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Metamodelling Servitization: conceptualizations of transition

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ABSTRACT
In this paper we identify three generic conceptualizations of the transition associated with servitization in the literature; the basic continuum model, the continuum with steps, and the model of punctuated stages.

Keywords: industrial services, servitization, transition process, integrated solutions, capital goods.

1 INTRODUCTION
In response to the growing manufacturing capabilities of developing countries, former traditional manufacturing firms are increasingly servitizing their business, i.e. they are organizing themselves to deliver solutions made of both products and services. The relevance of the servitization phenomenon is by no means anecdotal. Neely’s (2008) international study of companies classified as manufacturing in terms of their primary SIC codes shows that 30% of the studied companies (3,196 out of 10,634) have actually servitized. Based on an analysis of the EUROSTAT 2007 data, Santamaria et al. (2012) conclude that the average weight of services in the sales of European manufacturing firms is around 6%. Similar results emerged from the 2006-2007 European Manufacturing Survey which is based on a sample of 3376 companies; the vast majority of these ‘manufacturing’ companies offered some sort of service (Lay et al. 2010) and that around 16% of their turnover, directly or indirectly invoiced, came from the sale of service (Bikfalvi et al. 2012). Similar trends can be observed in USA and Asia as well. For example, Lertsakthanakun et al. (2012), for example, report that the servitization level of Thai companies has increased from 18% to 24% in the 2010-2012 triennium, although they still consider it low compared to similar countries in the region such as Malaysia and Taiwan.

While research activities in this area are rapidly increasing (Baines et al. 2009b), a closer look at the servitization literature reveals that the concept of servitization in itself is unclear. It has been defined or conceptualized as:
• “a wave consciously driving … companies into services to gain competitive ground” (Vandermerwe & Rada 1988, 315)
• “offering fuller market packages or “bundles” of customer-focussed combinations of goods, services, support, self-service, and knowledge… [by which] …services are beginning to dominate.” (Vandermerwe & Rada 1988, 314)
• “the innovation of an organisations capabilities and processes to better create mutual value through a shift from selling product to selling PSS.” (Baines et al. 2009b, 555)
To be clear about when the phenomenon is observed in the reviewed papers we need a pragmatic way to define servitization. For our research purposes in this paper, we conceptualize servitization as a change process whereby a former manufacturing company (deliberately or in an emergent fashion), introduces service elements in its business model. While this may not fully correspond to all previous definitions, we
find it sufficiently clear for the current study. Furthermore, we base our conceptualization on a process-based view on defining services (see also Sampson 2012; Brax 2013).

Among the most influential studies that model the transition process is the paper by Oliva and Kallenberg (2003). Other transition related studies have appeared later proposing variations or alternatives (list here). Although several literature reviews charting this area have already appeared (Baines et al. 2007; Baines et al. 2009b), none of these appears to systematically focus on the transition path. Martinez et al. (2010, 453) note that while there are generic change models available in strategic management, “there are no models specific to the issues of servitization as a change process”. Based on reviewing 169 servitization-related papers, Velamuri et al. (2011, 27-28) conclude that

“static assessments will not be enough to unpack the value creation paradox in hybrid value creation.

Dynamic assessments of the transition paths that lead to hybrid value creation and farsighted conceptualizations of the overall innovation strategies that are needed to realize the value creation promise in hybrid value creation are desperately missing and thus need to be researched.”

Thus, we argue that the abundant literature on servitization still lacks a comprehensive process model of the transition. In this paper we synthesize generic servitization patterns from the literature, and develop a meta-model of the transition process of servitizing manufacturers based on a focused review of the literature.

We group our findings based on the type of servitization model or generic conceptualization, and proceed starting from the most rudimentary concepts towards the more sophisticated and detailed models. We identify generic conceptualizations of the transition: 1) a gradual continuum model, 2) a continuum model with steps, and 3) a punctuated model with steps. Within the generic types, we identified variations of the model, and our analysis aimed at synthesizing these into one coherent description of each. In addition we note that many typologies do not indicate a transitional aspect, and many describe servitization as an end-state (e.g. ‘servitized offering’) and through a particular hybrid offering (e.g. integrated solutions). We next present our methodology, and move forward to explain and discuss each of the generic conceptualizations respectively, and briefly discuss our contribution and future research topics.

2 METHODOLOGY

2.1 Searches

We searched all major databases in November 2012 for research literature (number of identified articles appear in brackets): Ebsco (89), Emerald (51), Proquest (61), Sage (8), Science Direct (37), and Springer (28). We set out to identify sholarly or peer reviewed research papers that focus on servitization and hence limited the search to titles, abstracts and keywords where this was possible – papers using the term in full text only were considered low in relevance. In addition to search words servitiz* and servitis* we used the terms service infusion and integrated solution as well, knowing this term is preferred by some journals. Search strings were kept as similar as possible as identical searches were not always possible due to the differences in the provided search engines. In broader databases searches were limited to the business and management field, as some search terms are used in other fields (e.g. ‘infusion’ in chemistry). For the term integrated solutions we limited the sample to 50 most relevant papers in Ebsco due to relevance issues. In total, we identified 274 articles.

2.2 Filtering

We first compared the article sets and removed duplicates, which reduced the papers to 193. Next, articles were sorted based on relevance following a systematic procedure. Based on data available on the abstracting information, non-articles (such as editorials, book reviews, and opinion pieces) were separated from the research papers (total 176). Then, articles that clearly did not represent the broadly conceptualized area of business and management studies were omitted (e.g. literary science, total 129);
then articles not concerning manufacturing industries (92) and servitization (78), and finally, 5 articles that showed up in searches but were inaccessible in full-text. Thus, the final set consists of 73 articles.

2.3 Analysis procedure

The articles were first carefully read through, and reviewed and sorted, using the Atlas.ti software for analysis and an Excel file to record findings, as follows. A brief, unstructured description note of the article was written down. Then, the comparisons described in Table 2 were made. An Excel sheet was used to document findings. Steps 1-6 in the procedure were done based on reading through the article. Steps 7-10 were based on a detailed content analysis using the Atlas.ti program. Although in the quantitative research tradition a duplicate analysis has been considered as improving reliability (Krippendorff 2004), the articles were divided between the authors due to the large amount of reading, and to manage time as coding papers with software takes more time than reading in the usual manner. During the analysis the authors used a single Hermeneutic Unit (Atlas.ti file) which was duplicated for each and synchronized often, enabling the authors to see and discuss each others’ coding, kept regular phone meetings to develop the analysis procedure and to consult for an opinion when appropriate.

A focused coding structure was generated at the beginning of the analysis, but new codes were allowed to emerge from the data along the analysis. As an example, the authors set out to code the stages of the models, but identified some models represented a continuum rather than a more precise model, and the codes ‘continuum start’ and ‘continuum end’ were created. Codes as such are not the ultimate goal of the analysis, but their purpose was to label and tag observations and in this manner enable a systematic further comparative analysis across the data. However, codes can serve as simple tags or they may develop into categories and concepts. When a new code was created, the code was described in the notation spaces and memos provided in the software. Further observations and interpretations were collected in this manner. This approach also ensured both researchers used the codes in a similar manner.

After the initial round of coding, the analysis progressed gradually and iterative in parallel with writing: as a developing concept was identified and discussed between authors, further exploration and more detailed coding of the data supported the analysis. As the main types of meta-models were observed, the coding was used to derive queries that enabled a thorough but focused analysis.

3 CONCEPTUALIZING TRANSITION IN SERVITIZATION

In our analysis, we noted that a majority of the published research concerns a specific type of ‘servitized offering’ — in other words they focus on an end-state without addressing the transition. Since our aim is to look at transition models, we exclude such studies from this discussion. We next present the main conceptualizations, but first, however, we need to address the challenges we faced with the terminology.

The literature lists many alternatives to implement servitization: product-service-systems, integrated solutions, systems integration, turn-key solutions, and so on. These are characterizations of offerings. The offering of integrated solutions and the like can be seen as a ‘symptom’ of an underlying servitization process of the firm. Servitization is a change process whereby a former manufacturing company (deliberately or in an emergent fashion), introduces service elements in its business model. The presence of these symptoms or signifiers as such (e.g. the offering of integrated solutions), however, does not imply that the company has servitized, i.e. it does not necessarily mean that service elements have been added to a previous business model which was traditional manufacturing. Equivalently, the servitization process does not necessarily imply the delivery of integrated solutions as an end point as service dominance can increase even further. Nevertheless, in our visualizations, we include the level of servitization as the dependent variable, and conceptualize the other variables of interest as the explaining variables. We do not focus on any particular variable since literature has identified several independent variables. We deal with these in the discussions of the studies we relate with the basic models.
3.1 Gradual continuum model

The gradual continuum models address a change happening, but only address the direction of transition through identifying the start and the end, or utilize terms such as ‘increase of servitization’ without further detailing. Yet, some studies are very detailed but are categorized as basic model because they identify a shift between two positions, such as traditional manufacturing and integrated solutions in Brady et al. (2005). Figure 1 visualizes this generic conceptualization of transition. In the figure, letters A and B denote the start and end positions, respectively, which are observed at different points of time. Letter a marks the transition step. The continuum view emerged from such statements:

“There are various forms of servitization. They can be positioned on a product-service continuum ranging from products with services as an “add-on”, to services with tangible goods as an “add-on” and provided through a customer centric strategy to deliver desired outcomes for the customer.”

(Baines et al. 2009b, 556)

In this synthesis, the focal concept is the relative importance of physical goods and services in the firm’s total offering. For Brady et al. (2005) the focal variables are four sets of organizational capabilities: systems integration, operational service, business consulting, and financing. Brax (2005) concludes that the literature at that time conveyed a continuum view with incremental transition and argues that implementing a more punctuated shift should allow firms to break rigidities not beneficial for the services approach.

3.2 Continuum model with steps

Continuum models with steps are a more detailed variation of the basic gradual continuum described above. In addition to the start and end position, these studies describe various phenomena associated with the transition process but do not intend these as stages of transition that are likely to take place in a particular order (Figure 2). Note we emphasize a difference here between the terms of implementation step (marked with X in Fig. 2) or offering type (illustrated withy circles) and a transitional stage (reclangles). Although several steps and offering types may be indicated, the transition is conceptualized as a shift between a non-servitized and a servitized stage. The modification of Tukker’s (2004) classification by Baines et al. (2009a, 499) is an example of this type of approach. It identifies a continuum between product and service and arranges three PSS offerings along the way but does not suggest the transition proceeds through them in a particular order.

3.3 Punctuated model with stages

These models identify positions signifying a stage or a level of servitization and conceptualize transition as a pattern in which firm moves from one step to another (Figure 3). The number of stages may vary between models. The focal variables vary, but positions (A, B, C, D) typically signify a particular offering type or characterize the provider-customer-relationship. Some of the models identify the transitive steps between the positions (a, b, c) through challenges to be resolved, capabilities to be built, or other types of implementation steps. The focal variables vary and can be the composition of the offering offering.
(Vandermerwe & Rada 1988) or relational integration between the focal firms (Holmström et al. 2010; Martinez et al. 2010; Bikfalvi et al. 2012).

Figure 3: Punctuated model with stages

In their seminal work Vandermerwe and Rada (1988) identify three stages corresponding to three different types of offerings through which the importance of services increases in corporate strategy: i) goods or service; ii) goods with services; and iii) goods, services, support, knowledge and self service. Since they consider pure services as a potential starting point, their view of servitization represents moving towards holistic hybrid offerings. This view is clear in that it makes the distinction based on the type of the element added, but is not helpful in further distinguishing between different mixed offerings. Also, it can be debated whether companies add knowledge and self-service on the later stages of the evolution as these may be easier to implement than the more traditional provided services.

Davies (2004) modeled the capital goods value stream in the industry level, and noted that companies can move forwards, i.e. ‘downstream’, as well as backwards or ‘upstream’, from i) manufacturing, to ii) systems integration, iii) operational services, and iv) service provision. Thus the focal variable in the model can be viewed as being position in the vertical supply chain. Positions are explained through the function of each stage in the chain, such as designing and integrating systems. (Davies 2004) Later work addresses further details in the original model, for instance by comparing system sales and system integration business models (Davies et al. 2007). Holmström et al. (2010) develop a punctuated model based on the customer asset visibility as focal variable. By visibility they refer to data and information about customer’s asset maintenance processes and decision making. The default constellation is i) arms length after-sales service, and the value constellations that follow are ii) collaborative service supply chain, iii) condition based maintenance as a service, and iv) visibility based asset management. In moving towards the more advanced constellations they identify three transition challenges, respectively: a) resource positioning, b) planning, and c) feedback challenge (cf. Figure 3). (Holmström et al. 2010)

Martinez et al. (2010) focus on the customer-supplier interactions to support an evolving offering. They conceptualize transition through four offerings: i) product with peripheral service, ii) product with service, iii) customized product and service, and iv) total solutions. Their focal variables are intensity and scope of integration between internal functions, the organisation and the customer using the offering, and with suppliers. Based on a large scale survey, Bikfalvi et al. (2012) identify four typical stages of servitization based on the number of service offered and on the revenues companies realize with them: i) traditional manufacturers, ii) providers of standard services, iii) service high performers, and iv) non-effective servitizers. Their conclusion is that servitization is positively linked with increasing service networking activities of manufacturing companies, which supports the approach of Martinez et al. (2010).

4 DISCUSSION

We have differentiated models that suggest implementative steps or map the position of offering types in a continuum and the models that suggest transitional stages in servitization. Most stage approaches
Brax and Visintin perceive the firm as developing the capabilities through particular stages but note that the firm can continue providing offerings associated with the previous stages as well. In addition to the transition models, we recognized a number of servitization typologies without transitive relations. In other words, these papers do not arrange different servitization-related business models as developmental steps or differentiate them based on a servitization level. Good example is for instance the typology by Kujala et al. (2010). We have not included these in our analysis due to the lack of transitional aspects but we recognize this as an important future research avenue. The typologies, as well as the different end-state models should be analyzed against the punctuated transition model, to further integrate the field. Moreover, we recognize that in this task we will encounter alternative, equally servitized transition steps. The challenge thus will be to compare the focal variables used in the studies to identify a generic way of arranging the different alternatives to implement servitization in the offering level.

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