Operational criteria for the design of front-office processes in multi-channel service delivery systems

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Abstract
This paper identifies relevant operational factors that affect the design of front-office processes in Multi-Channel Service Delivery Systems. Based on two in-depth case studies in banking and telecommunications, we distinguish four operational factors: i) characteristics of the inputs and outputs of the service activities; ii) characteristics of the transformation taking place; iii) the expected utilization; iv) the economics of developing the activities in the channels. Building on these results, we propose a stepwise approach for addressing the design of front-office models for MC services.

Keywords: service operations, service design, multi-channel services.

Introduction
In recent years, we have witnessed a strong growth of Multi-Channel (MC) services, i.e., services provided through multiple channels, such as physical facilities, the internet and the phone. Channels can be seen as platforms which support the service processes which involve customer interactions; they provide "visible" interfaces to customers who use them to engage in service processes (Figure 1). For customers, a key feature of MC services is the possibility of combining different channels to complete a service delivery. For example, in retail settings customers typically use different channels for search and purchase phases (Verhoef et al., 2007).

From a service design approach, a key difference between MC and "traditional" (single-channel) services is the existence of the complex MC front-office layer depicted in Figure 1. Service firms are adopting a wide diversity of front-office delivery models in terms of the portfolio of channels involved, the service activities supported by each channel and the extent of cross-channel service flows which are supported, in order to allow for the combination of different channels in service delivery. In practice, setting up such front-office architectures involves a set of specific design decisions regarding i) the allocation of the provider's interactive service activities to the existing set of adopted channels; ii) the extent of cross-channel flows that are allowed (Sousa and Amorim, 2009). At the core of these design choices is the fact that channels have intrinsically different characteristics (e.g., degree of personal contact that they allow) and, as a consequence, differ in their ability to accomplish different objectives.

We argue that the main criteria that support the rationale of such decisions haven't however been fully addressed. Most of the research to date has been carried out from a Marketing perspective, focusing on customer-related factors, i.e., factors which

influence the design of the front-office processes with the goal of meeting *customer* requirements and, consequently, of accomplishing Marketing objectives such as increased sales and market coverage (e.g., Konu et al., 2008). Examples of factors include customer demographics, customer attitudes towards technology and privacy concerns. The underlying premise is that different channels have different abilities in meeting *customer* requirements. For example, from a Marketing perspective, providing a given service to young customers may favor a front-office design where most service interactions are offered through the internet or mobile communications devices, as these channels may be the ones preferred by this target market. In addition, Marketing contributions also highlight that customers have heterogeneous perceptions about the performance of the channels for conducting different service activities.

However, different channels not only have different abilities in meeting *customer* requirements, but also have different abilities in *supporting the different processes of service delivery*. In the previous example, if the service being provided to young customers is very complex and highly customized, the internet channel may place difficulties to service delivery and other channels allowing a higher degree of personal contact and customization, such as the phone or physical facilities, may be more adequate. In other words, there are relevant *Operational* factors which also affect the design of the front-office processes, in this case with the goal of accomplishing Operations objectives (e.g., quality, cost, delivery and flexibility, Ward et al., 1998).

In OM there has been substantial work on identifying relevant operational factors that determine service design decisions, such as the degree of customer contact (Chase and Tansik, 1983) or volume of customers processed (Silvestro et al, 1992). However, such work has had a primarily single-channel orientation. It does not adequately address service systems with multiple channels with distinct abilities for supporting the various activities in a service delivery process. In order to close this research gap, the objective of this study is to identify relevant operational factors that affect the aforementioned decisions in the design of front-office processes in MC Service Delivery Systems (MC SDSs). For that purpose we analyze a sample of service processes with diverse front office delivery models (or front-office architectures), and we investigate which operational factors influenced the different choices made by the providers about: the variety of channels which support the service various process activities; and, the number of cross channel process flows allowed.

Methodology

The research was based on in-depth case studies of MC services. The case method lends itself to early, exploratory investigations where the variables are still unknown and the phenomenon is less well understood. In addition, it is especially suited to build theory and to answer "what" questions (identification of relevant operational factors) with a relatively full understanding of the nature and complexity of the complete phenomenon (Meredith, 1998; Stuart et al, 2002; Voss et al, 2002).

The study focused on information-processing services, defined as services for which information is the main type of input (this is consistent with our adopted definition of service as processes which process customer components). Information-processing service providers have been pioneers in the adoption of virtual channels, such as the phone, on-line platforms, and, more recently, the new mobile communication technologies. These services have a high potential for both MC service delivery and the observation of diversity in what regards delivery models because most existing channels of service delivery (in particular, those based on information technology) have the ability to process information.

Theoretical sampling was employed in which the sample is selected to exhibit desirable traits for the questions being examined (Yin, 2003). In particular, cases were selected so as to enable the observation of diversity in design decisions with MC implications. Two cases were considered an adequate number, striking a balance between the need for in-depth investigation and the need to avoid the risks and limitations of single-case designs (Yin, 2003). We selected two service providers with the following characteristics: i) employed a broad range of channels of service delivery; ii) belonged to two different sectors, banking and telecommunications; iii) offered a diverse set of core services; iv) displayed significantly different MC delivery models across their core service portfolio. Data collection focused on a sample of the companies' core services with distinct MC delivery models. Consistent with our research framework, we developed a case study protocol providing specific data collection guidelines for the following main areas: i) characterization of the contextual business conditions, the target market and the service portfolio of the companies; ii) description of the core services' front-office service delivery processes, resulting in the building of service process flowcharts; and iii) identification of operational criteria which were found to influence the design of the observed service processes Additional data were collected with the goal of contextualizing and adequately understand the SDS design decisions, including: i) the investigation of antecedents and drivers for the adoption of the MC delivery strategy; ii) the description of the steps and actors involved in SDS design decisions (such as: new service development processes or modifications to existing MC service delivery processes). Data collection involved multiple data sources: i) a series of tape recorded in-depth interviews with managers from several departments involved in the design decisions with MC implications. These included the departments of General Management, Marketing, Quality Management and Direct Channels (Web and Phone channels). We conducted around 12 interviews in each firm spread across 6 visits on separate days. The interviews were taped, and transcribed, to support the analysis and processing of the information. At each step of the research the team prepared a structured summary of the information extracted to be validated in the subsequent visits to the companies; ii) a series of visits to the various facilities and back office structures supporting the various channels (e.g. stores and branches, call centres and other back-office units); iii) the collection and analysis of archival data, such as product and services brochures, internal process documents (e.g. process flowcharts) and the information available at the institutional website; iv) direct experience of the services as a customer on the part of the researchers (e.g., experience with the bank services through its branches, internet and phone).

Results and discussion

The analysis of the case data supported our initial proposition about the existence of several operational criteria which influenced the design decisions required for setting up the front office of MC services. In this section we discuss the results found, and we illustrate them with examples from the design decisions of the case study companies.

Our results include: (i) the identification of a set of operational factors which influence the decisions about the allocation of the service process activities to the various channels in the MC SDS; (ii) the description of the operational factors which influenced the definition of cross channel service process flows in a MC SDS. Building on these results, we propose a stepwise approach for addressing the design of front-office architectures for MC services.

Operational factors influencing the front-office design decisions: allocation of activities to channels

The analysis of the service processes of several core services offered by the companies revealed the existence of substantial differences in front-office service delivery models. In other words, the variety of channels through which customers could conduct the various service activities was different for the various service processes analyzed. We identified several operational factors which explained the differences in the allocation of activities to channels and we classified them into four categories.

A first category of factors included the *characteristics of the inputs and outputs required for executing the service activities*. One of such characteristics, highlighted by managers in the interviews, was the requirement of customer presence. In such circumstances, the variety of channels where the service could be fully offered to the customer faced restrictions. The legal context prevalent at the time of the study still contemplated various cases in which the signature of contracts with the firm required the physical presence of the customer. The trend was, however, for those restrictions to be progressively relaxed as the legal system evolved to meet the transactional characteristics provided by the new channels. Typical examples in the bank requiring customer presence in the branches included the signature of a contract for opening an account or for contracting a mortgage. For some small loans the system had already adjusted itself, allowing current customers to subscribe those services using the virtual channels.

Restrictions in the number of channels supporting a service activity were also found whenever there was a need to handle physical items. In the bank case, examples included the delivery of facilitating goods such as credit cards or checks, and the deposit or withdrawal of cash. In the communications company, the managers provided examples of service activities which required the access to the customers' mobile communications devices, for example for obtaining some type of support service. A similar situation occurred when customers wanted to experiment new mobile communications devices, which were only available in the stores.

Another characteristic of customer inputs which had a substantial importance in the MC design decisions was the need to ensure the privacy of customer information. The need to maintain the privacy of customer personal information, or of the information about the previous utilization of the service (e.g. transfers or payments, in the case of the bank; and calls and messages in the case of the communications company) could restrict the availability of service activities in some channels. In Table 1 we summarize these examples.

Table 1 – Characteristics of service inputs and outputs influencing the allocation of service activities to channels

Characteristics of inputs and outputs	**Service activities involving such inputs or outputs**	
	Case I	**Case II**
I/O exchange requires customer presence	• Contracting a current account • Contracting a mortgage	• Equipment experimentation
Tangibility	• Credit card delivery • Cash withdrawal • Deposits	• Requesting technical support for a communications equipment
Privacy	• Requesting information about payments, transfers.	• Requesting information about the history of communications

A second category of factors which were found to influence the design of the MC services was related to the *characteristics of the activities taking place*. In the interviews, the complexity or the risk of the service activities were cited to explain why some activities were not available in the virtual channels. For example, in the bank, activities such as providing information, advice and contracting new bank services (e.g. investment solutions, insurance contracts) were predominantly allocated to the branches or to the phone channel, where customers could have the assistance of the companies' employees. In the case of the communications company, activities related to customer support were also predominantly allocated to the stores.

Other characteristics, such as the duration and the cost (for the provider) of a service activity were also found to affect the design decisions. Service activities involving a high number of steps or delays to be completed were more likely to be allocated to the virtual channels. Both in the bank and in the communications case, activities which required a detailed review of past customer service utilizations (the history of transactions in the bank, a detailed list of calls and messages services used by the customer in the communications firm) were predominantly provided through the Internet channel.

Finally, the data also revealed that service activities which required a great extent of back-office work were less likely to be available in all the channels. For example, in the bank case, the analysis of a mortgage request could involve the need to investigate customer information and history (in the bank and in other institutions), and the elaboration of simulations. Therefore, it was predominantly available only at the branches.

Table 2 – Characteristics of service activities influencing the allocation of service activities to channels

Characteristics of service activities	**Service activities (examples)**	
	Case I	**Case II**
Complexity of the knowledge/competency	• Subscription of investment products	• Subscription of new price plans
Risk	• Contracting of some types of loans	• Providing private information (access codes, etc.)
Duration/Workload	• Advice about bank's services	• Analysing detailed billing information
Intensity of back-office dependency	• Analysis of a mortgage request	• Customer support services (e.g. analysis of the history of communications)

We identified a third set of operational factors related to the expected *degree of utilization of the service activities* by the companies' customers. Service activities characterized by very frequent customer utilization, or which were used by a large number of customers, were more heavily represented in the virtual channels (e.g. checking the account balance). Another related characteristic had to do with the degree of customization associated with the service activity (e.g. variety). Service activities which were very standardized (and therefore relatively less complex to automate) were predominantly available in the virtual channels.

Table 3 – Characteristics of the expected utilization of service activities influencing the allocation of service activities to channels

Characteristics of service activities	**Service activities (examples)**	
	Case I	**Case II**
Volume	• Balance check, payments	• Balance check, credits check, credits loading
Variety	• Request of information and simulation of mortgages	• Request of information about price plans
Frequency (per customer)	• Payments	• Balance check, credits check, credits loading

A fourth category of operational factors identified was related to the *economics of the implementation of service activities in the channels*. Service activities which required a costly or lengthy development of a specific channel capability were frequently available in a restricted number of channels (e.g. situations which required the creation of new elements in the supporting information system; situations which required the creation of new automated connections between the channel and the back-office structures). In the bank case, it was explained that the possibility of contracting some new investment products was not enabled in the Internet channel due to time to market constraints. In the communications case we found similar examples of new services which had to be launched in a very short time (in order to keep pace with competitors), and for that reason could not be made available in all channels. In such situations, the service activities were predominantly made available in the physical channels, where the companies could more quickly develop new competences by instructing the employees about the new services.

Table 4 – Economics of the implementation of the service activities in the channels

Characteristics of service activities	**Service activities (examples)**	
	Case I	**Case II**
Development cost	• Implementation of synchronous messaging services in the Internet	• Activation of some services in the Internet
Development time	• Subscription of investment products in the Internet	• Information about new mobile communications devices
Return on development	• Simulation of investment products in the Internet	• Exchanging credits (e.g. for new mobile devices, for extra balance) at non-proprietary stores

Operational factors influencing the front-office design decisions: cross channel processes

A complete definition of MC front-office architectures requires the specification of cross channel process flows. In MC services, customers frequently combine different channels to obtain a service (e.g. browsing for information in the internet channel and then placing an order or request through the phone). From a service design perspective this requires firms to define, for each service process, which channel combinations will be supported by the MC SDS.

Both companies addressed in the study expressed a similar objective in this regard: to provide customers with the maximum scope of channel choice. In other words, firms considered important to provide customers with a high level of flexibility in choosing and combining different channels for the multiple activities in a given service process. However, the data also revealed that often operational determinants restricted the amount of such cross channel processes supported by the MC SDS.

Increasing the flexibility of cross channel process choices available to customers could require firms to review their former decisions about the allocation of activities to channels. For example, when the allocation decisions resulted in a restricted number of channels supporting some service activities, customers could be forced to follow a specific cross channel service process. In such situations, firms reported that they often reviewed the allocation decisions by extending the activity to other channels. In Case I, for example, the flexibility given to customers regarding which channels to combine to obtain a certain individual loan had been recently adjusted. Individual loans were usually possible to contract only at the bank branches. Although customers could request information through either the branches or the virtual channels, the effective contracting required the presence of the customer in the branch (due to the earlier discussed characteristics of customer inputs and the complexity and risk involved in the service). Recently, however, because the bank had initiated the promotion of new individual loans through the phone channel (by directly contacting customers and advertising the service) they found it adequate to review the restrictions about where to contract the loan, for a matter of consistency in the delivery of the service process. For this reason, the bank started to allow customers to contract this type of loans directly in the phone channel.

Overall, we found that the variety of the cross-channel process flows supported by the MC SDS was affected by the following operational criteria: the *degree of interconnectedness among successive activities* in a given service process; the level of *integration of the back-office resources supporting the service process activities*, across the various channels.

A low *level of interconnectedness* among successive service activities favored the implementation of cross channel processes. A high level of interconnectedness - when services activities required, for example, the access to information about former customer requests or interactions with the provider – could restrict some cross channel process flows in the service system. For example, in the bank, activities which required the access to detailed information about the utilization of the current account were not available in the phone channel. Because the phone channel service was being provided by a subcontracted call center, it was not granted full access to private customer information or information about customers account movements. A similar situation was observed in the communications company: activities requiring detailed information about prior calls services used by the customers were not available in the non-proprietary stores.

Lower *levels of integration of back office resources* (e.g. customer support units, call centers, information systems) restricted the ability of the MS SDS to support cross channel processes. We observed that firms explicitly invested in the integration of back-office resources with the goal of extending the possible cross channel processes. The managers also revealed that specific dedicated information systems were developed (and frequently updated) for the channels, with the same objective. In Case II, managers explained that the company had recently invested in a new information system specifically designed to hold information about open customer requests (such as a request for detailed information about debits in a customer account which was not

immediately provided because it required the channels to request information from the back office) in order to enable customers to follow up on the initial request, in any channel (either the channel where the request was initiated or a different channel, according to customer convenience).

A stepwise approach for the design of multichannel service processes

The case evidence suggested that in the studied firms the organizational procedures for specifying the front office of MC services were not fully formalized. Moreover, the described decisions (e.g. about the allocation of activities and the definition of cross channel processes), although embedded in the observed front-office delivery models, were not systematically addressed, as our case data analysis and classification might suggest. This is consistent with former research results which found that the design of MC services is frequently unstructured and driven by ad hoc objectives related to the business context. Specifically, there was no systematic application of an operational rationale to the decisions about the allocation of service activities, both concerning each activity and each service process in the firms' portfolio. Rather, we found that companies followed somewhat general rules for the allocation for all services, and then made adjustments when specific restrictions or particular objectives required so. A final goal of our work was therefore to provide a contribution for the development of a framework for supporting the design decisions required for the specification of front-office delivery models. We build on our findings to propose a stepwise approach for the design of the front-office delivery model for MC services. We distinguish three main steps:

i) the description of the providers' core service processes. This description should involve a detailed decomposition of service processes into a sequence of activities involving interactions between customers and the service provider (the boxes depicted in Figure 1).
ii) a characterization (e.g. a ranking) of the adequacy of the various channels for supporting the different service process activities described in i). This characterization should result from the combination of the channels' ability to meet two complementary performance dimensions: operational and marketing performance. The first is derived from the importance of the various operational factors identified for each service process activity. The second is derived from the investigation of the preferences and perceptions of the firms' customer segments' about the various channels, for each service activity.

These two steps provide the firm with a detailed cartography of the front-office activities for the various service processes, and specify a classification of the adequacy of the various channels for conducting the different activities. This will enable a firm to develop preliminary front-office delivery models for its services, with, for example, some channels supporting full service processes, and others providing a limited number of activities. A specific number of channel and cross channel service process flows may also be derived from this allocation map.

iii) a final step builds on those preliminary front-office models, and involves the full specification the cross channel process flows to implement. This is an iterative stage, during which revisions of the previous allocation of activities to channels might be required. We found that in some cases, in order to guarantee consistence along a given service delivery process, firms provided some service activities through more channels than the allocation rationale initially suggested. Similarly, objectives of consistency across the overall service portfolio could

lead firms to make changes in the preliminary allocation map, and define homogeneous service models across their portfolio.

Finally, we also observed that firms specified priorities for customer channel utilization, on top of the existent front office delivery models. Frequently, although some service activities were available in all the channels, in practice, firms actively stimulated customers to predominantly use a specific channel. For example, in the communications company, service activities such as checking the account balance were predominately provided in the virtual channels. Although these activities were available in other channels (e.g. the store), this was not explicitly communicated to customers. They could request such service activity to the staff in the stores, yet this was clearly as an exceptional practice. The employees had specific instructions to inform and motivate the customers for using the virtual channels for that purpose.

Conclusions

Despite its importance, in most organizations service design is not a well-established practice, and the processes, tools and inputs needed for effective service design are not fully developed (Ostrom et al, 2010). This is particularly true in the design of MC SDSs. Often, the SDSs of MC service businesses have evolved over time in an ad hoc fashion driven internally by the profusion of individual channels (Schoenbachler and Gordon, 2002; Coelho and Easingwood, 2004), rather than having been the result of a structured design process.

Specifically, service providers still lack a robust rationale to support them in the design of operationally effective MC SDSs. This study identifies relevant operational factors that affect the design of front-office processes in MC SDSs. In addition, it proposes a stepwise approach for front-office design which can provide structure and managerial guidance for the diverse and complex choices that need to be made when designing MC SDSs. The study answers calls for the need to develop more comprehensive frameworks for offering managerial guidance, incorporating both cost effectiveness from the company's perspective and benefit maximization from the customer's perspective (Ostrom et al, 2010).

Overall, our work contributes to foster the development of an integrated framework for the design of MC SDSs incorporating Marketing and Operations objectives.

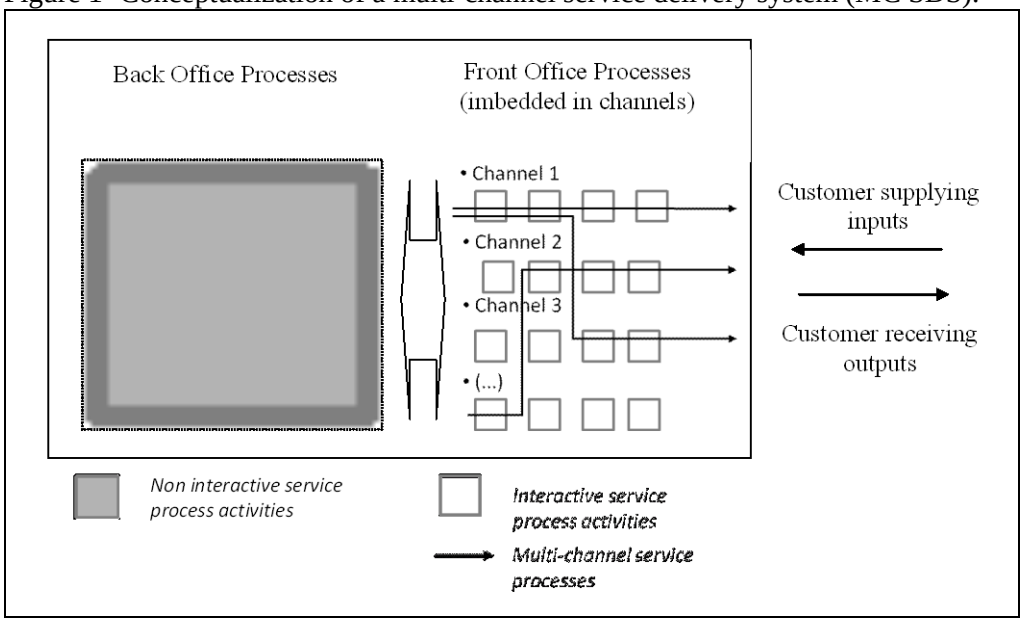
Limitations and future research

Our study examined cases from the banking and telecommunications sectors. We submit that the results are generalizable to other information-based services. Future research should test and validate the uncovered set of operational factors by conducting replication case studies in other information intensive MC services as well in other types of MC services.

The objective of this work has been to identify relevant operational factors that affect the design of front-office processes in MC SDSs. That is, the identified factors were found to influence decision-making; however, we have not assessed the adequacy of the examined decisions. Building on the outcome of this work, future studies should take a prescriptive stance and assess the performance impacts of different design decisions. Of particular interest would be to identify possible sets of design architectures matching different MC service contexts.

Finally, we have proposed a stepwise approach for front-office design. This approach needs to be validated, for example, by testing its application with managers involved in MC SDS design processes.

Figure 1- Conceptualization of a multi-channel service delivery system (MC SDS).



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