SERVICE DELIVERY SYSTEMS: THE TRANSFORMATIONAL CONTEXT

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Abstract

This paper suggests that many of the works found within the services literature require re-appraisal to ensure their relevance and utility in a radically changing business landscape. Approaching inquiry from a General Systems Theory perspective the paper proposes a new framework for future research on service design through an operations management lens. This framework suggests that research is needed to address the transformational context of service delivery systems, in particular the correlation of 'customer input' type with 'transformation types', categorized by material, information, and customer. This potentially provides archetypical forms of service delivery systems which are more closely aligned to organizational practice. These archetypes may be used for the logical derivation of future hypothetical propositions and subsequent confirmation through empirical investigation and thus provides a platform for future research. We suggest that this approach facilitates the pursuit of theory which informs organizational practice in a changing and expanding service context.

INTRODUCTION

The service industry is recognized as an important contributor to the economy in many developed countries with contributions to Gross Domestic Product (GDP) reportedly exceeding 70% (Machuca, Gonzalez-Zamora, and Aguilar-Escobar 2007). As a research field Services Management is a complex subject with notable diversity in the definition of the phenomenon under study. Recently, this has been further compounded by emerging phenomena such as servitization (Cook, Bhamra, and Lemon 2006; Vandermerwe and Rada 1988; Wise and Baumgartner 1999), and the growing interest in the development of a 'science' for services (Chesbrough and Spohrer 2006). To address the diversity within the field, academics have expended effort on the characterization and classification of services. A review of the literature surfaces a plethora of frameworks, classification schemes and conceptual models representing a variety of perspectives. Initial exploratory research into these frameworks suggests that the major paradigm in the services literature, which transcends SERVQUAL (Parasuraman, Berry, and Zeithaml 1991; Parasuraman, Zeithaml, and Berry 1985, 1988), the service-profit chain (Heskett et al. 1994), and a variety of service operations frameworks (Chase 1978; Schmenner 1986; Silvestro et al. 1992), is one of customer-centricity with an emphasis on customer presence. It is unsurprising therefore, that the extant literature in services management is predominantly concerned with customer-contact environments, customer-facing operations, or customer-processing activities. This emphasis is somewhat concerning.

Given recent developments in the service landscape such as advances in information technology, it is an opportune moment to question the overwhelming customer-focus of these frameworks. While we agree that customer centricity is an important concept for both services marketing and service operations, we do not equate this with customer presence. This issue is of particular importance to companies focused on the provision of information-intensive services; a group contributing a large proportion of GDP (53% of the US GDP in 1997) (Karmarkar and Apte 2007). Given this contribution it is disconcerting to observe that Service Operations Management (SOM) research appears to have neglected this segment of the service sector in favor of physical services such as restaurants, hotels, transportation, or delivery services (Karmarkar and Apte 2007). In a broad review of the services operations management literature Machuca, Gonzalez-Zamora, and Aguilar-Escobar (2007) find that published research and

pipeline research in the sectors of financial services and telecommunications, which are information-based environments, account for 9.4% and 6.9% respectively of the total research output. In addition, we suggest that the focus of many of these studies has been restricted to the customer contact part of these operations (see for example, Aksin and Harker 1999; Athanassopoulos and Iliakopoulos 2003; Boshoff and Allen 2000; Ding, Verma, and Iqbal 2007; Frei and Harker 1999; Mulligan and Gordon 2002; Rossiter 2003; Zomerdijk and Vries 2007). Here we reflect on Levitt's Marketing Myopia (1960), and suggest that current SOM research is suffering from the same condition. We believe that significant benefits for industry and commerce may be attained from research which seeks to integrate both customer contact and non-customer contact aspects of service delivery: a focus on the end-to-end process.

The process construct has been widely adopted by both service marketing and service operations as a convenient unit of analysis. Again, our observations suggest that the 'service process' is often interpreted as a 'customer process', a part of the process where the customer is involved, or a service facility where the customer is present. We therefore highlight an important semantic differentiation between the 'service process' and 'processes in a service context', the latter focused on a 'transformational perspective', encompassing the entire set of activities necessary for delivering services to the customer. This demands a new conceptualization of the design of service delivery systems which emphasizes a holistic approach; one which may be informed by the systems paradigm (Ackoff 1980; Checkland 1981; Katz and Khan 1966; Von Bertalanffy 1968).

The argument presented within this article seeks to emphasize the limitations inherent in many service frameworks; it attempts to provide new insights for designing holistic customer-centric delivery systems; it posits the 'transformational context' as an alternative paradigm for future trajectories for services research.

WHAT ARE SERVICES?

Over recent decades services management academics have devoted a great deal of energy to the definition and characterization of 'services', especially their differentiation from goods. Despite this work however, there is still a lack of consensus on a general definition of services

(Johns 1999). To provide a context for our argument, we briefly summarize three distinct perspectives of services.

First, services can be thought of as an entire industry which is not concerned with the production of manufactured goods. The Service Industry as a whole comprises distinct segments such as financial services or telecommunications, which are all different (Lovelock 1983). Economists brought about this perspective for the purpose of classifying and reporting those activities in national statistics (Johns 1999). From a management perspective, however, industry-based classification schemes are of little help since they overlook the fact that service operations characteristics often vary considerably within specific industries and even within organizations. This makes the management of different service operations or service processes difficult (Silvestro et al. 1992).

Second, a service can be seen as an outcome, "what the customer receives" (Mohr and Bitner 1995, p.239). It has been well documented that service outcomes share four specific attributes, often referred to as IHIP, that distinguish them from manufactured goods: intangibility, heterogeneity (variability), inseparability of production and consumption, and perishability (Sasser, Olsen, and Wyckoff 1978; Zeithaml, Parasuraman, and Berry 1985). Although these characteristics are often regarded as the core paradigm in services marketing (Lovelock and Gummesson 2004) their validity has been subject to heavy criticism (Johns 1999; Lockyer 1986; Lovelock and Gummesson 2004; Sampson and Froehle 2006; Vargo and Lusch 2004b). In addition, while arguments have been put forward challenging the applicability of IHIP to physical services such as food services, retailing, or transportation services, Karmarkar and Apte (2007) argue that it is also inapplicable for information-intensive services, such as telecommunications or financial services, which share attributes of both goods and service products.

Last but not least, a service can be described as a process (Fisk, Brown, and Bitner 1993), "the manner in which the outcome is transferred to the customer" (Mohr and Bitner 1995, p.239). Shostack (1987) claims that services are processes, "series of interactions between participants, processes, and physical elements" (Tax and Stuart 1997, p.107). Service processes generally involve customer contact (Chase 1978) or/and customer participation (Shostack 1987), which is often regarded as the most striking difference between manufacturing and service operations

(Edvardsson and Olsson 1996; Walley and Amin 1994). Kellogg and Nie (1995) coined the all-encompassing term 'customer influence' to acknowledge that in services the customer takes part in the process of production and delivery. As a result of the well-accepted view that manufacturing and service processes are differentiated by the extent of customer influence on the production process, it would seem that service operations research has been biased towards service environments characterized by a high degree of customer contact (Slack, Lewis, and Bates 2004).

In a landmark article Roth and Menor (2003) call on researchers to investigate service design issues through an operations management lens. This article responds to that call. First, we review and critically appraise some of the major works in the literature relating to service design, especially service process design. Second, we propose a new conceptual framework for service delivery system design that combines insights from the Unified Services Theory (UST) (Sampson and Froehle 2006) with the concept of the 'transformational context' of processes in a service environment.

INSIGHTS INTO SERVICE PROCESSES

While the product-process matrix (Hayes and Wheelwright 1979) had a significant influence on the field of operations and production management, particularly the selection of appropriate production processes, dictated by the volume-variety characteristics (Collier and Meyer 2000), the application of this framework in a service context has proven difficult (Kellogg and Nie 1995; Silvestro et al. 1992). As processes with distinct attributes require a different management approach (Schmenner 1986; Silvestro 1999; Silvestro et al. 1992), researchers have developed service-specific frameworks to classify service organizations or service processes according to the characteristics they exhibit (Collier and Meyer 2000). Service frameworks facilitate our understanding of service systems across a wide range of organizational contexts. Table 1 presents a brief overview of classification schemes developed in the services literature, together with some associated critiques. The frameworks contribute to the articulation of relevant process dimensions that vary according to the type of service operations. Table 2 provides a summary of major process characteristics identified in the literature and shows how these attributes vary according to the type of process considered. It should be noted that while both marketing and operations have contributed to the emergence of recognized service frameworks we purposefully

limit our analysis to typologies that focus on the service process as unit of analysis, which predominantly come from the SOM field (Cook, Goh, and Chung 1999). While we acknowledge the value of the classification schemes developed by previous researchers, we suggest that the works of Chase (1978; 1981), Schmenner (1986), and Silvestro et al. (1992), regarded as highly influential in SOM, suffer from some limitations that undermine their utility as conceptual frameworks for guiding service system design.

First, the process construct has long been seen as a convenient level of analysis in services management since it allows for the cross-comparisons of operational processes (Lovelock 1983; Wemmerloev 1990). However, we suggest that the use of the term service process in these frameworks is confusing. We concur with the view of Tinnilae and Vepsaelaeinen (1995, p.59) who claim that these schemes suffer from a "facility bias" that consists of "analyzing separate service facilities instead of the whole service process". Instead of focusing on an end-to-end service process holistically, what we call 'a process in a service context', service researchers tend to focus on the characteristics of the operations within a particular service facility, such as a bank branch for instance. This is often termed a 'service process'. We contend that the emphasis should be on an entire, integrated process in a service environment rather than on distinct service facilities analyzed independently (see Figure 1). We suggest that this misunderstanding about the unit of analysis is a boundary issue that may have been driven by the customer contact theory (Chase 1978; 1981; Chase and Tansik 1983). The customer contact theory is one of the most influential paradigms in the service operations literature (Chase and Apte 2007; Cook, Goh, and Chung 1999) and emphasizes the physical presence of the customer in service operations. Notably, most researchers have integrated a measure of customer contact into their typologies (Table 1) and, as noted by Metters and Vargas (2000), most process dimensions highlighted in these service frameworks relate to customer-contact issues. The strength of the customer contact model is to separate a service process into a front-office part, where the customer is, and a back-office part, where processes are executed without the presence of the customer. The two parts have different design requirements since front-office deals with high customer-induced variety while back-office is focused on possible economies of scale and maximizing process efficiency. It is worth noting that the scope of the definition of customer contact has been gradually extended by service researchers to reflect changing practices (e.g. telephone and internet channels) and now encompass situations where the customer is not physically present in the

service system (Zomerdijk and Vries 2007). Although some authors argue that the front-office or the front-end of the delivery process is the *unique* concern of service operations management (McLaughlin, Pannesi, and Kathuria 1991); Slack, Lewis, and Bates (2004, p.385) show concerns that service operations research has been biased towards "high contact, business-to-consumer services". This highlights the disproportionate attention given to the customer-self and the front-office as a key element of service production and delivery. Recent research articles dealing with diverse topics such as customer waiting time in front-of-process service situations (Durrande-Moreau 1999; Evangelist et al. 2002; Sheu, McHaney, and Babbar 2003), the management of customer preferences in restaurants (Verma and Thompson 1999) and in e-services (Iqbal, Verma, and Baran 2003), employee's motivation and vision in the service process in hotel settings (Hays and Hill 2000), and service quality measurement based on the bi-directionality of service encounters (Williams and Saunders 2006) point to this bias towards customer presence and front-office service environments in SOM research.

In addition, we argue that while service design from an operations management perspective is a whole process issue we also need to recognize that there are multiple end-to-end processes involved within the service system space. Most frameworks do not account for the different processes or channels delivering the same type of service outcomes in service systems (Tinnilae and Vepsaelaeinen 1995). The often complex process-structure inherent in service delivery systems (Larsson and Bowen 1989) is somewhat neglected. Instead of looking at the integrated set of processes embedded into the delivery system as a whole, research has focused on the characteristics of individual 'service processes' without considering the interrelated nature of the multiple channels of service delivery. While Sousa and Voss (2006) report that service firms increasingly use multiple channel of service delivery, which comprise both physical and virtual front-office and back-office environments, they note that existing research is generally concerned with single delivery channels observed in isolation. Thus, we argue that the multiple delivery processes in service systems need to be analyzed systemically. Finally, since many frameworks were developed before the advent of the internet and the proliferation of information technology in businesses, it seems that the impact of these profound changes on service systems has not been accounted for. As noted by Karmakar and Apte (2007) "technological changes drive process changes". The current IT-driven services revolution embodied by growing automation, self-

service, outsourcing, and off-shoring is creating new operational challenges that particularly affect the design requirements of service processes.

To summarize, we concur with the view of Heineke and Davis (2007) who recommend focusing on the process as unit of analysis in order to gain meaningful managerial insights into service operations. We argue that a reductionist view on specific facilities is not appropriate since it does not consider end-to-end processes and therefore ignores the complex process-architecture of service systems. Thus, we want to emphasize the importance of taking a holistic systems-driven perspective when analyzing processes in service environments in order to address the emergent properties of service systems. This is consistent with Vargo and Lusch's proposition regarding the new dominant logic of services. Here we equate 'operant' (primary) resources with the integrated processes which produce effects for customers (2004a).

SERVICE DESIGN

Service design encompasses a number of elements: customers, service concept, service encounters, and service delivery system. Service design acts as an integrator of these components as illustrated in Figure 2. The service concept refers to the outcome that is received by the customer (Lovelock and Wirtz 2004) and is made up of a "portfolio of core and supporting elements" (Roth and Menor 2003) which can be both tangible and intangible. It is a description of the service in terms of its features as well as in terms of the benefits and value it intends to provide customers with (Heskett 1987). Alternative terms for the service concept include: service offering, service package, and service or product bundle (Roth and Menor 2003). It is the role of 'delivery' to ensure that the expected service outcome is received by the customer. The most compelling accounts of what service delivery systems comprise are offered by Heskett (1987), Goldstein et al. (2002), and Roth and Menor (2003). In summary, service delivery systems include "the structure (facilities, equipment, etc.), infrastructure (job design, skills, etc.) and processes for delivering a service" (Goldstein et al. 2002, p. 132). A service delivery system is made up of multiple, interdependent service processes (Johnston and Clark 2001) which constitute a hierarchically-organized process architecture (Smart, Maull, and Childe 1999) and an integrated design approach is required to ensure adequate coordination between processes within the whole service system (Sousa and Voss 2006). A service encounter was initially interpreted as the direct interactions between customers and employees (Chase 1978; Surprenant

and Solomon 1987) but the concept has been extended to include all possible interactions between the customer and the process in a service environment (Walley and Amin 1994). Recently, Froehle and Roth (2004) classified service encounters in five groups in relation to the degree of technology involved.

The purpose of service design is to have processes that consistently deliver high quality services to drive customer satisfaction and customer retention, whilst maintaining process efficiency (Johnston and Clark 2005). Thus, good design gives service businesses leverage to gain a competitive edge in the marketplace (Shostack 1984; Verma et al. 2002). The design activity should focus on ensuring high standards of both technical service quality (TSQ), the right service outcome, and functional service quality (FSQ), doing things appropriately in the process of delivery, so that the service is perceived as being of good quality (Mohr and Bitner 1995) and generates customer satisfaction (Dabholkar and Overby 2005). It would seem that the customer contact paradigm has infiltrated the marketing literature since some of the dominant models on service quality and customer satisfaction, which emphasize customer presence, have directed researchers' attention towards the functional aspects of service delivery. As pointed out by some authors (Tax and Stuart 1997; Brown 2000 and Bowen 2000 cited in Lovelock and Gummeson 2004), services marketing research is heavily focused on the personal interactions occurring between customers and service providers in service encounters. First, the well-documented dominance of the SERVQUAL model (Parasuraman, Zeithaml, and Berry 1985; 1988) for service quality (Buttle 1996; Kang and James 2004; Lovelock and Gummesson 2004; Woodall 2001) has resulted in an overemphasis on the customer and 'soft issues' within the process of service delivery. Second, the service profit-chain (Heskett et al. 1994), a widely-accepted theoretical perspective explicating the links between staff satisfaction and profit, stresses on the role of employees in the service provision process as a critical driver of customer satisfaction. However, an over-emphasis on the functional aspect of service delivery is inconsistent with the results of a recent empirical study conducted in information-based service settings by Maddern et al. (2007) who show that TSQ is a key driver of customer satisfaction. For these authors the attainment of high levels of TSQ is a process issue. Finally, we disagree with Stauss (2005) who argues that the service-centered paradigm put forward by Vargo and Lusch (2004a) solely concerns people-processing services. While the new logic relies on the concept of co-creation of value between customers and service providers, we do not equate this

with physical presence of the customer in the system. Service providers assist customers in unlocking value of the service outcome. Moreover, Vargo and Lusch stress that information-processing is the major transformation occurring in services: "we argue that the primary flow is information" (p.9). They point out the need for "an increased focus on operant resources and specifically on process management" (p.10) which warrants an emphasis on developing core competences. Thus, from this perspective, end-to-end process design is a necessity.

Although there are no formal rules or general methodology for service design (Gummesson 1994), a number of techniques have surfaced in the services literature to facilitate process design: service blueprinting (Shostack 1984; 1987), the walk-through audit (Fitzsimmons and Maurer 1991), the sequential incident technique (Stauss and Weinlich 1997), and the service transaction analysis (Johnston 1999). Inspired by the systems-approach, blueprints display services as "interdependent, interactive systems" (Shostack 1987, p.35). Southern (1999) shows that the use of service system maps facilitates an understanding of the way processes function within the overall service system. Since service blueprints integrate the customer's view of the process they seem particularly adapted to analyzing operations where the customer is present and directly involved in the service delivery process. A survey of the service operations literature reveals that these techniques have been applied to high customer-contact environments such as restaurants, hotels, supermarkets, or hospitals (Baum 1990; Chuang 2007; Fitzsimmons and Maurer 1991; Getz, O'Neill, and Carlsen 2001; Johnston 1999; Kim and Kim 2001; Southern 1999; Stauss and Weinlich 1997; Tseng, Qinha, and Su 1999). Thus, from a survey of the literature in both marketing and service operations, we suggest that current approaches to service process design are marked by a strong orientation towards customer presence, a predominant focus on high-contact service operations, and that research in low customer contact settings is limited.

A major challenge for SOM research, therefore, is to identify general principles that guide the design of service systems in service settings such as separable services where customer presence is not essential for service production (Lovelock and Gummeson 2004). Given the prominence of the information sector in modern economies and the relative paucity of research in information-driven service contexts (Karmakar and Apte 2007; Machuca, Gonzalez-Zamora, and Aguilar-Escobar 2007), we believe that more research is needed to address service system design issues in information-intensive environments. A preliminary step on this journey is to develop an

appropriate conceptual framework to facilitate this research; a platform on which future research trajectories may be based. In the next section, we reflect on a short case example identified during our research with an information-intensive organization to highlight the relevance of our argument. We continue, in the last two sections, with a description of the key components and perspectives which we believe should form the basis of a new framework.

CASE-EXAMPLE

To illustrate the breadth of the challenge facing those designing services from an operations management perspective, and to highlight the issues described, we reflect on case-based research undertaken in the Telecommunications sector. The company is one of the world's largest network providers with operations throughout Europe and the USA. This case relates to their "enterprise" or business-to-business unit which provides mobile telecommunication and data solutions through network contracts to a range of business customers (from small one-person operations to global corporations).

To reiterate the earlier discussion, service design comprises both the 'what' is to be done for the customer and the 'how' it is to be achieved (Edvardsson and Olsson 1996). In this company the 'what' is specified by sales and the 'how' is delivered through operations. The sales activity is carried out through multiple channels; internet and telesales for small customers (1-10 Customer Telephone Numbers), a regional sales force for companies up to 250 employees, and a sector based sales force for large corporations. In addition, the sales activity for new businesses is separate from the cross and up selling teams who manage customer accounts after the customer is acquired. The sales activity is essentially concerned with customer presence and customer contact. However, following the customer transformation, which dominates the sales activity, the process emphasis quickly switches to 'information' as the dominant transformation. Here the processes associated with customer risk assessment, tariff setting based on customer specification (medium and large customers demand bespoke tariffs), contract writing and account set up take place. If service design only consisted of the activities where customers were present it would account for fewer than 10% of the people employed in establishing "what" is to be delivered.

A further problem occurs when the ’what’ and the ’how’ are not integrated. Take, for example, the large customers who are demanding increasingly bespoke solutions. These solutions include, unique tariffs (e.g. no charge for calling headquarters, no charge for calling other employees, very low charges for data handling; there are in excess of 500 of these unique features). The setting up of these characteristics is enormously complex and requires manual coding of the billing engine, configuring of software switches on base stations developing highly specialized Microsoft Exchange servers, configuring unique features on the phone etc. This is all so that the network can be used and the customer billed correctly (‘how’). The emphasis on ‘what’ enables the service offering to be customized to the customer requirements. Corporate Account Managers articulate customer requirements through client engagement incorporating the characteristics of FSQ. The lack of integration with back-office (‘how’ activities), however, often leads to incorrect implementation which has a detrimental effect on customer satisfaction. Our case research also identified occurrences where, due to the complexities of service-outcome specifications, and the constraints inherent in back-office systems, the company was unable to bill for the service provided. In addition, back office purchasing and logistic operations attempt to predict the demand for a large variety of handsets. To achieve maximum profitability per unit sale call-off deals on high volume agreements are made with Original Equipment Manufacturers (OEM). As the variety increases through sales negotiations at the front office, the company often has to reduce the call off volumes resulting in a higher unit cost. This affects the profitability of previous sales. This further emphasizes the need for integration and both forward and feedback information flows across the end-to-end process architecture.

This example from a rapidly evolving sector exemplifies the challenges facing service designers. Some customers are offered limited product ranges (through internet and telesales) others want highly complex product/service bundles. Design cannot be carried out without consideration of back office ‘set up’ activities which are of an increasingly diverse set. To further limit service design to simply the customer contact part of the process misses out most of the activity, resources and complexity. The design of service delivery systems needs to take account of the whole process (what we call processes in a service context).

TOWARDS A NEW CONCEPTUAL FRAMEWORK

Sampson and Froehle (2006) propose the Unified Services Theory (UST) that states that a process is a service process if one can identify the presence of significant customer inputs in the transformation process. According to the UST, production processes can be split up into two distinct parts – a service process segment that involves customer inputs and a manufacturing process segment without customer inputs – that are to be managed differently. The authors identify four types of customer inputs from the services management literature: customer-self inputs, which can in turn be broken down into inputs involving physical presence and inputs involving mental presence; customer information; and customer belongings. The origin of the UST can be traced back to a classification scheme put forward by Lovelock (1983) that categorizes services based on the nature of the service act (see Table 1). People-processing services are directed at people's body such as passenger transportation or food services, mental stimulus processing services are directed a people's minds such as advertising or broadcasting services, possession-processing services are directed at people's belongings such as freight transport or car repair services, and information-processing services are directed at intangible assets such as telecommunications or financial services. In UST terms, we can describe Lovelock's work as a customer-inputs-based categorization of service operations which looks at "the way in which (customer) inputs are transformed into outputs" (Lovelock and Yip 1996, p. 68) (see Figure 3).

A major assertion of the UST is that the process design dimensions, identified in service frameworks, are directly related to "a classification of customer inputs or the treatment of customer inputs" (Sampson and Froehle 2006, p.336). Thus, it is possible to gain insight into process design by analyzing the nature of customer inputs to the service system (architecture of processes in a service context). This provides a framework which extends beyond the boundary limitations of previous work which has predominantly focused on customer presence. In addition, the UST focuses on the transformation (value-adding) process within the service system. This represents an important shift in emphasis in service design research: it calls on scholars to take the perspective on 'how' inputs are transformed, a key theme in operations management (Johnston and Clark 2001).

Hill et al. (2002) argue that issues relating to service process design and service system structure are strongly influenced by the use of new technologies in service delivery systems, such as front-office automation and the development of e-channels of service delivery. These technologies represent a wealth of potential benefits for service systems: reduced costs, improved service quality, and increased availability of service operations (Walley and Amin 1994), and can facilitate customer acquisition and retention. There is ample evidence of the growing application of technology to front-office service situations in traditional customer contact environments such as the implementation of self-service technologies at service encounters (Beatson, Lee, and Coote 2007; Bitner, Brown, and Meuter 2000; Meuter et al. 2000) and the swift development of web-based, virtual service environments (Voss 2003). E-tickets, instant check-ins at airports, e-banking, e-shops, e-tracking, ATMs, automated ticket and vending machines, etc have become commonplace and are now found in a wide range of service delivery systems and service organizations, refuting the old belief that automation and standardization concern only back-office situations. As a result of these developments, human interactions in the service provision process can be dramatically reduced or can even disappear. Voss (2003) refers to this situation as service in a virtual environment. Thus, the changing nature of front-office brings about significant changes in the design characteristics of service delivery systems. While traditionally a major requirement for the design of front-office activities has been the role of employees in managing customer relationships and customer-induced variety, it now seems that interface or application design has become an equally critical task. For instance, in retail banking, customers can use traditional (bank branch), automated (ATM), or electronic (internet, phone) delivery processes for a single service outcome. Again, the nature of customer inputs vary according to the channel selected by the customer and will therefore exhibit a variety of process design characteristics.

The UST provides a paradigm for dealing with technology-driven process changes since it shifts the focus from customer-presence or customer participation to the types of customer inputs differentiating customer-self inputs from customer-information inputs. We propose an extension of the UST to encompass end-to-end processes. Sampson and Froehle (2006) explicitly distinguish between service and non-service (manufacturing) process elements for the purpose of analysis. However, in our view, disintegrating processes in this way is misleading and is likely to result in sub-optimization. Analyzing service systems through the lens of an extended UST,

focusing on a set of end-to-end, interrelated processes as unit of analysis, allows us to accommodate for the new developments in the service landscape.

INTRODUCING THE TRANSFORMATIONAL CONTEXT

The UST focuses on the value-creation input/output model which is the backbone of operations management (Johns 1999; Slack et al. 2005). On this basis, both manufacturing and service operations can be seen as systems whose purpose is the production of a specific outcome through the management of inputs, transformation process, and outputs. We agree with Johnston and Clark (2001) who stress the importance of taking the perspective of the 'thing' that is processed or transformed to differentiate between different types of operations. Typically, there are three generic types of operations that can be distinguished on the basis of their core transformation process, the conversion of inputs into outputs: 'material-processing operations' (M), 'information-processing operations' (I), and 'customer-processing operations' (C). Managerial challenges differ widely across these three types (Morris and Johnston 1987; Wemmerloev 1990). Although most companies are characterized by a mix of the three types – I, C, and M - one type of transformation is usually regarded as dominant (Slack, Chambers, and Johnston 2004).

The concept of 'dominance' relates to the core, value-adding transformation process. Put simply, it is about what a company does. For instance, the core activity of a commercial airline is to transport its customers from point A to point B. This would be categorized as a dominantly 'customer-processing' entity; although two concurrent transformations: information-processing, such as passenger information for booking or air-traffic information; material-processing such as baggage-handling, occur at different stages in the service delivery process. Dominance also relates to the concept of primary task (Checkland and Scholes 1990) commonly used in systems-thinking to designate the core purpose of a system.

In a manufacturing context M is typically the dominant transformation type. On this basis, important theoretical concepts such as the product-process matrix (Hayes and Wheelwright 1979) and the theory of Swift, Even Flow (Schmenner and Swink 1998) lead to a better understanding of process design issues. As demonstrated in Swift, Even Flow, the speediness and the variability of the flow of materials through a process influence the productivity of the

process. This has major implications for process design in the context of predominantly material-processing operations that should aim to remove non-value added work, reduce bottlenecks, and reduce variability so as to maximize productivity. Although M is dominant in manufacturing, the presence of I and C transformations can also be identified such as the 'information' and 'customer' transformation inherent in 'make-to-order' or 'engineer to-order' situations (Morris and Johnston 1987). Thus, different process configurations of M, C, and I, what we call the 'transformational context', provide different management challenges (see Figure 4).

As already noted in this article, we suggest that much of the services research has been focused on 'customer-processing' activities; particularly with respect to 'customer presence'. This orientation towards customer contact is visible in much of the empirical work carried out in information-intensive service environments such as banks or telecommunications. For example, while Zomerdijk and Vries (2007) claim that they look into the front-office and back-office configurations of service delivery systems in banking, we observe that they actually focus on the 'sales' part or the front-of-process of the delivery system. An end-to-end view of the process is missing. Other examples of research in information-processing environments that predominantly emphasize customer contact, front-office, or front-of-process issues include Akamavi (2005), Aksin and Harker (1999), Athanassopoulos and Iliakopoulos (2003), Boshoff and Allen (2000), Ding, Verma, and Iqbal (2007), Frei and Harker (1999), Katz, Larson, and Larson (1991), Mulligan and Gordon (2002), and Rossiter (2003). While we acknowledge this work, we suggest that, to achieve high levels of utility, SOM research needs a re-orientation towards a customer-centric, end-to-end process perspective of service delivery systems.

Thus, we concur with the view of Stauss (2005) who states that a unique focus on 'people-processing' operations is misleading as it does not reflect the modern orientation taken by many service organizations. On the contrary, we believe that the rapidly changing landscape in services calls for a re-balancing of research efforts towards separable services such as 'information-processing' and 'possessions-processing' services. Notably, the swift development of the information sector in modern economies poses great challenges for both operations (Karmarkar 2004) and marketing (Rust and Espinoza 2006) with significant implications for the design and management of information-intensive services in particular. We acknowledge that Schmenner (2004) applies Swift, Even Flow to information flows but we believe that further research is

required to account for the transformational contexts of processes in information-intensive service environments. Issues of capacity and inventory, for example, necessitate further attention in this context. Moreover, a focus on the customer transformation process alone is outdated. Indeed, we need to move beyond the concept of dominance to a more holistic perspective. The emphasis needs to shift to the combination of 'customer-processing', 'material-processing', and 'information-processing', as a service system, to align research more closely with practice. Figure 5 illustrates our perception of what the transformational context of the delivery system of our case example comprises. While the presence I and C would seem obvious from the case it must be noted that M represents the handsets that flow through the process. Although Slack, Chambers and Johnston (2004) insist on the predominance of one specific 'transformation type', depending on the nature of operations, we know little about the operational implications of different configurations of 'customer', 'information', and 'material' processing in service environments (see Figure 5). We suggest that different transformational contexts, different extents of M, I, and C transformations in service systems, require different designs and therefore different design principles. Thus, we propose that the derivation of the design principles for service delivery systems is more appropriately addressed by analyzing the transformational contexts of processes in relation to the type of customer inputs (UST) as illustrated in Figure 6.

IMPLICATIONS FOR FUTURE RESEARCH

In light of these arguments it is legitimate to wonder whether Chase (1996) was right to insist that new SOM research should focus on testing and validating previously established frameworks. Alternatively, we suggest that there may be a need to conduct further exploratory research in an attempt to discover a new paradigm that would contribute to shape the uniqueness of service operations management as a field of study, as suggested by Nie and Kellogg (1999).

This article suggests that a new conceptual background for future empirical work on service delivery systems, grounded within the 'systems' discipline, needs to be developed. Given a variety of 'transformational contexts', characterized by combinations of material, customer, and information transformations, combined with a variety of customer inputs, as suggested by the UST, we ask whether it is possible to identify archetypical forms of service delivery systems which are more closely aligned to organizational practice. These archetypes may be used for the logical derivation of future hypothetical propositions and subsequent confirmation through

empirical investigation and thus provides a platform for future research. We suggest that this approach facilitates the pursuit of theory which informs organizational practice in a changing and expanding service context.

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TABLE 1
Process-based service frameworks

Author(s)	*Framework and dimensions*	*Critiques and/or comments*
Chase (1978; 1981)	Amount of customer contact in the service process Classification continuum: pure services, hybrid, quasi manufacturing based on the distinction front-office / back-office	Customer contact defined as physical presence of the customer. Thus, the scheme overlooks other forms of contact (on the phone for instance) with identical managerial implications (1)
Lovelock (1983)	Four categories of services based on the nature of the service act: - Directed at people's bodies - Directed at people's minds - Directed at people's belongings - Directed at people's intangible assets	
Schmenner (1986)	Two-dimensional service process matrix based on: - Degree of labor intensity - Degree of customer contact and customization	Labor intensity no longer applicable since substituted by information and automation (2) Second dimension difficult to interpret (3)
Shostack (1987)	Service processes differentiated on the basis of two attributes: - Complexity - Divergence	Helpful for service design and service process positioning (6)
Wemmerloev (1990)	Two-dimensional matrix based on: - Rigid versus fluid processes - Degree of customer contact	Taxonomy focuses on service process and can facilitate design and management of service systems (6)
Silvestro et al. (1992)	Service process model based on: - Volume of customers processed on vertical axis - Six process dimensions on horizontal axis: contact time, customization, discretion, people/equipment focus,	Volume factor does not guide decisions for other dimensions (4) Complexity of vertical axis that encapsulates six dimensions (4) Small sample for empirical data which undermines the generalization

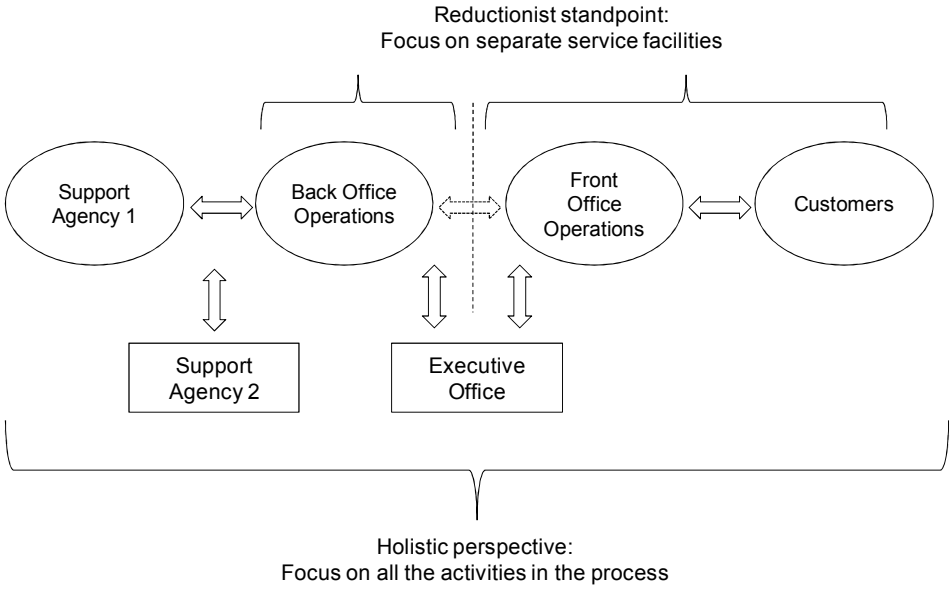
	back-office/front-office orientation, and process/product orientation	of results (5)
Kellog and Nie (1995)	Two-dimensional positioning matrix based on: - Service process structure based on customer influence - Service package structure based on customization	Difficult to distinguish between the two constructs customer influence and customization which are reasonably similar (4)
Tinnilae and Vepsaelaeinen (1995)	Service process analysis matrix based on: - Channel type for service delivery - Type of service based on complexity and contingencies	Axes are complex and hard to interpret (4) Certain changes of position in the matrix are not possible (4)
Lovelock and Yip (1996)	Classification based on core transformation process: - People-processing services - Information-processing services - Possession-processing services	
Collier and Meyer (1998)	Service positioning matrix based on - Service delivery system characteristics based on number of customer pathways and management control - Service encounter activity sequence based on degree of customer freedom and encounter repeatability	

1. Froehle and Roth 2004
2. Kellogg and Nie 1995
3. Tinnilae and Vepsaelaeinen 1995
4. Collier and Meyer 1998
5. Verma, 2000
6. Cook, Goh, and Chung 1999

TABLE 2
Service process characteristics

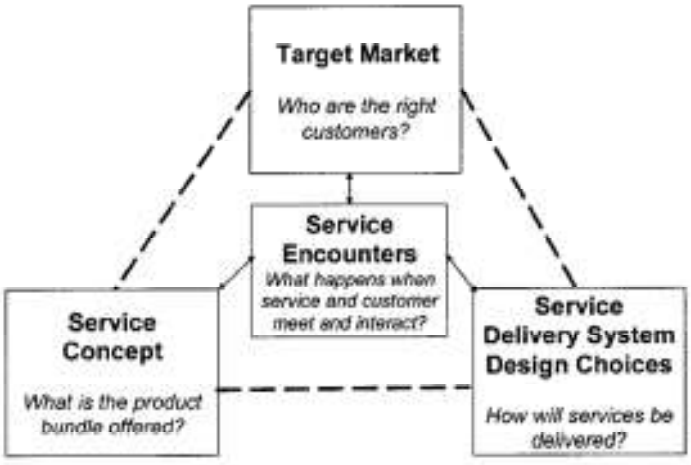
Service Process	*Professional Service*	*Service Shop Mass Service*	*Service Factory*
Degree of customization	High	⟷	Low
Degree of discretion	High	⟷	Low
Technology focus	Effectiveness	⟷	Efficiency
Labor intensity (Capital intensity)	High (low)	⟷	Low (high)
Location of facilities	Distributed	⟷	Centralized
Layout of facilities	Customer-oriented	⟷	Efficiency-oriented
Capability of handling variability	High	⟷	Low
Technical skills of workers	High	⟷	Low
Personal skills of workers	High	⟷	Low

FIGURE 1
Reductionist vs. holistic view of service processes



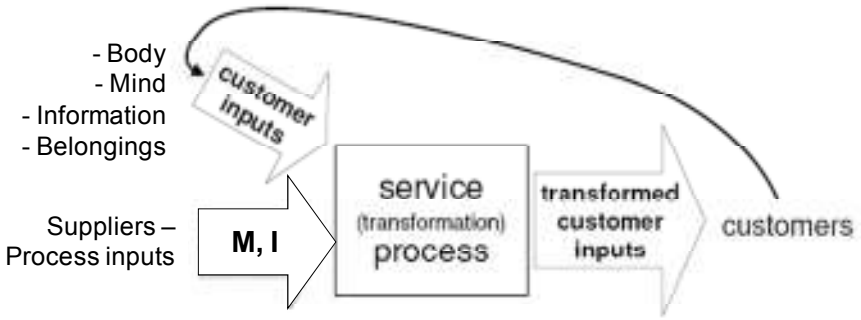
Adapted from Narasimhan and Jayaram 1998.

FIGURE 2
Looking at the big picture: the service strategy triad



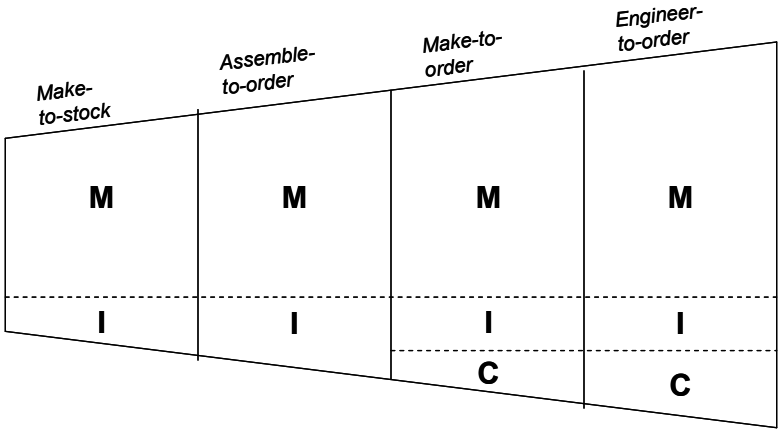
Roth and Menor, 2003

FIGURE 3
A service process according to the UST



Adapted from Sampson 2001

FIGURE 4
The 'transformational context' in different manufacturing environments



Adapted from Kolisch 2001

FIGURE 5
Representation of the transformational context of a service delivery system in the telecommunications sector

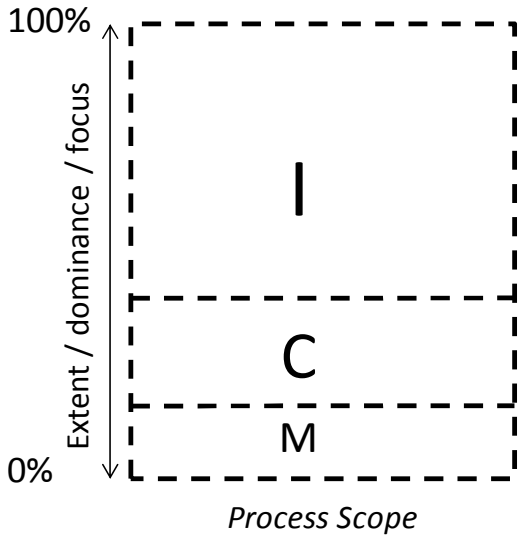


FIGURE 6
A new research framework: combining customer inputs and transformational context