

# Exploring the “mid office” concept as an enabler of mass customization in services

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Rhian Silvestro

*Operations Management Group, University of Warwick,  
Coventry, UK, and*

Paola Lustrato

*Department of Global Operations, UniCredit, Milan, Italy*

## Abstract

**Purpose** – Mass customization (MC) is a well-established strategy for providing high levels of customization while achieving the scale economies of high volume production. The purpose of this paper is to explore a new service design configuration, the “mid office,” as a service interface which may support front office customization capabilities while protecting the back office from disruption. The authors posit that it may facilitate MC by enabling product/service and organizational modularity.

**Design/methodology/approach** – The research is based on a single case study of a large European bank’s payment services, traditionally high volume, low variety operations. The bank adopted a MC strategy which involved the creation of a mid office. The analysis spans product/service and organizational design.

**Findings** – When combined with menu-driven customization and reuse modularization, the mid office appears to support partial rather than full MC. It facilitates postponement of customization to the assembly stage through service coproduction, organizational decoupling, and the streamlining of employee adaptive behaviors.

**Research limitations/implications** – The study bears the limitations typical of case study research; however this was appropriate given the exploratory nature of the research into a nascent concept.

**Practical implications** – The paper identifies a series of design decisions to enable practitioners to choose between full and partial service MC, ensuring design coherence through a mirror effect of service modularity and organizational modularity.

**Originality/value** – It is argued that the mid office is a service interface which facilitates partial MC by enabling service and organizational modularity. The paper reinterprets the archetypes of full and partial MC in service terms, and proposes a contingent approach to service MC implementation based on service value.

**Keywords** Service design, Case study, Mass customization, Modularity

**Paper type** Research paper

## Introduction

Mass customization (MC) is well established as a strategy for providing high levels of customization, while simultaneously achieving the scale economies of high volume production (Kotler, 1989; Pine, 1993a, b; Hart, 1995). More recently different types of MC have been defined based on the stage in the value chain at which the customer becomes involved and customization is offered (Duray, 2002; Rudberg and Wikner, 2004; Squire *et al.*, 2004; Fogliatto *et al.*, 2012). Squire *et al.* (2006) define two archetypes: full MC, where customization takes place during design or fabrication, and partial MC, where customization occurs during assembly or delivery. The two archetypes are distinguished by different sources of customer value, and require different production approaches and organizational structures to support implementation (Huang *et al.*, 2010). This had led to



an understanding of the contingencies of MC implementation in manufacturing, but there has been no research into the application of these two MC archetypes to services.

A key enabler of MC is product modularity, which enables product parts to be flexibly combined to provide high variety (Ulrich and Tung, 1991; Åhlström and Westbrook, 1999; Salvador, 2007). It has been argued that modularity in the design of products and services should be “reflected” in terms of organizational modularity (Sanchez and Mahoney, 1996; Baldwin and Clark, 1997) and that implementation of MC is facilitated by the “loose coupling” of organizational parts (Sanchez 1999; Schilling and Steensma, 2001; Hoetker, 2006; Voss and Hsuan, 2009). In the service operations literature the decoupling of front and back offices, by separating activities requiring customer contact from those which can be “hidden” from the customer, has long been recognized as a means of ensuring delivery of an appropriate customer experience while achieving cost efficiencies in the protected technical core of the back office (Chase, 1978; Shostack, 1984; Bitner *et al.*, 2008). However in recent years the front/back office dichotomy has been challenged. Zomerdijk and de Vries (2007) argue that it is giving way to a more complex set of service design decisions and cite the “mid office” as an example of a new organizational setting which is emerging in the financial services industry. In financial services the mid office refers to knowledge based organizational units which lie between front and back offices. Although the concept is recognized in the practitioner literature (e.g. McDonald, 2011), there have been no empirical studies of this emergent service design configuration. In this paper we propose a definition of the “mid office” concept and posit that the mid office may be used to facilitate high volume back office productivity, while enabling a focus on front office customization. The combined benefits of high volume processing and customization are the essence of MC, and the mid office may therefore be a means of facilitating full or partial MC. This paper explores the role of the mid office in facilitating MC, and in enabling product/service modularity and organizational modularity.

A large European bank was selected for the case study research with a focus on its payment services[1]. Market pressures to achieve scale economies, yet also deliver customized services, have created a tension for banks’ payment services, which have traditionally been regarded as high volume, standardized operations located in the back office, where cost efficiency is paramount and customization is anathema. The bank’s response to this challenge was to implement a MC strategy which included the creation of a mid office. We begin with a review of the literature on service design and the emergence of the mid office concept; this is followed by discussion of the MC and service modularity literature, and the formulation of our research questions. The research methodology is explained and the case study presented. The bank’s implementation of MC is analyzed and the role of the mid office in enabling service and organizational modularity evaluated. Finally, conclusions are drawn about the mid office as a means of facilitating MC and on the application of full and partial MC archetypes to services.

### **Service design and the “mid office” concept**

The decoupling of front and back offices has long been recognized in the service operations literature as a key design decision (Chase, 1978; Shostack, 1984; Kingman-Brundage, 1993; Bitner *et al.*, 2008). The front office comprises the service setting in which actions of the service provider are visible to the customer; the back office refers to the service setting where actions that support the service process are invisible to the customer (Patricio *et al.*, 2008). Decoupling in this way enables the technical core of the back office to be isolated from disruption by customers, with a focus on cost efficiency; while front office efforts can focus on managing customization, with front line personnel who are selected, trained and

motivated to provide appropriate adaptive behavior (Gwinner *et al.*, 2005). This may take the form of either interpersonal adaptation, whereby employees alter various elements of interpersonal communication (tone of voice, gestures, etc.) to meet individual customer needs, or service-offering adaptation, where employees tailor or create a unique bundle of service attributes or benefits to meet individual needs (Bettencourt and Gwinner, 1996).

In recent years the front/back office dichotomy has been challenged. It has been argued that front and back offices need not necessarily be located separately, and that front and back office activities may be performed by the same individual, or a team of multi-tasked personnel (Metters and Vargas, 2000; Zomerdijk and Voss, 2010). In such services there may be no back office, as such, resulting in improved flexibility, responsiveness and utilization of front office space. Zomerdijk and de Vries (2007) proposed that the dichotomy of front and back offices be superseded by three design decisions: deciding where customer contact occurs in the process; which activities are decoupled from each other; and how employees are grouped together. Based on these three decisions a range of service design configurations emerge:

[...] although the literature is quite clear on the division of service organizations into front office and back office parts, in practice the situation is not so straightforward. Service organizations, particularly financial institutions, are setting up so-called “mid-offices” to act as a platform between front office and back office parts and operate different kinds of back offices [...] this calls for more research on structuring front office and back office work in service delivery systems (Zomerdijk and de Vries, 2007, p. 109).

There is no clear and agreed definition of the mid office; in the financial services literature it is rather loosely defined as a link between front and back offices, or as a part of the organization that shares resources with front and back offices (e.g. Financial Times Lexicon, 2015; Investopedia, 2015). According to McDonald (2011), “the term mid-office refers to the collection of semi-structured activities, processes and decisions that exist between your formal front and back office processes”; he argues that mid offices are characterized by knowledge-based work requiring high levels of expertise and professional judgement which therefore represent a source of strategic advantage. To date there have been no empirical studies exploring the strategic role of mid-offices, their benefits or any potential trade-offs that might be implied.

While Zomerdijk and de Vries (2007) refer to the mid office as a “platform,” it would appear to be more consistent with the concept of service “interface” since the front office is regarded as an interface between the organization and its customers (Voss and Hsuan, 2009). Defining the mid office as an interface lying between front and back offices is consistent with Rayport and Jaworski’s (2004) definition of a service interface as “any place at which a company seeks to manage a relationship with a customer, whether through people, technology, or some combination of the two.” This resonates with the practical reality of financial services mid offices which typically combine people and technology to support the front office in managing customer relationships. In this paper we propose the following definition of the mid office: an interface between front and back offices, which protects the technical core of the high volume back office but also supports the front office with knowledge-based expertise. This definition does not confine the concept of the mid office to financial services, even though in practice this is the sector in which it is most well recognized. So defined, we suggest that a mid office service design configuration could be used to both improve the efficiency of back offices and the effectiveness of front offices in adapting to customer requirements. If the mid office can facilitate high volume processing and scale economies in the back office, while also

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enabling service customization in the front office, then the mid office may offer a service configuration which supports MC. We therefore pose the following question:

*RQ1.* What is the role of the mid office in facilitating service MC?

## MC

Hart (1995) defines MC as “the use of flexible processes and organization structures to produce varied and often individually customized products and services at the low cost of a standardized, mass-production system” (p. 36). MC is advocated as a strategy which enables companies to combine the scale economies and cost efficiencies of mass production with a customer proposition based on perceived variety and customization (Kotler, 1989; Pine, 1993a, b). MC does not fit the conventional paradigm of manufacturing management (Duray *et al.*, 2000) but rather challenges the traditional view that high product variety and operational complexity compromise the performance of high volume operations (Hayes and Wheelwright, 1979; Hill, 1985). In a discussion of this volume-variety trade-off in services, banks’ back office operations have been described as a classic example of high volume, low variety mass services (Silvestro, 1999); so the adoption of MC by banks’ payment services goes to the heart of the debate on the viability of MC strategies.

Product modularity is one of the main mechanisms for enabling MC (Ulrich and Tung, 1991, Sanchez and Mahoney, 1996; Sanchez, 1999; Åhlström and Westbrook, 1999) and has been defined as “building a complex product or process from smaller subsystems that can be designed independently yet function together as a whole” (Baldwin and Clark, 1997, p. 84). Duray *et al.* (2000) identify four stages in the production cycle, design, fabrication, assembly and usage, and argue that the earlier in the value chain modularization is applied, the more customized the process is for individual customers. The stage at which modularization is applied is determined by the “customer order decoupling point,” or CODP (Olhager and Rudberg, 2003). This is the point in the supply chain at which the customer order penetrates, and it “distinguishes forecast and order-driven activities” (Yang and Burns, 2003). Rudberg and Wikner (2004) discuss the implications of CODP for the MC of engineering design processes. Engineering designs can be mass customized by either adapting standard designs (“adapt-to-order”) or by allowing the customer to select from a library of existing designs (“engineer-to-stock”). Haug *et al.* (2009) argue that MC can even be applied in “engineer-to-order” processes, which are usually regarded as supporting pure customization, by exploiting standard design elements (analogous to component commonality) to achieve higher volumes and scale economies.

By integrating the customer into the value chain, MC can create three scale economies (Piller *et al.*, 2004). The first is through postponing some activities until the order is placed (Sanchez, 1999): “the logic behind postponement is that the delay leads to the availability of more information and thus the risk and uncertainty of those activities can be reduced or even eliminated” (Yang *et al.*, 2004). The second is through the acquisition of more precise information about customer requirements which facilitates improved demand forecasting and capacity utilization. The third is achieved by creating loyalty resulting from directly interacting with customers. The process of eliciting product specifications from the customer is itself a source of customer value and so loyalty can be achieved not only through product customization, but also through the experience of co-design (Merle *et al.*, 2010). The customer experience is an even more significant factor in service MC, where customers may not only “co-create” services at the design stage but also “coproduce” during the service delivery process

(Ostrom *et al.*, 2010; Tuunanen and Cassab, 2011). However the impact of MC on the customer experience has been explored only in manufacturing (Piller *et al.*, 2004; Merle *et al.*, 2010).

The concept of customer integration into the production cycle has led to a more nuanced understanding of the contingencies of MC implementation. Squire *et al.* (2006) identify two MC archetypes: “full” MC which is appropriate when customers value a high degree of customization and responsiveness, and “partial” MC which is suitable for price and time sensitive customers who are willing to accept a lower level of customization. Full MC is defined by customer involvement during design or fabrication, where customers help to design or tailor products to their needs. Partial MC involves the customer at the assembly or delivery stages: customers configure products from existing components or preconfigured modules so that customization is offered within a constrained set of options. Squire *et al.*'s study suggests that postponement of customization enables partial MC to yield greater scale economies than full MC, making full MC more expensive to deliver and the scope for modularization more limited. Therefore full MC still implies many of the trade-offs conventionally assumed to accompany high levels of customization. This is likely to constrain the feasibility of high production volumes when implementing full MC, though production volumes may be higher than those characteristic of full customization strategies.

The two MC archetypes also have implications for organizational design (Huang *et al.*, 2010). Early advocates (e.g. Pine *et al.*, 1993) argued that implementation of MC required flat, decentralized structures with highly empowered, multi-skilled employees. However Liu *et al.*'s (2006) study of the relationships between MC capability and ten work design practices found no relationship between MC capability and empowerment. More recently Huang *et al.* (2010) applied the full and partial MC archetypes to develop an understanding of the contingent relationships between MC and organization structures positioned on a continuum from mechanistic to organic. They found that for full MC manufacturers there was a close relationship between organic structures and MC capability; however for partial mass customizers “organic structure with superior information processing capability may be an ‘over-fit’” (p. 525). This suggests that organic structures support the implementation of full MC, while more mechanistic structures are appropriate for partial MC. So in manufacturing the archetypes of full and partial MC help to inform not only production process choice, but also the organizational implications of implementing MC.

The distinction between full and partial MC is an important contribution to the MC literature, but it has not been applied in services. Indeed most empirical studies of modularity are based on manufacturing applications (e.g. Åhlström and Westbrook, 1999; Mikkola and Gassmann, 2003; Gomes and Dahab, 2010; Lau *et al.*, 2010); this manufacturing focus is also evident in Fogliatto *et al.*'s (2012) recent literature review of MC. We propose that these archetypes may be applicable to service organizations, and may lead to a better understanding of the contingencies of MC implementation in services.

#### *Application of MC and modularity in services*

Kaplan and Haenlein (2006) question the relevance of MC to services since “the act of integrating the customer in the value creation process to develop an individualized offering is already inherently included in the services definition” (p. 171); they contend that the concept of service MC is therefore tautologous. We disagree with this view. Even though service implies some degree of customer integration into the process,

nevertheless customization and the degree of customer involvement in the service process are well established in the service operations literature as dimensions for differentiating between services (Schmenner, 1986; Chase, 1978). Furthermore the traditional trade-off between customization and service volumes (Silvestro, 1999; Slack *et al.*, 2012) means that the apparent paradox of providing high volume, customized services is as much a challenge for service managers as it is for manufacturers. We contend that there is a pressing need to develop typologies of service MC so that the contingencies of implementation can be better understood.

Even though the literature on service MC is in its infancy when compared with the manufacturing MC literature, there has been a growing interest in the application of the concept of modularity to services. Implementing MC in services requires modularization of the service process, rather than a tangible product (Voss and Hsuan, 2009); consequently service modularity can be analyzed from multiple perspectives: service offering, service production and service production network (Bask *et al.*, 2011). Modularity can support two types of service customization: “combinatorial, that is, the result of the combination of a set of processes and products to create a unique service, or menu driven, which involves the selection of one of several existing services/products to meet the customer’s needs” (Voss and Hsuan, 2009, p. 556). Tuunanen and Cassab (2011) distinguish two types of service process modularization: modular “reuse,” where components that make up a service are reused in the design of another service; and modular “variation,” where modules have to be significantly altered in order to be incorporated into another service. As discussed earlier, a key element of product modularity implementation is postponement; Yang *et al.*, 2010, argue that there is scope for further research into the transferability of the concept of postponement to services; they point to the banking industry as a service setting in which postponement may be particularly applicable.

In services the key concepts of modularity have to be re-interpreted (Voss and Hsuan, 2009), for example, while modular components in a product are physical parts, in services they may be sub-systems or parts of a process; interfaces are “linkages shared among components” which are typically standardized in order to facilitate the mixing and matching of components. Platforms are architectural designs for products, services, and infrastructure which configure the organization of components and interfaces making up the product architecture (Meyer and De Tore, 2001). More specifically, Moon *et al.* (2011) define a service platform as “a common basis that consists of processes, activities, objects, and/or features that are shared and remain constant from service to service, within a given service family” (p. 155). Voss and Hsuan call for further exploration of these concepts in different service contexts, and for further research into the roles of contact personnel in facilitating customization. In this paper a new service interface, namely, the mid office, is explored; and we investigate its implications for the customizing roles and adaptive behaviors of front line staff and its role in enabling service modularity. In exploring the role of the mid office in facilitating service MC, we therefore pose the following subordinate research question:

*Subordinate Research Question (a).* Is the mid office an enabler of service modularity?

When managed strategically MC has implications which extend beyond product and service design to organizational design: “firms need to modify, and sometimes transform, if necessary, their organization structure to facilitate mass customization” (Selladurai, 2004, p. 298); a view consistent with an empirical study by Rungtusanatham and Salvador (2008). It has been argued that organizations competing with modular product

designs should “mirror” these modular structures in their organizations (Baldwin and Clark, 1997; Sanchez and Mahoney, 1996). Modular organizations are characterized as “loosely coupled organizational forms [which] allow organizational components to be flexibly recombined into a variety of configurations” (Schilling and Steensma, 2001, p. 1149). Modularity reduces interdependence between parts of the organization and reliance on knowledge transfer, so that, for example, design teams responsible for different modules can work autonomously (Sanchez, 1999), while also creating outsourcing opportunities (Gomes and Dahab, 2010; Hoetker, 2006; Doran, 2003; Sako, 2002). Voss and Hsuan (2009) speculate that implementing modularity is likely to lead to a higher incidence of loose coupling in services than in products; however, the link between modularity and organizational decoupling in services has not been empirically tested. Given that the mid office acts as an interface between decoupled front and back offices, we propose that the mid office may facilitate MC by enabling organizational modularization; so our second subordinate research question is:

*Subordinate Research Question (b).* Is the mid office an enabler of organizational modularity?

To summarize, this paper responds to recent calls in the literature for further qualitative empirical research into service MC and modularity (Voss and Hsuan, 2009; Yang *et al.*, 2010; Bask *et al.*, 2011) and into the relationship between MC and organizational design (Huang *et al.*, 2010; Kristal *et al.*, 2010; Rungtusanatham and Salvador, 2008). The mid office concept is explored with a view to establishing whether this new service interface can facilitate service MC, by enabling service and organizational modularity. In order to address our research questions, case study research was conducted based on the implementation of MC in a large European bank.

### **Research method**

The exploratory nature of this research renders an interpretivist research paradigm based on qualitative, in-depth case study research appropriate (Eisenhardt, 1989). The above review indicates that the service literature on MC may be regarded as “nascent” compared to the more mature manufacturing literature and “nascent theory involves exploring phenomena through qualitative data” (Edmondson and McManus, 2007, p. 1167). Case study methodology is considered suitable for collecting qualitative, complex phenomenological data, and for addressing the “how and why” questions (Yin, 2009; Eisenhardt and Graebner, 2007). It is also appropriate when the aim is to examine and articulate processes of implementation (Bryman, 2008; Pratt, 2009). Our aim was to capture rich insights into MC strategy and the role of the mid office in realizing that strategy, from the key actors responsible for its implementation. The study therefore required an in-depth and holistic understanding of MC implementation, spanning portfolios of products and services, technologies, organization structures and delivery systems. Single case study research is particularly conducive to the development of such understanding (Voss *et al.*, 2002).

A characteristic of nascent theory is uncertainty in the definition of constructs (Edmondson and McManus, 2007; Voss *et al.*, 2002); this is true of the concept of the mid office, the focus of this study, which again points towards the appropriateness of case study research. Single case studies are appropriate for the development of nascent theory, as generalization and hypothesis testing are not the intended outcomes of such research (Voss *et al.*, 2002). Although they limit generalization, single case studies provide an opportunity to collect and analyze extensive qualitative data (McCutcheon

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and Meredith, 1993; Strauss and Corbin, 1998; Yin, 2009) which are required in order to explore the operational and organizational changes involved in implementing MC (Rungtusanatham and Salvador, 2008).

#### *Case selection and background*

We focus on banks' payment operations for a number of reasons. Payment services are fundamental to banking operations and are ancillary to many banking services, representing a core area of banking activity where mid offices are becoming increasingly common. Furthermore, banks' payment services are currently wrestling with the operational tensions of volume and variety, and the conflicting requirements of product/process simplification and customization (Lodge *et al.*, 2009; Lodge, 2010). Aggressive competition is changing the perceived role of payment services, which are increasingly expected to achieve not only cost efficiencies but also revenue growth through added value and differentiation (Uzureau, 2008; Uzureau and Knox, 2009; Mathis and Cavinato, 2010). This makes payment services a particularly appropriate operational context for the study of MC. Finally there is evidence that financial services have been implementing MC for some time: a survey of UK financial services managers revealed that most managers saw opportunities for implementing MC within their product portfolios (Papathanassiou, 2004).

A large European bank, referred to with the disguised name of “Banca San Giovanni” (BSG), was selected for the study because it was known to be adopting MC in the development of its products and services and implementing a major transformation program to support these developments. The company was thus a “prototypical” rather than an “extreme” case (Pratt, 2009). Pragmatic reasons of accessibility also influenced the choice of organization: one of the co-authors was an intern in the bank and therefore had access to senior managers and staff in a number of departments. She had had the opportunity, over a number of years, to develop a detailed understanding of the bank's competitive context, its structure, strategy, products and services. Her in-depth understanding of the organizational context meant that she was up to speed with the organization's *modus operandi*, and had the required background in financial services management to undertake interviews competently and efficiently.

#### *Data collection and analysis*

The data collection and triangulation process was based on multiple sources of primary data, including management interviews and in-company archival data, and secondary data.

*Management interviews.* A series of in-depth interviews with senior and middle management was conducted over a five month period in 2009-2010, each interview lasting between two and three hours. A purposive sample (Patton, 1990) of managers was selected for interview ensuring that the key players in the transformation program were represented, and that different functional perspectives could be captured. Appendix 1 contains the list of interviewees and indicates the broad themes on which the interviews were based. The interviewing process started with our “principle informant” (Voss *et al.*, 2002), a senior manager in payment services who was spearheading the transformation program, to obtain his insights into the business environment and the objectives, scope and implementation of the bank's transformation program. Then semi-structured interviews were conducted with three managers from the bank's business units; and with four managers and two members of staff from operations. These were used to document their account of the transformation program, its implementation and impact over a period of four years (2007-2010). Interviews were also conducted with the treasurer of one of the bank's corporate clients in order to gain some insights into clients' perceptions of the bank's transformation of payment services.

The interview protocol outlining indicative questions is included in Appendix 2; each interview was based on the “funnel model” (Voss *et al.*, 2002), starting with broad questions then progressing to more specific, detailed questions. The introduction of MC in BSG was based on what was regarded as a “transformation program” in the bank. Therefore interview questions centered around understanding the strategy and structure of the organization “before” and “after” transformation. The interview guide (summarized in Appendix 2) was structured around the following themes:

- the company’s strategy and the aims of the transformation program;
- the design of BSG payment products and services (including the role of technology);
- organizational design of branch network and shared services (including staff roles and management of customer relationships);
- perceived benefits, limitations and challenges of the transformation program; and
- perceived impact and outcomes of the transformation program.

The content of each interview was transcribed and then documented in the form of structured notes. For example, notes on “perceived impact and outcomes” were structured on the basis of the ten different categories spanning the impact on marketing and operations, customers and employees, and organizational performance (refer to Appendix 2). The structured notes ensured that information from the interviews could be easily traced to interviewees, that their views could be analyzed, compared and cross checked, and that citations from the interviews could be included in the case study analysis. Given the relatively small number of interviews conducted, traceability of the data was straightforward and did not necessitate data coding. In order to ensure quality and reliability of information, the structured notes were shared with the interviewees for validation; also the final research report was provided to the bank’s senior management for validation purposes.

*In-company archival data.* Triangulation of the interview data was conducted based on a variety of internal documentary evidence, including annual reports, strategy statements, organizational charts, transformation program steering committee records and projects materials (refer to Appendix 2). These were studied to develop an understanding of the organizational environment and the strategic reasons for the transformation. Operating manuals, process maps and other internal documents were examined to develop an understanding of the changes to the design of products and services and to the delivery systems and processes which were implemented in the wake of the transformation program. Access to web-based products and services was also provided.

*Secondary data.* A range of secondary sources were also used in order to develop a wider understanding of products, services and the supporting technologies. These included industry papers, reports, web sites and attendance at conferences discussing the current challenges faced by payment services particularly with regard to service customization and the development of new technologies.

### **The case study: BSG**

BSG is one of the main Italian banks and a leading banking group of the Euro zone. With a network of thousands of branches throughout Italy, it has a market share of over 15 percent in most regions and serves over ten million customers. BSG also has a European presence with over eight million customers served by a number of

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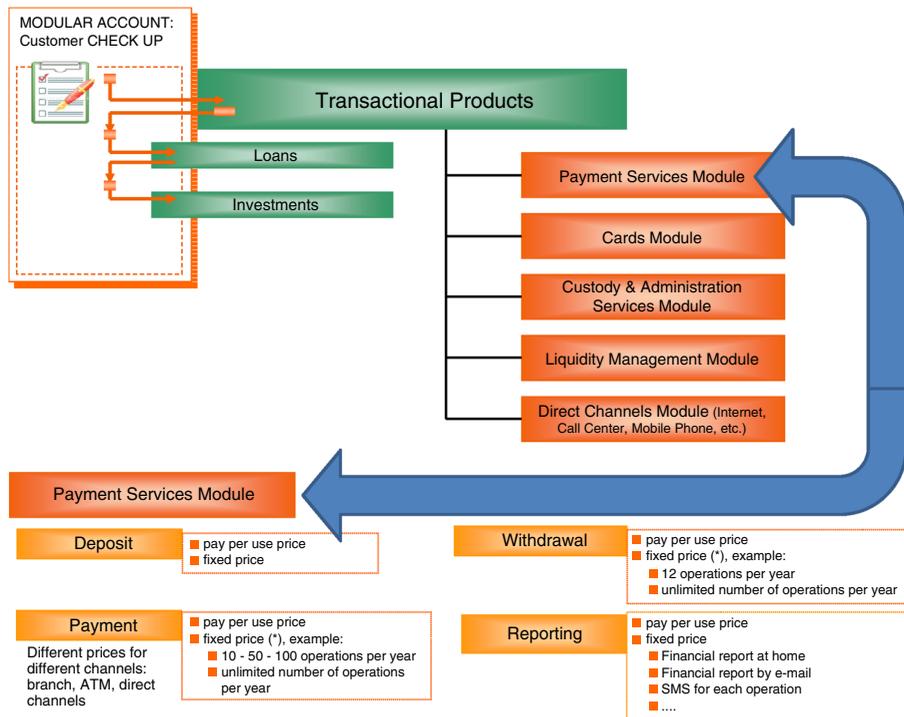
international subsidiaries. In response to the difficult economic situation, the strategy of BSG, as stated in the 2007-2009 Business Plan, was to “focus on sustainable growth” by leveraging BSG’s distinctive competences which were considered to include: innovative products and services specialized for particular customer segments. BSG’s competitive strategy hinged on operational excellence and intimate customer relationships with the intention of producing an outstanding experience and inspiring customers’ trust. In 2008 BSG’s organization structure was based on a traditional matrix arrangement of business units (commercial divisions structured along the lines of customer segmentation and territorial distribution) and shared service centers. Payment operations represented one of these centers, led by the Chief Operating Officer. In recent years, BSG had consolidated branch back office operations into 24 centers called Centralized Territorial Back-Offices (CTBOs) arranged according to geographic and competence specialization.

#### *Modularization of products and services*

Even though MC and modularity were not terms explicitly used in BSG, in the mid-2000s the concept of product modularity was already being applied. Products could be combined in different ways based on individual customer requirements; for example, a mortgage might be combined with insurance, with specific terms and conditions relating to payment methods and penalty clauses. The combined product bundle was then defined as a “new” product (with an ID in the banking product catalogue) and could be sold as a pre-packaged solution instead of offering the client a number of independent components. The role of branch staff was to choose from the available product bundles and adapt them to specific customer needs according to defined mandates. This required significant competence, customer intimacy and discretion to recognize the most appropriate offering for each customer, adapt it to individual needs and ensure adherence to a number of complex rules defined within authorization mandates.

While BSG tried to improve market alignment with these well-defined product bundles, the result was product proliferation, leading to cost escalation, and finally, customer confusion. Customers were finding it increasingly difficult to determine which products best served their needs, and the pricing of products was complex and difficult to understand. Paradoxically, despite the ever growing range of products, customers still perceived the range to be fixed and limited, often failing to meet their individual requirements.

So in 2008 the bank’s approach was to go back to basics, reducing its product range to a limited number of core product components, which could be flexibly arranged with changeable terms and conditions: “the rationalization of the product line led to a 51% decrease in the number of products offered to customers without affecting the coverage of the product line” (BSG 2008 Annual Report). The bank now catalogued only its core products, enabling employees and customers to simulate, assemble and price products, with the support of web-based technology platforms. Modules could be easily assembled by customers and/or front-line staff, using menu driven configuration tools, without the need of highly specialized product knowledge. To illustrate with an example, BSG launched the so-called “Modular Account” which allowed customers to build their own transactional, loan and investment products by selecting from a series of web-based menus. Each type of product was catalogued as a number of possible modules, and each module (payment services, cards, etc.) encompassed a number of possible services; Figure 1 provides examples of the services supporting the payment services module. This approach also simplified the pricing of products for the customer, as the modules were each priced separately so that selecting a particular combination was simply a matter of summing the module prices.

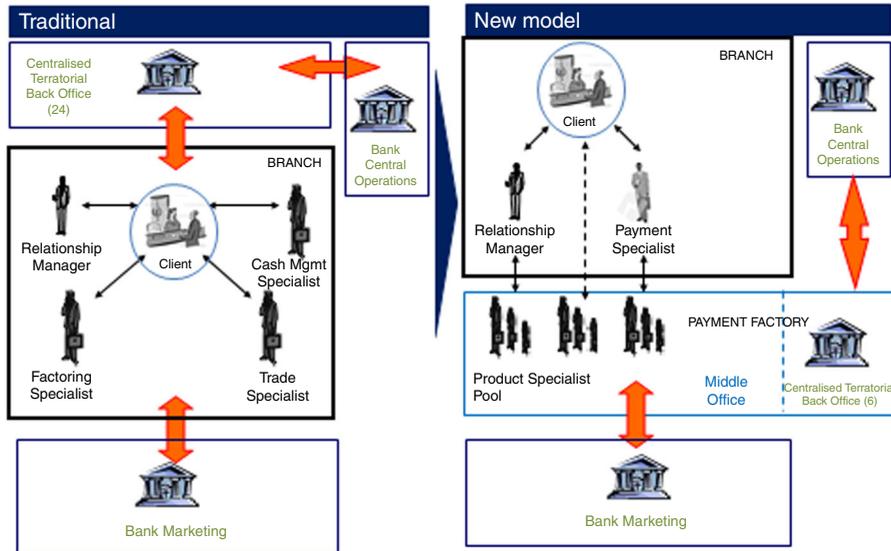


**Figure 1.**  
BSG's modular account

BSG's transformation was especially apparent in the area of transaction banking which BSG was redesigning in order to maximize customization for corporate clients, while leveraging economies of scale through huge transaction volumes. This required investment in two key technology platforms: a web-based portal which facilitated transparent, streamlined information flow between the bank and its clients; and the transaction hub, a common infrastructure layer for managing high volume payments at lower costs. The role of branch staff was to facilitate the process of elicitation from clients and assist them in navigating the web-based self-customization tools to build their own solutions.

*Organizational re-design*

In 2008 the traditional structure of the bank (see Figure 2) had clear separation of front offices (the branches) and central territorial back offices (24 CTBOs). Every branch had a relationship manager (RM); and the Factoring, Trade and Cash Management specialists were based at the main area branches. The bank found that there was inconsistency in the knowledge and competences of these specialists, based on their exposure to specific clients in different regions; indeed this was even true for the territorial back office operators who were located in centralized but still numerous centers, and therefore geographically focused. In order to support its strategy of offering differentiated and customized products while also exploiting scale economies, a new organization structure was introduced, as illustrated in Figure 2. The new structure was based on the centralization of payment operations into a smaller number of shared services centers, called payment factories, which were incorporated into the CBTOs, and performed the high volume back office



**Figure 2.**  
BSG's old vs new  
organization  
structures

processing. In 2008 there were over 20 CTBOs but the aim was to reduce them to six offices which would manage and streamline all payment operations. Each payment factory also incorporated a new organizational unit which BSG named “Middle Office” (hereon referred to as “MO”) consisting in a pool of product specialists who supported the branch staff and occasionally came into contact with clients via the telephone or internet. The MO was structured on the basis of the product groups; BSG’s Head of Payment Operations explained the organizational redesign as follows:

In the past we were only required to be efficient, nowadays we are consolidating and centralising Operations Centres in order also to improve quality, through standardization and control; leveraging highly specialised and scarce competences to serve a wider range of possible customers than only those belonging to the branch where specific competences have been located till now.

According to BSG’s Payment Products Manager, the MO was designed to be a highly specialized unit which protected the high volume payment operations from disruption, and at the same time provided product-based expertise to support front office staff. The MO was therefore consistent with the definition of the mid office concept proposed in this paper.

In the branches the number of client contact points was reduced to RMs and payments specialists (PaSs). RMs were responsible for client relationships, and were expected to be proactive in proposing solutions to address their credit needs and investment capacity. PaSs covered a wider territorial region than the RMs (so each PaS supported several RMs); they were experts in transaction banking and had some knowledge of the territorial texture within which they operated. Both RMs and PaSs were less specialized than the former branch specialists; however the need for highly specialized competences in branches was reduced due to the simplified modular products and new information technologies. So RMs and PaSs were expected to build efficient but personalized offerings, leveraging flexible product modularity and drawing on the expertise of the MO as required.

In the MO product specialists (most being former branch specialists) were grouped in a pool of resources, to develop competences based on the degree of specialization and

frequency with which they were required. While the experience of former branch specialists was limited to local clients, the new product specialists, working in product based teams, could acquire more expertise in handling a wider variety of requests, responding more flexibly to client requirements, yet also ensuring service consistency across the bank. The aim was to enable local knowledge gleaned from various territorial areas to be brought to the center, and to create a critical mass of expertise with high levels of competence and discretion in responding client needs. Whereas previously complex queries arising from the branches were resolved in the CTBOs, these were now handled by the MO, enabling back offices to focus on high volume processing.

The main changes implemented by BSG with regard to product/service modularization and organizational redesign are summarized in Table I.

**Analysis**

Based on the BSG case study, we now analyze the role of the mid office concept in enabling service and organizational modularity:

*Subordinate Research Question (a).* Is the mid office an enabler of service modularity?

BSG introduced the mid office in order to support its new modular products and services. BSG’s service offerings before and after 2008 may be characterized as changing from combinatorial to menu-driven customization (Voss and Hsuan, 2009). Prior to 2008 front

	BSG’s traditional structure (pre 2008)	BSG’s redesign based on the mid office (post 2008)
<i>Product/service design</i>		
Product/service modularity	Customers choose from a growing range of highly customized product bundles with advice from front office specialists; this requires significant competences and customer intimacy	Limited number of modular product types assembled by customers and/or front-line staff using menu driven configuration tools without need of highly specialized product knowledge
Platform	Web based technology supported a growing range of customized products	Flexible web based platforms facilitated the assembly of modular products with simplified pricing, enabled by simple, menu based product configuration and pricing engines
<i>Organizational design</i>		
Client contact	Multiple client contact points. Clients may contact RMs plus at least three types of specialist in the very large branches	Fewer sales contact points and simpler interfaces. Service delivered by RMs and PaSs in a larger number of branches
Decoupling of activities	Branch network represents front office; 24 CTBO’s perform back-office high volume transaction processing	Branch network represents front office; mid office is a pool of product specialists making occasional contact with customers; smaller number of CTBO’s perform back-office high volume transaction processing
Employee grouping	Specialists located in the branches with high levels of discretion and responsibility for customer relationships	Branch staff, responsible for client accounts, given lower levels of discretion. In MO product specialists with high discretion are grouped in product based teams

**Table I.** Summary description of BSG’s implementation of mass customization

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line staff created tailored offerings by selecting products and predefined bundles and adapting terms and conditions to individual customer needs and preferences. It might be argued that while the predefined bundles were designed by BSG’s marketing function, the role of front line staff was to “fabricate” individually customized products (Duray *et al.*, 2000). However the perceived outcome of combinatorial modularity was product proliferation, customer confusion and cost escalation.

The new strategy enabled branch staff and customers to select modular options from the web-based menus, and assemble and price products quickly and easily. This meant that customization now took place, not at the design or fabrication stage, but during assembly (Duray *et al.*, 2000); products were designed and fabricated by marketing through the provision of tightly controlled menu systems, but produced and assembled by clients. This represents a move from co-creation of products and services by front line staff and clients at the fabrication stage, to coproduction during assembly (Ostrom *et al.*, 2010). Menu-driven personalization and MO support meant that branch skills did not need to be as specialized as those required to support combinatorial modularity, thus reducing staff costs. The MO also supported product development by collecting data on multiple experiences from different types of customers and territories and feeding this into marketing procedures. The Head of Transaction Banking, Marketing and Sales maintained that this enabled the reuse of customization solutions for similar customer requests. Thus the BSG case provides examples of modular variation before 2008 and modular reuse post 2008 (Tuunanen and Cassab, 2011).

The scale economies achieved through BSG’s implementation of the mid office can be evaluated in the light of Piller *et al.*’s (2004) three scale economies of customer integration. The first arises from postponing some activities until the order is placed. In BSG menu-driven modularity, with support of the MO, meant that customization was postponed to the assembly stage. This enabled BSG to reduce the number of core products by 51 percent and the frequency of new products introduction. Marketing and product management perceived that the narrower product range had reduced product development and marketing costs while also making the pricing more transparent to the customer. Furthermore information collected by the MO product specialists facilitated improved demand forecasting because market analyses could now be based on macro trends and medium-to-long term changes in requirements.

The second source of scale economy arises from the acquisition of more precise market information. Before 2008 data on customer experiences were fragmented across the organization; local expertise was developed but was difficult to feed into the product design process. After 2008 the new technology meant that the marketing department received market intelligence automatically from the customization engines. The MO also played a key role in disseminating information on customer requirements and buying behaviors: “I expect MO Product Specialists to feed marketing and product development functions with their market insights, and that delivery outcomes of specific product strategies can be easily reported back to product designers by pools of experts so as to refine product development and marketing mix decisions” (Head of Cash Management Sales for Financial Institutions). However the Head of Retail Banking Customer Relationship Management raised some concerns regarding the initial acquisition of market information, fearing that the decoupling of expertise between branches and MO might compromise the harvesting of local client knowledge. Thus even though the MO provided an interface to facilitate knowledge transfer from branches to marketing and product management staff, the lower skills of branch staff might compromise the quality of market intelligence and local insights.

With regard to the third type of scale economy, we were unable to determine whether service modularization had affected switching costs and client loyalty. With the introduction of the MO branch personnel were less specialized than before, so BSG's ability to lock in the customer was if anything compromised rather than reinforced through MC. Furthermore there was some evidence of client dissatisfaction with the new processes, and a loss of confidence in the bank's management of client relationships. For example, the treasurer of a large corporate client observed that:

I was used to being able to reach my counterparties, although numerous, at the BSG branch very easily [...]. In general, the supply chain has lengthened so the front office and the back office are gradually moving away from each other and from me as customer [...]. I do not think that the consolidation of back offices is aimed at improving the quality of service or customer satisfaction, I think the main objective of this consolidation was to improve efficiency, cut costs and produce economies of scale.

To conclude, the case analysis suggests that the mid office can be an enabler of service modularity, facilitating a move away from combinatorial to menu-driven customization, from modular variation to modular reuse and from co-creation to coproduction of services. There is some evidence to suggest that the mid office concept can enable the scale economies of customer integration arising from postponement and from the acquisition of more precise market information:

*Subordinate Research Question (b).* Is the mid office an enabler of organizational modularity?

In BSG the new structure meant simplifying customer contact points, using front office branch staff to interface directly with the client, while the MO enabled Product Specialists to be decoupled from the branches and grouped on the basis of product specialisms. Thus product modularity was "reflected" (Baldwin and Clark, 1997) in terms of organizational modularity in two respects: the mid office enabled organizational modularity by decoupling the front and back offices; and the mid office was itself based on a modular structure, with product based teams. RMs and PaSs in the branches would draw on the expertise of the different product specialists, depending on the mix of product modules their clients required; product modularity was therefore "reflected" in their engagement with MO specialists. This is consistent with the contention that MC results in the decoupling of operations (Sanchez and Mahoney, 1996; Schilling and Steensma, 2001; Hoetker, 2006); and that modularity is likely to lead to loose coupling in services (Voss and Hsuan, 2009).

Before 2008 knowledge and expertise was highly fragmented across the branch network, and there was tight organizational coupling between highly skilled staff within the branches. Post 2008 organizational modularity meant that staff discretion and skill levels in the branch network were reduced, with centralization of knowledge and expertise in the MO. BSG's Payment Products Manager observed that the new structure, which deployed PaSs in a larger number of branches than previously, facilitated greater consistency in the provision of payment services to corporates, and a higher level of service in the smaller conurbations.

This organizational change is consistent with a move from organic to mechanistic structures (Huang *et al.*, 2010) and with Liu *et al.*'s (2006) contention that MC does not necessarily imply increased empowerment. Organizational decoupling also facilitated the streamlining of adaptive behaviors (Gwinner *et al.*, 2005), with front office staff focusing mainly on interpersonal adaptive behaviors, and service offering adaptive behaviors being

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expected of the MO product specialists. According to a senior manager in International Trade Services “both front end/sales and mid office staff had been trained to let them learn a new way of working, exchanging information about customers even if they were not in the same branch” but he acknowledged that further investment in staff training was required to achieve the transformation.

While the case analysis suggests that the mid office can enable organizational modularity, in BSG management had significantly underestimated the organizational disruption of re-allocating tasks, roles and responsibilities between these employee groups. BSG management recognized that the focus had been on redesign of products and technology platforms, without sufficient effort being expended on the organizational aspects of implementation. The Head of Payment Operations observed that, for employees who were moved from branches to the MO, there were frustrations involved in changing their roles from selling to the more limited and sporadic contact with customers. For many the move, which meant MO staff now reported to Operations, was considered to be a demotion, because the bank was perceived to afford higher status to front line roles reporting to Sales and Marketing. By 2010 roll-out of the MOs and reduction in the number of CBTOs had yet to be fully implemented. The failure to implement these organizational design changes in a timely way meant that many of the benefits of MC both in terms of scale economies, on the one hand, and service customization, on the other, were compromised. Indeed it may have led to the disadvantages usually associated with high volume, high variety services (Silvestro, 1999). Consequently the full benefits of organizational de-coupling and knowledge sharing (Sanchez and Mahoney, 1996; Schilling and Steensma, 2001; Hoetker, 2006) could not be exploited.

The BSG case analysis is summarized in Table II, structured around the key elements of MC drawn from the manufacturing and service operations management literature. Table II also identifies the perceived impact of the changes both in terms of product/service design and organizational design.

## Discussion

The BSG case analysis allows us to evaluate the trade-offs implied by a new service design configuration in which the mid office acts as a service interface between front and back offices. The trade-offs are analyzed with respect to three design decisions: customer contact, decoupling and employee grouping (Zomerdijk and de Vries, 2007). With regard to the customer contact decision, the mid office enables separation of customer contact activities, reducing staff discretion in the front office, with a focus on interpersonal adaptive behaviors. The mid office provides a critical mass of expertise and a mechanism for knowledge transfer; however, by reducing discretion in the front office, the harvesting of local knowledge may be compromised. With regard to the coupling/decoupling decision, according to Zomerdijk and de Vries coupled processes have the benefits of flexibility, responsiveness and front office utilization, while decoupling enables specialization and sealing off the back office from uncertainty. The mid office facilitates the benefits of decoupling, potentially improving the efficiency and effectiveness of both front and back offices, by yielding scale economies of customer integration in the front office and volume scale economies in the back office. At BSG there was also evidence of greater consistency in service levels between branches. However decoupling through the mid office required significant investment in terms of staff training and re-organization. With regard to the grouping decision, Zomerdijk and de Vries identify the benefits of grouping employees into either market or functional groups. In BSG the MO enabled new employee groups, with teams in the MO being given product responsibility and front

	BSG's traditional branch network pre 2008	BSG's redesign based on mid office post 2008	Perceived impact of change
<i>Product/service design</i>			
Type of customization (Voss and Hsuan, 2009)	Combinatorial customization: each new product bundle given a unique bank code	Menu driven personalization with easy configuration and combination of product modules	Pre 2008: product proliferation and customer confusion. High staff costs due to the need for specialist skills and high discretion levels across branch network.
Nature of customer participation (Ostrom <i>et al.</i> , 2010)	Customer co-creation of services: front office helps clients choose customized offerings	Customer co-production of services; customers and/or front office staff select modules from menus	Post 2008: significant reduction in number of products and simplification of products and pricing. Reduction in staff costs in branches
Type of service modularity (Tuunanen and Cassab, 2011)	Variation modularity: each combined product bundle requires significant design alteration	Reuse modularity: product modules enable reuse of customization solutions for similar customer requests	Pre 2008: high marketing costs due to product proliferation and frequent introduction of new products.
Stage at which customization takes place (Duray <i>et al.</i> , 2000)	Customization takes place at the fabrication stage	Personalization during assembly by customers and/or front-line staff	Post 2008: scale economies in marketing costs due to reduction of core products range; less frequent new products introduction; improved demand forecasting; simplified pricing
Scale economies of postponement (Piller <i>et al.</i> , 2004)	Limited scope for postponement as early involvement of customer is required in order to co-create products and services	Postponement of customization to the assembly stage	Pre 2008: difficult transfer of local knowledge to marketing and product designers.
Scale economies through acquisition of market information (Piller <i>et al.</i> , 2004)	Limited: local expertise dispersed across branch network, to facilitate customer intimacy and accumulation of in-depth local knowledge	Significant: product configuration engines automatically feed marketing department with market intelligence; MO staff also passes intelligence to product developers	Post 2008: scale economies achieved through improved exploitation of market intelligence, enabling organizational learning; but less scope to harvest local knowledge
Scale economies through improved customer loyalty (Piller <i>et al.</i> , 2004)	Customer intimacy with branch personnel created opportunities to lock in the client	Limited: lower levels of customer intimacy reduced scope for client lock-in	Pre 2008: easier to lock in client. Post 2008: some evidence of increased client dissatisfaction with the new structure; clients aware of reduced discretion of front line staff
<i>Organizational design</i>			
Organizational decoupling (Baldwin and Clark, 1997;	Tight coupling and dependency between RMs and specialists within large branches	MO enables decoupling of front and back offices. Modular product structures reflected in	Pre 2008: high staff costs. Post 2008: lower staff costs in branches. Critical mass of MO created economies

**Table II.**  
Analysis of BSG's implementation of mass customization

(continued)

	BSG's traditional branch network pre 2008	BSG's redesign based on mid office post 2008	Perceived impact of change
Hoetker, 2006; Voss and Hsuan, 2009)		product based teams in MO	of scale in terms of staff and technology costs
Organizational form (Huang <i>et al.</i> , 2010; Liu <i>et al.</i> , 2006)	Organic, decentralized structures, with fragmentation of expertise across branch network	More mechanistic structures in branches; centralization of knowledge bases in MO	
Employee adaptive behaviors (Gwinner <i>et al.</i> , 2005)	Branch staff required to develop both interpersonal and service offering adaptive behaviors as well as product specific competences	Interpersonal adaptive behaviors deployed in branches; service offering adaptive behavior in MO	Pre 2008: specialist skills dispersed across branch network, leading to inconsistency in accumulation of local expertise and service delivery; further increased operational costs. Post 2008: greater consistency of service delivery across branch network. Expertise in MO shared across the organization
Degree of empowerment (Gwinner <i>et al.</i> , 2005; Liu <i>et al.</i> , 2006)	High discretion levels in branch network	Lower discretion levels in branch network; high discretion in MO	

Table II.

office staff responsible for client accounts. The MO groups could now benefit from critical mass expertise, whereas in the traditional structure expertise was fragmented, with specialists being distributed across the branch network. The trade-offs implied by this new service design configuration are summarized in Table III.

With regard to our research questions, the case analysis suggests that the mid office can act as an enabler of both service and organizational modularity, and thus facilitates service MC. The BSG case study provides a rich description of the implementation of MC in a financial services organization, and provides insights into the role of the mid office in enabling a “mirror effect” (Baldwin and Clark, 1997) between service and organizational modularity. While the contribution of this paper is to explore the role of the mid office in facilitating MC, it is important to point out that mid offices need not necessarily perform this role; that is to say, in service organizations which are not implementing MC, mid offices may still be appropriate but they may perform a different function. For example, in a mass service (offering high volume services with low variety) a mid office might be created in order to provide some form of knowledge-based support to front liners who provide standardized services with minimal customization. In financial services, IT technical support and risk management are often cited as examples of mid offices (cf. Investopedia, 2015), but such support services could be provided in both high and low volume services; and while mid office staff support and advise front office staff, the purpose may not necessarily be to help customize services for individual customers. We do not therefore contend that the role of the mid office is exclusively to facilitate MC; nevertheless, the mid office offers a design configuration which is conducive to service MC for service managers who choose to implement MC strategies.

The distinction between full and partial MC has enhanced understanding of the contingencies of MC implementation, both in terms of process choice and organizational design, but has not hitherto been applied to services. Having contended that the mid office is an enabler of service MC, we now consider whether this distinction is applicable in this

	Trade-offs implicit in three service design decisions (Zomerdiijk and de Vries, 2007)	Trade-offs implied by the mid office (MO) concept
	<i>Customer contact decision</i> (determining which activities are carried out with/without customer contact)	
Front office (FO) activities	Back office (BO) activities	MO facilitates separation of contact activities MO supports FO selling and personalization
Cross-selling	Efficiency potential	MO enables reduced discretion levels in FO MO enables separation of adaptive behaviors; MO provides service offering adaptive behaviors; FO provides inter-personal adaptive behaviors
Customizing or personalizing a service		However: MO, with reduced FO discretion, may compromise harvesting of local knowledge
	<i>Decoupling decision</i> (organizationally separating activities by allocating them to different employees)	
Coupled processes	Decoupled processes	MO facilitates decoupling of front and back offices MO protects BO from disruption and uncertainty
Maximum flexibility	Employing experts	MO facilitates economies of customer integration, reducing product marketing, design and development costs
Maximum responsiveness	Sealing off BO from uncertainties	MO facilitates volume scale economies and efficiencies in BO
High degree of FO utilization	Specialization effects	MO enables higher consistency in service delivery in the FO
Broad tasks		MO creates a critical mass of expertise and provides a mechanism for knowledge transfer
		However: MO requires significant investment in re-organizing and training
	<i>Grouping decision</i> (grouping employees in either market or functional groups):	
Market groups	Functional groups	MO can be used to complement FO structure (e.g. market or customer based groups in FO; functional or product based groups in MO)
Workflow coordination	Economies of scale	
Cross-fertilization		
More specialization and uniformity		

**Table III.**  
Impact of mid office on three service design decisions

context, and if so, which type of MC the mid office can enable. BSG's strategy before and after 2008, appears to be consistent with a change from "full" MC, where customization is provided at the fabrication stage, to "partial" MC, where customization is postponed until assembly (Squire *et al.*, 2006). The case analysis suggests that before 2008 BSG's products and services were based on combinatorial customization and variation modularity, requiring clients and branch specialists to co-create service bundles according to individual requirements. Post-2008 the core products and modules were designed by marketing, based on customer intelligence but usually with no customer involvement. Customization took place during the assembly of core products and modules in the front office, with the support of MO product specialists. Menu-driven customization and reuse modularity facilitated scale economies at the design stage due to the simplification of products and pricing, and less frequent and disruptive new product introductions. We conclude that the mid office is conducive to partial rather than full MC. Our research indicates that the manufacturing archetypes of full and partial MC are applicable to services, but it has enabled us to re-interpret these archetypes in service terms.

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Zomerdijk and de Vries (2007) argue that coupling of front and back office processes enables services to maximize flexibility and responsiveness, with a high degree of front office utilization and broad tasks. We suggest that the coupling of front and back office processes may be appropriate in services adopting full MC strategies where customization is offered from the design and fabrication stage. However the mid office, which enables decoupling of front and back offices, can facilitate the implementation of partial MC, where customization takes place during assembly of the service, through service coproduction in the front office. This is consistent with Huang *et al.*'s (2010) contention that full MC requires organic, decentralized structures and knowledge bases, while partial MC can be supported with more mechanistic structures. We therefore propose a contingent approach to the implementation of full vs partial MC in services. Squire *et al.* (2006) argue that choosing to implement full vs partial MC hinges on understanding what customers value and that full customization may be successful only “where customers are somewhat price and time insensitive” (p. 18). Similarly the choice between full and partial service MC may be contingent upon the source of customer value: when customers value a high degree of customization, flexibility and responsiveness to individual requirements, full service MC may be appropriate; while partial service MC may be suitable for customers who value a lower level of customization, and for whom cost, speed and consistency of service are priorities. Table IV presents the key characteristics of full and partial service MC with reference to concepts drawn from the manufacturing and service operations literatures.

To date the distinction between full and partial MC has been applied only to products and manufacturing processes. This paper has demonstrated its relevance and applicability to services and has generated some insights into the contingencies of service MC. We propose the following contingent conditions which render full and partial service MC appropriate:

**Full service MC** is appropriate when customers value customization, flexibility and responsiveness to individual requirements, and are somewhat price insensitive. Customization is combinatorial, enabled during fabrication of the service through co-creation, variation modularity and service offering adaptive behaviors. This is facilitated through organic organizational forms, high levels of discretion in the front office, and tightly coupled front and back office processes.

**Partial service MC** is appropriate when customers value a lower level of customization and when consistency of service, speed and cost are priorities. Personalization is menu-driven, enabled during assembly of the service through coproduction and reuse modularity. This is enabled through more mechanistic organizational forms, lower discretion in the front office, and the decoupling of front and back offices. Decoupling can be facilitated through a mid office service interface which provides service offering adaptive behaviors, to support interpersonal adaptive behaviors in the front office, and protects the back office from disruption.

### Implications for practitioners

The BSG case analysis has provided insights into the challenges and benefits of implementing a mid office to facilitate MC. BSG management attested to the fact that the mid office was instrumental in supporting product/service modularity. However the organizational changes required to implement the mid office, and enable organizational modularization, lagged behind the modular redesign of products and services. The failure to fully implement the mid office concept and roll out the changes in the branch network, compromised both the customization capabilities and scale economies which the MC

MC concepts from the literature	Full service MC	Partial service MC
<i>Service design</i>		
Source of customer value (Squire <i>et al.</i> , 2006)	Customization; flexibility; responsiveness	Lower level of customization; consistency of service; speed; cost
Type of customization (Voss and Hsuan, 2009)	Combinatorial customization	Menu-driven personalization
Nature of customer participation (Ostrom <i>et al.</i> , 2010)	Co-creation	Co-production
Type of service process modularity (Tuunanen and Cassab, 2011)	Variation modularity	Reuse modularity
Stage of value chain when customization occurs (Duray <i>et al.</i> , 2000; Squire <i>et al.</i> , 2006)	Fabrication	Assembly
Scale economies through postponement (Piller <i>et al.</i> , 2004)	Limited scope	Scope for postponement
Scale economies through acquisition of market information (Piller <i>et al.</i> , 2004)	Limited scope	Scope for scale economies
Scale economies through increased customer loyalty (Piller <i>et al.</i> , 2004)	Scope for scale economies	Limited scope
<i>Organizational design</i>		
Organizational de-coupling (Zomerdijk and de Vries, 2007; Zomerdijk and Voss, 2010)	Coupled front and back offices	De-coupled front and back offices; with mid office interface
Organizational form (Huang <i>et al.</i> , 2010)	Organic, decentralized structures and knowledge bases	More mechanistic structures; centralized knowledge bases
Employee adaptive behaviors (Gwinner <i>et al.</i> , 2005)	Service offering adaptive behaviors	Interpersonal adaptive behaviors in front office; service offering adaptive behaviors in mid office
Degree of empowerment (Gwinner <i>et al.</i> , 2005; Huang <i>et al.</i> , 2010; Liu <i>et al.</i> , 2006)	High discretion levels in front office	Lower discretion in front office; highly empowered mid office

**Table IV.**

Characteristics of full and partial service mass customization

strategy was intended to deliver. In order to successfully implement service MC and better exploit the mid office concept, we believe that managers need to understand the managerial decisions which are implicit in the choice between full and partial MC implementation.

The first step is to understand and define the source of customer value. Full service MC is likely to be appropriate only if customers value a high degree of customization and are willing to pay for a service that is flexible and responsive to their needs; for more price sensitive customers who value lower levels of customization and consistency of service between encounters, partial service MC may be more appropriate. Having defined the source of customer value, managers need to make a series of implementation decisions regarding not only service modularity but also organizational design. Managers then need to ensure that customer value is aligned with the nature of customization offered (combinatorial or menu-driven) and the nature of customer participation (co-creation or coproduction). The stage of the value chain at which customization should occur also needs to be determined, alongside the decision as to whether variation or reuse modularity

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is appropriate. Consideration needs to be given as to which types of scale economies are intended: partial MC is likely to enable the scale economies of postponement and acquisition of market information; while full MC may create opportunities to increase customer loyalty. Then a series of decisions follow in terms of organizational design: the organizational form, the nature of employee adaptive behaviors and the degree of empowerment. Managers also need to decide whether or not front and back office processes should be coupled; and, if partial MC is being implemented, whether to create a mid office to facilitate organizational de-coupling.

These design decisions, implicit in Table IV, enable service managers to evaluate the service and organizational design options of full vs partial service MC and to ensure design coherence through a mirror effect of service modularity and organizational modularity. Choosing between the service archetypes of full and partial MC proposed in this paper may help managers obviate some of the problems of MC implementation, by aligning the sources of customer value to the type of MC implementation. For those service managers who opt for partial MC, the BSG case study offers insights into how the mid office can both support service/product modularity and realize organizational modularity through decoupling.

### Conclusion

We propose that the mid office, defined as “an interface between front and back offices, which protects the technical core of the high volume back office but also supports the front office with knowledge-based expertise,” can facilitate service MC by enabling service modularity and organizational modularity. The mid office facilitates streamlining of employee adaptive behaviors between front, back and mid offices, with lower levels of discretion in the front office. The BSG case analysis suggests that the mid office is an enabler of service modularity, facilitating a move away from combinatorial to menu-driven customization, from modular variation to modular reuse and from co-creation to coproduction of services. It enables the implementation of a more mechanistic (rather than organic) organizational form, which is conducive to partial MC (Huang *et al.*, 2010). The BSG case analysis provides some significant insights into the nature of full vs partial MC in services, a distinction which has hitherto been applied exclusively to production and engineering environments. An important contribution of this paper is to reinterpret the manufacturing archetypes of full and partial MC in service terms, drawing on concepts from the service operations management literature. Our characterization of the two service MC archetypes implies a contingency approach to service MC implementation based on service value. Finally Table IV offers a template which practicing managers can use to evaluate the service and organizational design options for MC implementation.

The research described in this paper is based on a single case study. Despite limited generalizability, case study research has been advocated for the conduct of explorative, qualitative research into complex social phenomena (Yin, 2009; Eisenhardt and Graebner, 2007; McCutcheon and Meredith, 1993). A single in-depth case study was considered appropriate for this research because the mid office is a nascent concept which has not previously been studied (Edmondson and McManus, 2007). Furthermore the implementation of MC in this large organization was complex, requiring extensive data collection and in-depth study. Further research is required to test our characterization of full vs partial MC in services. There is also scope for further developing the concept of the mid office as an enabler of partial MC, and for exploring its implementation beyond the financial services sector. A particularly important future research direction is to measure the performance outcomes of

full and partial MC in services; and to ensure intra- and inter-organizational learning from both the successful and less successful examples of implementation.

#### Note

1. The term “payment service” is being used generically here to refer to the management of all payment types (electronic payments, cash, cheques, credit cards, electronic invoicing, etc.) and the management of trade services (which refer to financing activities of trading parties).

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Appendix 1

Interviewees	Interview structures
(1) Head of Transaction Banking Marketing and Sales, International Trade Services, Corporate Banking	Strategic context Aims and objectives of transformation program Implementation of transformation program Implications for product and service design Implications for organizational design Outcomes
(2) Manager in charge of Sales and Marketing of trade finance services, International Trade Services, Corporate Banking	Strategic context Implementation of transformation
(3) Head of Customer Relationship Mgmt; Retail Banking	Implications for product and service design
(4) Head of Cash Management Sales for Financial Institutions	Implications for customer relationships
(5) Head of Payment Operations	Implications for organizational design
(6) Payment Products Mgr, Payment Operations	Outcomes
(7) Chief Information Officer	Role of the technology platform
(8) Manager in IT responsible for liaising with Payment Operations	Implications for product and service design Implications for organizational design Outcomes
(9) Senior professional in team responsible for coordinating regional back offices	Implementation of transformation
(10) Senior professional belonging to central back office	Implications for product and service design Implications for organizational design Outcomes
(11) Corporate treasurer of one of the bank's corporate clients	Implications for product and service design Implications for customer relationships Outcomes

**Table A1.**  
List of interviewees

**Appendix 2. Interview protocol**

**Questions on interviewee’s role**

What is your job role? To whom do you report? Who reports to you?  
 What is the role and position of your unit within the organization?  
 Explain the structure of your organizational unit and your role within this.

**Questions on the new strategy and structure**

The introduction of MC in BSG was based on what was regarded as a “transformation program” in the Bank. Therefore interview questions centered around understanding the strategy and structure of the organization “before” and “after” transformation. An interview guide was used to collect the data and was structured around the following themes. Interview data were triangulated with reference to other archival data as illustrated in Table AII.

**Questions on the impact of the transformation program**

Interviewees were invited to comment on the perceived benefits, limitations and challenges of the transformation program, and its impact on:

- Product/service design.
- Product range and new product introduction.
- Sales and marketing costs.
- Service delivery and quality.
- Staff competences and behaviors in front, mid and back offices.
- Client relationships, client satisfaction and loyalty.
- Employee satisfaction, loyalty and commitment.
- Cost efficiency, scale economies.
- Operational flexibility.
- Knowledge transfer: ability to harvest local knowledge; ability to spread knowledge to inform product development and facilitate organizational learning.

	Themes used to structure the interviews	Examples of archival data
Strategy	Strategic aims and objectives; nature of the competitive environment; customer and competitor pressures; means of differentiation; distinctive competences	Annual reports; strategy statements; transformation program steering committee records and projects materials; market analyses; project business case
Product and service design	Product and service customization; product range; new product introduction; role of technology in facilitating product and service delivery	Product/service catalogue; product specifications; pricing model; operating manuals; process maps; access to web-based products and services; projects materials; industry papers and reports; conference presentations
Organizational design	Aims and objectives of new structure; roles of front, back and mid offices; management of client relationships; front, back and mid office staff roles; integration and communication between front, back and mid offices	Organizational charts; operating manuals; process maps; transformation program steering committee records and projects materials; project business case

**Table AII.**  
Structure of  
interview guide

#### About the authors

Dr Rhian Silvestro is an Associate Professor in Operations Management at the Warwick Business School, the University of Warwick, and her research interests include managing financial supply chains; service process design and improvement; service performance measurement; B2B service management; workforce scheduling; and health service management. She has conducted research in a number of large, leading edge organizations including retail companies, banks, transport companies, and call centers. She has acted as a consultant to ward managers in NHS hospital trusts, as well as NHS Direct, in the area of nurse scheduling and the computerization of rostering systems. Her work is published in journals which include *OMEGA International Journal of Management Science*, *International Journal of Operations & Production Management*, *International Journal of Production Economics*, *International Journal of Service Industry Management*, *International Journal of Quality & Reliability Management*, *Health Services Management Research*, and *Journal of Advanced Nursing*. She is a Co-author of *Performance Measurement in Service Businesses*, published by CIMA. Dr Rhian Silvestro is the corresponding author and can be contacted at: Rhian.Silvestro@wbs.ac.uk

Paola Lustrato works at UniCredit SpA, Milan, as an Enterprise Architect within the Group Information Office, which oversees the coordination and governance of ICT activities in the Group. This department is responsible for ensuring the unity of vision and IT risk management, alignment with business strategic requirements and uniform application of the rules of information systems. Previously she was an Associate Director Consulting at Gartner and a Senior Consultant at IBM Italy, and has conducted Business and IT consulting activities in major Italian banks. Her areas of specialization are Transaction Banking and Banking Payment Operations. In recent years, she has worked in projects concerning Payment Systems Transformation, Core Banking Transformation & Legacy Modernization, IT Strategy and Change Management. She was involved in IBM research activities in collaboration with CETIF, the Research Centre on Information and Financial Technologies of the Catholic University of Milan.

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