks associated with developing applications on their own (Thompke and Hippel 2002). The customers have a better understanding of what they need and can address the subtler aspects of their requirements. This outsourcing of product development can bring down the expenditure associated with understanding customer needs. The trial-and-error cycles during development can be reduced, as the customer will be involved in these iterations. As such, the risk that the product fails to meet customer expectations is hence mitigated.

**Proposition 3:** *The greater involvement of customers in the co-creation process will mitigate the risks associated with product development.*
In addition to risk mitigation, the involvement of the customer in product development will also significantly reduce the intensity of the role of the sales and marketing department in the pre-and post-sales cycles. For example, the responsibility of a salesman working for Apple would be to only sell the iPad (platform). Conventionally, a salesman is responsible for the sale of the product, promotions of complementary products, and value added services, etc. His/her job generally demands a high-level of customer engagement. The use of word-of-mouth marketing in co-created digital ecosystems along with the development of a successful application store/market would adversely affect this interaction with customers. This is because other users would do the promotional activities for the firm and the application market would house most of the complementary products, which would be accessible to anyone using the platform anyway. The anticipated result thus would be reduced importance associated with the sales and marketing department. The firm would need to address this change by evolving the department’s roles and responsibilities (Thompke and Hippel 2002).

Proposition 4: Enabling greater involvement of customers in the co-creation process will necessitate a change in the roles and responsibilities of the sales & marketing department.

Theoretical and Managerial Implications

Firstly, this paper contributes to the literature on co-creation of value. Previous work has focused on the organization as the source of innovation in value co-creation; this paper sets the foundation for future work to explore the organizational implications of empowering the customer. Secondly, it adds to the literature on digital ecosystems by categorizing different types of platform ecosystems and differentiates them based on the source of innovation and the dominant logic (GD and SD). A fundamental aspect of digital ecosystems is the ability to embrace the complexity of customer needs and expectations. This paper raises two fundamental questions that make a call for future research. First, how will enhancing the role of the customer influence firm performance? This is an important question to answer as it is not viable for organizations to pursue greater involvement with customers if it will not positively influence their sales and customer experience. Second, what changes does an organization need to make internally to enable more customer-centric capabilities? Greater involvement of customers is a fundamental principle of agile approaches to development; however, managing the change from traditional product development approaches to an agile approach requires change to an organization’s internal dynamics of product development. Organizations need to not only change their product development methodology, roles and responsibilities; they also need to invite the customer to the design table. It is logical to assume that a more customer-centric design will improve a product’s overall appeal to a customer; however, specific risks related to the internal dynamics of customers as a source of innovation for product development needs to be explored further.

There are several implications for practice. Managers can analyze the 2x2 model to identify the quadrant their organizations fall into and can accordingly switch to a more customer-centric approach if required. Managers are constantly searching for additional sources of value for their investments. The co-creation of value process presents one such solution. Managers can additionally moderate the risks and expenditures associated with product development by delegating the process to the customers. They can enhance their customer satisfaction by proposing schemes to encourage higher degrees of customer interaction. One way is to motivate customers by periodically conducting app development competitions and rewarding the winners. The real challenge to managers lies in accommodating the sales and marketing department after the transformation. With the decline in power and importance, their role and responsibilities would change, leading to conflicts that could damage the firm. Many organizations have already begun to embrace changes in marketing to enhance the influence of customers. New roles such as a social media analyst and customer insight managers are expanding the traditional role of the customer service representative. The real challenge will be adjustments related to the sales role in organizations. As most sales organizations drive revenue, there is an inherent belief that they own the customer. As the involvement of the customer becomes more pervasive inside organizations, the diffusion of customer ownership is expected to meet with great resistance from sales organizations.
Limitations and Directions for Future Work

There are some limitations to this conceptual study. Firstly, this is an explanatory paper that presents a set of propositions but doesn’t explicitly propose any theory. Secondly, the conceptual study supports its propositions with a blend of ideas. It doesn’t follow any single theory as such subjecting it to variable interpretations. Future research is needed to develop a single theory that could entail the concepts presented in this paper. The propositions need to be tested empirically. The independent variable could be the degree of co-creation while the dependent variable could be a set of different performance measures such as customer satisfaction, profitability, sales, market growth, etc. depending on the concerned proposition and the method employed to test for it. An example would be a mixed methods design that would combine surveys, case studies and interviews. Another direction for further work could be to test the impact of co-created digital ecosystems on customer loyalty through a longitudinal study.

Conclusion

This paper developed a conceptual 2x2 model of digital ecosystems using the notion of co-creation of value and assessed the impact of co-created digital ecosystems on aspects of firm performance. Four main propositions were conceptualized. These propositions suggest that use of co-created digital ecosystems by service oriented firms will have a positive impact on the customer satisfaction, expand the firm’s market base and in turn increase the sales, reduce the risks associated with product development, and necessitate a change in the roles and responsibilities of the sales & marketing department.

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