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A qualitative study of the challenges related to the development of product enabled services in technology driven start-ups

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Abstract

Product-enabled service development has been identified as one of the potential sources for sustainable growth and competitiveness of firms in advanced economies. Many firms are in the process of shifting their focus from offering standalone products or services towards integrated offerings of products and services to meet specific customer demands, thus generating additional value. This paper examines technology-based start-ups' attitude towards the development of hybrid offerings as part of their business differentiation and positioning strategies. The main research question is answered within the context of Danish technology-based start-up firms by adopting a case study based qualitative research approach. Five explorative case studies, of in total four different start-ups and one larger firm used as reference case, have been composed to examine the challenges associated with the development of product-enabled services as part of an integrated value proposition. The research findings indicate an insufficient approach towards hybrid offerings where start-ups initially focus on products or services, but not as an integrated hybrid solution. This decoupled approach seems to be linked to the fact that start-ups have limited human and financial resources that is often combined with lacking business and commercialization knowledge. The screening criteria from the new venture funding organisation appear to be very much product focused, as the tangibility of the products, as compared to services, makes it easier to make selection decisions. By basing their selection criteria on a customer-dominant logic, the funding organisation can better support start-ups to embark onto the right competitive path from the very beginning. This would help the start-ups in the design and development of integrated hybrid offerings and avoiding the pitfalls of a fragmented "product first and then service" strategy.

Keywords

Product-enabled services, hybrid solutions, business differentiation

1. Introduction

Advanced economies throughout the world, and the Nordic countries and Denmark in particular due to the higher standard of living, are constantly forced to explore new growth opportunities. The on-going globalization processes have greatly challenged the innovation and competitive strategies of European firms. Today it is much harder for firms to compete and to escape the forces of commoditization since manufacturing and business process knowledge and insights are being widely spread around the world to low-cost regions (Chesbrough, 2011). In addition, the ever-increasing degree of knowledge and information sharing are shortening the product life spans, making it even more difficult for firms to

compete in successfully satisfying customers' increasing demands for highly customized products and services.

These disruptive economic forces create a “commodity trap” - many product-focused firms are sooner or later trapped in a prices game that leads at a minimum to very hard times (Chesbrough, 2011). Firms must take action to avoid this destructive situation and product-enabled service development has been identified as one of the key sources for sustainable growth of firms in advanced economies. There is an increasing acknowledgment of the economic potential from product-service hybrid offerings (Velamuri et al., 2011). The promise and value of product-enabled services can be found in the fact that successful firms always have been able to leverage complementary products and services to enhance their customers' value (Schiling, 2010; Teece, 1986, 2006). Firms must turn to the development and innovation of services in relation to new and existing product offerings as it provides an escape from the route to commodity trap and a solution for growth and competitive advantage (Chesbrough, 2011). Knowledge-intensive services in particular are becoming the engine of growth for firms in advanced economies where prosperity lies in service and business innovation initiatives based on customer integration and co-creation.

Given the potential benefits, many firms are trying to mix products with services in an effort to boost revenue and balance cash flows. However, many of these firms do not exactly know how to structure, market, and sell their combined offerings (Shankar et al., 2009). Several publications have pointed out numerous challenges faced by firms dealing with the transition from product manufacturer to service provider, but product-enabled services development in start-up firms have been given nearly no attention.

1.1 Objective and scope

The objective of this paper is to examine the attitude of technology-based start-ups towards the development of hybrid offerings as part of their business differentiation and positioning strategies. The main research question focuses on the challenges associated with the development of product-enabled services as part of an integrated value proposition. The research question is answered within the context of Danish technology-based start-up firms that are already dealing with or interested in the development of new services and service innovation. The study is exploratory in nature and aims at providing a basis for future more systematic research.

1.2 Relevance

The relevance of the research is based on the on-going emergence of product enabled service innovation and hybrid solutions as a way of escaping the disruptive forces of commoditization. This makes the research relevant to at least three groups of people:

- Entrepreneurs and executive management teams will be able to use some of the research insights to make informed decisions in the process of establishing new services as a key component of their competitive business strategy.
- New venture funding organizations can use the insights to align their selection criteria with emerging business trends, to strengthen their screening process and to enhance the commercialization potential and global competitiveness of their portfolio firms.
- Researchers and students can use the case studies and practical insights that are based on empirical data and existing theories as a basis for future research in product-enabled services.

2. Summary of insights from literature review

The insights from the literature review can be summarized in the following lessons learned.

2.1 Hybrid value creation is becoming a survival factor for manufacturing firms

Hybrid value creation enables firms to escape the “commodity trap” and is increasingly becoming a survival factor for manufacturing firms, especially for those who operate in businesses with high commoditization level (Chesbrough, 2011).

2.2 Little research on product-enabled service development in start-up firms

Several publications point out challenges faced by firms dealing with the transition from manufacturer to service provider, but product-enabled services development in start-up firms have been given very little attention. Since it is highly relevant for existing firms it should also be of strategic relevance for start-ups. Looking at services as add-ons might be inadequate path for firms, as they have to see their offerings as hybrid solutions from the beginning.

2.3 Commercialization strategies for start-up firms lack focus on hybrid offerings

Literature regarding start-up firms’ commercialization strategies is focusing on products and thus missing the commercialization aspects related to hybrid offerings. In addition, many small firms are lacking capabilities for business development and have limited resources making both the development and commercialization of hybrid solutions a difficult task.

2.4 Complementarity vs independence – two characteristics of hybrid offerings

The two underlying characteristics, complementarity and independence, determine how customers value and use an offering (Shankar et al., 2009). The two characteristics lead to four types of hybrid offerings, where the two related to high complementarity are most interesting from a product-enabled services point of view.

2.5 The value-adding attributes depend on the type of hybrid offering

There is no standard formula for hybrid offerings, as different value-adding attributes (individualization, marketing-integration, operational-integration and firm-customer interaction) are all important for the success a specific kind of hybrid offering.

2.6 There are multiple definitions related to hybrid product and service offerings

Many different disciplines and perspectives try to define the concept of combined product and service offerings, including the overall term “hybrid value creation” and definitions like “product service systems”, “Combined product and services”, “integrated solutions” and “servitization.” The term product-enabled service is defined as hybrid value creation though the combination of a product and complementary value-adding services enabled by the product.

2.7 Product and service innovation have multiple points of differentiation

There are fundamental differences in the nature of services and products which cause firms to struggle with a combined product-service development (Ettlie & Rosenthal, 2011). These differences include lack of formalized service innovation process, lack of dedicated investments in R&D for service innovation, type of customer involvement in the development process and source of ideation.

2.8 The potential of the customer-dominant logic for studying product-enabled services

The service-dominant logic (SDL), in which intangibility, exchange processes and relationships are central, is a more suitable way than the traditional good-dominant logic in helping firms to see and think about their business as a service and their products as service enablers (Vargo and Lusch, 2004). SDL can help firms to better understand how the function of service and product are related and in that way serve as a better logic for combining products and services than the GDL. However, Heinonen et al. (2010) argue that even though the SDL has widened the scope of understanding the function of marketing it is still very production- and interaction-focused, thus calling it provider-dominant logic. Co-creation in the SDL is dominated by the perspective of the service provider. They contrast the provider-dominant logic with an emerging customer-dominant logic (CDL) that positions the customer in the centre, rather than the service, the service provider/producer or the interaction. CDL is not a subset of SDL but rather a different perspective that focus on what customers are doing with services to accomplish their own goals, instead of what companies are doing to create services that customers will prefer (Heinonen et al., 2010). If firms only focus on interaction, they will fail to take into account what the role of the firm is in the customer's life. The ultimate outcome of marketing should not be the service but the customer experience and the resulting value-in-use for customers in their particular context (Heinonen et al., 2010). This is also why the customers should not be involved as a co-creation partner but instead the firm should be involved in the customer's activities, so it is the customer's context that is in focus and the customers who control the value creation.

Value is created within experiences and focusing only on value creation within the interactions between service provider and customer is too narrow, as not all experiences are co-created with the service provider (Heinonen et al., 2010). This might contain a business opportunity for the service providers, as customers create value beyond their role as participators. Service providers should expand their perspectives in order to get to know their customers on a deeper level, i.e. going beyond the co-creating activities to identify activities that customers are involved in with other individuals, companies or service systems.

2.9 Moving from a product to a service provider includes multiple challenges

Transition from product manufacture to service provider implies multiple challenges related to change in business model, change of firm's mind-set, the way customers are involved, development of new managerial capabilities and cultural changes in the business (Oliva & Kallenberg, 2003; Shankar et al., 2009). For example, Heinonen et al. (2010) identifies five major challenges for firms moving from a provider-dominant logic to a CDL, based on the three issues. These challenges include firm involvement, firm control in co-creation, visibility of value creation, scope of customer experience and character of customer experience.

2.10 Services provide a better source of innovation for small firms

The innovation capacity in small firms is in general at a higher level on the service side than on the manufacturing side. Beside this, smaller service firms tend to be more innovative than smaller manufacturing firms.

3. Research methodology

The selection of a case study-based qualitative research approach was motivated by the fact that there are relatively little known about the challenges start-up firms face in relation to the

development of hybrid offerings (Velamuri et al., 2011). Eisenhardt (1989) defines the case study approach as “a research strategy which focuses on understanding the dynamics present within single settings” (Eisenhardt 1989, p. 534). The case study based qualitative research approach adopted here is based on multiple explorative case studies of Danish technology-driven firms that have received funding from an investment organization supporting technology-based start-ups. However, the methodology has been enhanced by using a single-case study of a larger well-established firm that did already move from a purely product market orientation to one focusing on hybrid solutions. This single-case study is used as a reference in the development of the list of issue addressed during the interviews. The funding organisation that are funding the four start-ups case firms has also been addressed with an interview to examine their perspective and attitude towards product-enabled services in the firms they screen or fund. The research method comprised of the following steps: literature review; problem formulation; case selection; design and formulation of interview questions; data collection and preparation of case profiles; data analysis; shaping insights; enfolding existing literature; articulation of recommendations. The contacts to the case firms were established through a preliminary interview with the CEO of the Danish investment firm SDTI. SDTI have a portfolio of about 70 start-up firms and invests each year in approximately 15 new innovative Danish start-up businesses with international perspective and potential. These firms are all based on innovative product and/or service ideas in various kinds of technology driven industries and are geographically located in all places of Denmark. This approach to the selection was driven by three reasons. *First*, the firms were already preselected for a certain level of innovation capacity, i.e. these are firms that are expected to be open towards newly emerging trends in the global business environment. *Second*, the fact that they were funded by an organization supporting innovative start-ups allows examining how such organizations perceive hybrid value offerings as part of the overall business strategy of new start-ups. *Third*, the firms were located in various parts of Denmark and operated in multiple industries securing less biased data. Six firms from SDTI’s portfolio were selected based on two criteria: i) the age of firm being under two years, and ii) the business is dealing with or willing to deal with innovative product-enabled services. The six firms were contacted and the four responded positively and agreed to cooperate in the data collection process (Table 1).

3. Analysis of results

This section summarizes the main results from both the within-case and cross-case analysis of the case profiles constructed on the basis of the collected data. The observations associated to each of the four start-up firms and the larger reference firm, have one by one been examined in order to cluster related observations. The clustering have resulted in 27 dimensions that are ranked by the relevance for the four start-up firms, with the dimensions associated with most observations first. The dimensions are divided into two groups depending on relevance. The first group contains those dimensions that have been found to be most relevant, as they have been found in more than two cases (Table 2). The second group of dimensions have been found to have less overall relevance, since they only are represented by two or less observations. An investment manager at SDTI was also interviewed as some of the dimensions were related to the role of SDTI as funding organisation. The additional interview provided a broader perspective on firms’ attitude towards product-enabled services not only from the start-up point of view but also from the point of view of the funding organisations supporting the start-ups. The following list summarizes the relevant observations extracted from the interview with the investment manager:

Table 1 Overview of case firms

Firm name	Location	Firm age	Industry
Me mover ApS	Copenhagen	1 year	Transport
IndeklimaTest ApS	Odense	1 year	Biotech
Brainreader ApS	Aarhus	1 year	Software (Medical)
Symphonic Playground ApS	Copenhagen	1 year	Software (Music)

Table 2 Most relevant observations from cross-case analysis (X means “no data”)

Dimension	Case A	Case B	Case C	Case D	Case E (Ref.)
Nature of offer	Mostly product-focused	Mostly service-focused	Mostly product-focused	Mostly product-focused	Both product and service focused
Formalization of innovation process	No formalized product and service innovation process	No formalized service innovation process	No formalized process, new service development is left for the future	Specific agile approach towards product development but none towards services	X
Value proposition (VP)	No clearly defined VP	No clearly defined VP	Clearly defined VP	No clearly defined VP	Clearly defined; Knowledge embedded in the products is used as USP
Impact of people-intensive services	People-intensive services require management of properly skilled employees	Digitization of processes	People-intensive services requires management of properly skilled employees	X	Difficulty to locate and hire better-qualified people to replace staff with obsolete skills
Resource capacity	Lack of resources to consider service development in parallel with products	Resources are allocated to development of the initial idea only	Lack of resources to consider service development in parallel with products	Lack of resources to consider service development in parallel with products	X
Service testing	Services are tested real-time	Services are tested real-time	Services are tested real-time	Services are tested real-time	X
Management ICT systems *	Employment of currently available commercial software systems	X	X	X	Investments in systems and structures like CRM, to handle the service component

Table 2 (continued)

Dimension	Case A	Case B	Case C	Case D	Case E (Ref.)
Exploration of tacit knowledge	Through social media and through firms' user community	No particular way	Through firms' user community	Through firms' user community	X
Competences of entrepreneurial team	X	Lack of business and commercialization related experience and skills	Entrepreneurial team with multiple competences	Lack of business and commercialization related experience and skills	X
User community as innovation source	Using user community as a source of innovation	X	Using user community as a source of innovation	Using user community as a source of innovation	X
Service customization	Customization is seen as part of future services	No customization of service as it will add no value	X	X	Services help customization; important competitive advantage
Complexity of the problem faced by customers	Low level	High level	X	Low level	X
Solution complexity	Low level	High level	X	Low level (a lot was needed to reach that level)	X
Branding	No branding of the link between the product and services	X	X	Branding of the total solution	Brand products and services through other well-known architect brands
Product testing	Systematic tested internally and through beta tests	X	Systematic tested internally and through beta tests	Systematic tested through beta tests and focus groups	X
Offering the combination of product and service as a platform for 3rd party value propositions	No intention	No intention	X	No intention	X
Impact from external factors	X	X	a) Service development opportunities are affected by legal issues b) Venture firms are product focused	X	Shifting amount and allocation of public funding

- The screening process of new technology-driven start-up firms focuses on the business model presented by the entrepreneurial team, i.e. the business case with a focus on potential revenue streams.
- Product-driven businesses are primarily screened and evaluated on the basis of their products. Prototypes and proof of concept are important factors in the initial phase of the development.
- SDTI is primarily investing in development projects that are targeting commercialization within a relatively short period.
- The entrepreneur has to invest at least 8% and SDTI covers the rest of the needed capital up to DKK 3.5 mil. in the pilot phase. A private investor has to be included if further investment is needed.
- Patents applications, patents or at least opportunities for patents are considered to be highly relevant when screening product firms. Some start-up firms, depending on their specific offerings and industry, are not attractive for investment if the firm does not possess a patent.
- The business idea and the possibility to commercialize the idea relatively quickly are considered to be highly relevant when screening service businesses, where IPR is more difficult to protect.
- SDTI see a tendency in the competences of the entrepreneurs, especially in very knowledge-intensive businesses: they are missing commercialization skills and thus are very focused on research and development.
- The quality of the entrepreneurial team is, like the business concept, a very important factor for SDTI when screening the firm. SDTI has to be convinced that the team can reach the agreed milestones.
- SDTI's procedure is to screen new potential start-ups, invest in the start-ups and exit their engagement with the start-ups within 3-5 years, in order to invest in new start-up firms. There are not enough resources helping entrepreneurs in shifting their business models to a better services focus.

4. Summary of insights

This section summarises the main research insights.

4.1 Informal innovation process

Start-ups should not give up attempting to structure their development processes by taking into account the differences between product and service development and aiming at higher business efficiency. Funding organizations could help in the development of programs and services to support start-ups and help improving their innovation processes.

4.2 Product-enabled services not part of an integrated value proposition

The entrepreneurs and funding organisations need to pay more attention to hybrid offerings from the very beginning as an integrated part of the business model. Technology start-ups have to design the hybrid offering as such and not as a product with services added at a later point. Hybrid offerings are a question of differentiation and, in the end, survival, which implies that choosing a product-only strategy from the beginning will result in missed opportunities and loss of possible competitive advantages (Chesbrough, 2011).

4.3 Lack of resource capacity

Start-up innovators should continue to pursue a focused strategy as their limited financial and human resources force them to focus on effectively delivering consumer value. However, services could provide new opportunities for the start-ups because the service innovation capacity in small firms is more or less at the same level as in larger firms (Forsman and Rantanen, 2011). Services provide start-ups with better competitiveness and innovativeness as compared to larger firms (Forsman and Rantanen, 2011). Start-ups appear to face a paradox regarding resource allocation and commercialization strategy. The limited resources force the start-ups to focus on either products or services, which implies a fragmented commercialization strategy.

4.4 Real-time service testing

Given the differences between product and service development, the testing phases should be designed as part of the overall development strategy (Ettlie and Rosenthal, 2011). Start-ups should pursue the application of the real-time testing approach in the case of services as well. The new venture funding organizations should support the start-ups in this approach and through their influence and activities in the start-ups, secure real-time testing of the service.

4.5 Competences of the entrepreneurial team

This insight is highly relevant for governmental stakeholders as political resources need to be allocated for development of programs that lead to better awareness of PES as differentiator within the context of commercialization. Especially targeting entrepreneurs for whom lack of resources and skills have a huge impact on the firms' performance and wrong decisions can have devastating consequences. The commercialization strategy should, as pointed out in the literature, reflect the firm's commercialization environment (Gans and Stern, 2003; Gebauer et al., 2010). Start-ups risk choosing a losing path from the very beginning if not aware of the influencing factors within the commercialization environment (Gans and Stern, 2003).

4.6 User communities as a source of user-driven innovation

Start-ups appreciate the establishment of user communities around their businesses because it allows for the possibility for future user-driven innovation initiatives and provides a gateway for the firms to establish firm-customer relationships through two-sided communication and information sharing (Brax, 2005; Vladimirova et al., 2011). Start-ups must see customers as primarily an operand resource, instead of an operant resource as in the GDL, because they are active participants in relational exchanges and coproduction (Vargo and Lusch, 2004). Even though firm-customer relationships are important, start-ups should not allocate too much of their scarce resources as the remaining three value adding attributes are more crucial, depending on the type of hybrid offering (Velamuri et al., 2010).

4.7 ICT management systems and human resources

Start-up firms should actively begin to locate potential human resources at the earlier stages of their establishment, since it could be too late to start searching for resources when the services have been developed and launched. One way for start-ups to enable this process could be through participation in different kinds of networks, which not only could promote the entrepreneurs' activities but also help the firm establish relationships with potential human resources. The reference case shows that active engagement in service enabling

networks can also be used as a source of new knowledge and information, which might could be transferred into novel service offerings.

4.8 Customization of hybrid offerings

As pointed out in one of the previous insights, entrepreneurial teams face various challenges related to PES due to their limited amount of human and economic resources. Customization is as pointed out by Velamuri et al. (2010) an important source of hybrid value creation and the start-ups have to recognize the diversity in the customer needs as pointed. The reference case emphasises that services help customization and is seen as an important competitive advantage for larger firms, as it is a survival factor. Start-ups should address customization, as a part of their hybrid offering, but depending on the kind of hybrid offering the start-ups should first of all focus on the critical value-adding attribute, due to their limited amount of resources. The start-ups did already digitalize various components of their business, and should continue to do this as it makes the offering easier to scale.

4.9 Screening and funding of start-up firms

It appears that the selection process of funding organizations is very much product driven. In many cases the funding organizations see the value from refocusing the firms to more service-driven business models. However, they do not have the time and enough resources to help such refocusing. The product-focused funding approach of the funding organization motivates start-up firms to initially focus on a more tangible product development process in order to reach the important milestones and get further investments. Basing the selection criteria on a customer dominant logic could provide a better basis for businesses with hybrid solutions. It is not easy for firms to change their business mind-set and remaining parts of the old manufacturing mind-set can prevent the right adoption of the new service mind-set (Brax, 2005). The start-ups have an advantage because they have the possibility to embark onto the right competitive path right from the beginning. If existing funding mechanisms support the start-up firms in moving to the design and development of integrated hybrid offerings from the beginning, they can avoid the pitfalls of a fragmented “product first and then service” strategy. The start-ups and funding organisation must understand that services are the fundamental basis of exchange (Vargo and Lusch, 2004). The insight indicates a need for services or programs that can help start-ups refocusing their business model towards more service-driven business and affect the GDL that are predomination in the start-ups, by helping start-ups adopting a more CDL (Heinonen et al., 2010; Vargo and Lusch, 2004).

4.10 Hybrid offering as a platform for 3rd party value propositions

It appears that start-up firms have little knowledge about existing theories of innovation focusing on specific commercialization strategies (Gans and Stern, 2003; Teece, 1986, 2006). Funding organizations could cooperate with university education programs and innovation offices in order to develop professional training and knowledge sharing programs targeting executive managers of start-up firms. Such cooperation could become a new and innovative resource that could help start-up firms in reinventing their value propositions.

4.11 Impact of external factors

Start-up managers have to identify and be aware of the external factors that can have influence on the service development and the service itself. In one of the cases legal issues caused the firm to follow a transaction-focused business model, as the product could not have been sold as a service, even though this approach in many ways would be preferable for all the stakeholders.

5. Conclusions

This paper focused on examining the attitude of technology-based start-ups towards the development of hybrid offerings as part of their business differentiation and positioning strategies. Relevant literature related to product-enabled services and service business has been reviewed in order to identify possible issues and challenges faced by firms in relation to product-enabled services development. The final results are based on the joint analysis of five case studies of technology driven firms in Denmark.

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