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MASS CUSTOMIZING IT-SERVICE AGREEMENTS – TOWARDS INDIVIDUALIZED ON-DEMAND SERVICES

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Abstract

IT-service providers shall achieve both cost reduction in IT-operations and customer individuality in service agreements. This article suggests applying the well known principle of mass customization to balance individuality and standardization in service agreements. Dependent on the commitment modularity type, its employment may not only save time and resources at the point of customer involvement but also allow the predefinition of repeatable processes in IT-operations. We develop a typology for positioning and classifying IT-service providers as mass customizers of service agreements. This categorization is based on commitment modularity types and points of customer involvement in the IT-service life cycle. We identify four generic archetypes of IT-service providers' customization strategies and explain their characteristics by means of selected examples of actual IT-service agreement situations. Finally, we introduce a service model that enables IT-service providers to implement one specific archetype with a great balance in standardization and individuality. We therefore propose to (1) strictly separate the design of services from contracting and usage stages, (2) modularize self-contained commitments and (3) productize options and changes of a service agreement. This model has been prototyped and developed in close cooperation with IT-service providers and is currently applied for a pilot project.

Keywords: Individualization, Mass Customization, Service Level Agreements, Service Model, IT-Service Management.

1 INTRODUCTION

In response to an increasingly service-oriented and comparable economy, the IT providers' challenges are twofold. On the one hand they seek to reduce costs by optimizing IT-operations processes: driven by best-practice-frameworks like ITIL (OGC, 2007b) and CobiT (ISACA, 2004), provisioning processes strive for repeatability, documentation and automation. On the other hand, customer orientation demands the alignment of IT-services to business needs (Peppard, 2003; Nieminen & Auer, 1998). Business-oriented services are believed to reduce mismatches (Trienekens et al., 2004; Rands, 1992) and enhance cost transparency and satisfaction on the customer's side (Heine, 2006; Drury, 2000). IT-services are therefore understood in this article as a set of related functions provided by an IT provider in a specific quality to support one or more business processes (cf. Rodosek, 2003).

To achieve both optimized IT-operations and customer-oriented service offers, a standardized portfolio of IT-services must be defined. As a result, the definition of service catalogues according to ITIL (OGC, 2007a) is on the very rise of expectations within Gartner's hype cycle (Govekar et al., 2009). However, standardized service offers in a catalogue leave many customer requirements unfulfilled and have to be individualized in customer-specific contracts / service level agreements (SLA). Completely individual negotiated "one-of-a-kind" services make standardized IT-operations almost impossible and keep them project-based. The permanent demand to adapt existing agreements to new requirements of the customer's business model and processes further complicates matters. Most change requests implicate project-based, unrepeatable IT-operations. Thus, demand-oriented IT providers have to balance standardization and individualization in service agreements.

Our proposition is that the industrial principle of mass customization is adoptable to support this balance in the design of service agreements. Although known primarily as a production principle (Pine, 1993; Kaplan & Haenlein, 2006), mass customization has also been applied to intangible products (Choi et al., 1997). Kahn (1998) and Wehrli (1997) focus distributive and marketing aspects when mass customizing offerings and deals. Likewise, we disregard the production focus when applying the principle to customize IT-service offers and agreements. Doing so, we follow the idea of 'industrializing' IT management through applying industrial concepts (Zarnekow et al., 2006).

Related work concerns itself with how to modularize IT-services themselves. The packaging of modularized service modules has been examined by diverse researchers – e.g. (Nieminen & Auer, 1998; Kaitovaara, 2001; Salmi, 2008). Configuration themes of those resource-oriented modules have been examined by Felfernig et al. (2000; 2001) among others. Boehmann and his colleges (2003; 2005) introduce service engineering methods and architectures that aim to composite resource-oriented service components to achieve repeatable processes and learning effects in IT-operations. We base our work on this research to engineer new services according to the customer requirements and negotiated agreements. However, as soon as the customer does not order resource-oriented components but a business-oriented service, this modularity layer is no longer applicable to the defining of service agreements. Rather than choosing between predefined services, commitments are negotiated that overlap resource-oriented silos. This is why we care about the standardization and reusability of commitments in this article to achieve repeatable processes of operations in a later step.

In this respect, we first identify and classify different approaches of customizing service agreements. We therefore apply the principle of mass customization from industry to IT-service agreements and introduce a model based on its key dimensions. Implied by the typology, we introduce different archetypical approaches of customizing service agreements on the basis of analyzed service catalogues and SLA of diverse IT providers and their customers. We then introduce a service model to mass customize service agreements based on modular, self-contained commitments. This model enhances predefined and repeatable processes in IT-operations and provisioning by distinguishing stages of change and run in the provider's business. It also achieves transparency of the actual commitments with a customer and his possibilities to change or extend them according to evolving business requirements. Furthermore it provides a basis to plan and schedule future efforts of IT-operations.

2 ADAPTING MASS CUSTOMIZATION TO IT-SERVICE AGREEMENTS

Mass customization has become a common principle for industrial manufacturers to meet varying customer demands and achieve competitive costs. Its adaption to the design of service agreements has several potential advantages. Firstly, selecting and reusing instead of developing new commitments and agreements reduces time-to-market and development cost (Ulrich & Ellison, 1999). The customization of agreements saves time and resources at the point of customer involvement. Secondly, predefined submissions allow the pre-engineering of processes of provisioning and therefore enable cost-efficient, standardized, documented, optimized and repeatable IT-operations. Spreading the arising pre-engineering costs across several offerings and capturing economies of scope and of learning are further effects (Ulrich, 1995). Equally important is the possibility to permanently adapt a closed service contract to new requirements throughout its life-cycle without endangering the standardized and cost-efficient provisioning of the service (Baldwin & Clark, 1997).

These aspects are also outlined by Piller's three level of mass customization (Piller, 2002): Adapted to our scope, the aim of mass customization is to address a large market and meet the needs of every individual demander with regard to certain service characteristics (differentiation option) at costs that correspond to standard mass services (cost option) while building up an ongoing relationship with each customer (relationship option). This implies amongst others, that variety and customization are distinct and, to ensure the latter, the customer must be involved in shaping the service agreement (Mintzberg, 1988). Therefore, the point of customer involvement in the production cycle is one of the two basic key indicators of the degree or type of customization provided (Duray et al., 2000). The second is the method of achieving customization under cost restrictions. Specifically, it is the type of modularity employed, since modularity is the key to achieving mass customization (Pine, 1993). In the following we analyze these key dimensions of customization to group types of customization later on.

2.1 Modularity

Mass customization requires modular architectures to achieve economies of scale and scope (Blecker et al., 2006). Defining modular components that are configurable into different varieties of a service and its service agreement allows individuality, cost reduction and reduced delivery times (McCutcheon et al., 1994). In literature, different types of modularity have been distinguished to provide customized end products (Pine, 1993; Ulrich & Tung, 1991; Duray et al., 2000): *swapping* (switch options), *bus* (add to existing base), *mix* (combine while using unique identity), *sectional* (arrange to a unique pattern), *cut-to-fit* (alter dimensions before combining) and *sharing* (design around common base unit) modularity. Due to the intangibility of services, the characteristics of bus and mix modularity as well as those of cut-to-fit and sharing modularity may be combined. Based on that, we adopt these types to the modularity range of intangible service agreements and differentiate between *swapping*, *option*, *sectional* and *sharing* modularity as shown in Figure 1a.

The *commitment swapping modularity* represents the possibility to switch between variants of a commitment. One of the variants has to be chosen. A typical example is the choice between defined service levels like "silver" versus "gold".

An *option modularity* allows adding additional commitments to an existing agreement base. Additional commitment modules are selectable from a list of options. The selection of an additional commitment like for example a 24/7 support will influence the service as a whole. Some of those optional commitments can be added several times with different parameters.

The *sectional modularity* focuses on arranging commitment modules to a new service agreement. Consider the arrangement to commit daily reports and continuous monitoring. Commitment-arrangements may either be *restricted* by predefined combining rules or be allowed *unrestricted*ly. The latter allows more efficient designing of new service agreements but lacks certainty that such a new agreement would be able to be provisioned based on standardized processes.

The *commitment sharing modularity* is used to design a new service agreement with preferably many identical commitments. They are uniquely designed around a base unit of common commitments. For example the same definition of a service transfer point may be reused in different service agreements.

Following Duray et al. (2000) the above described types of modularity can be classified into two groups: applying the *sectional* and *commitment sharing modularity* types causes a new design or deep alteration of an IT-service and its operational activities to provide it. Even if no commitment is altered, its new assembly would result in an engineering of IT-operations, since commitments may not necessarily be able to be provisioned in the same way when used in different contexts. In contrast, the *commitment swapping* and *option modularity types* provide customization by allowing customers to choose between a predefined number of choices without being allowed to alter any of the commitment modules or their predefined structure in a service agreement. This shall be called "*standard customization*" in analogy to Mintzberg (1988). In contrast, the former group represents a "*tailored customization*", since it alters a basic design through sharing or assembling commitments. Along with Mintzberg the design of a new IT-service and new commitments from the scratch without the use of any modularity would represent a "*pure customization*". We use this classification when linking the modularity types with the points of customer interaction in the next section.

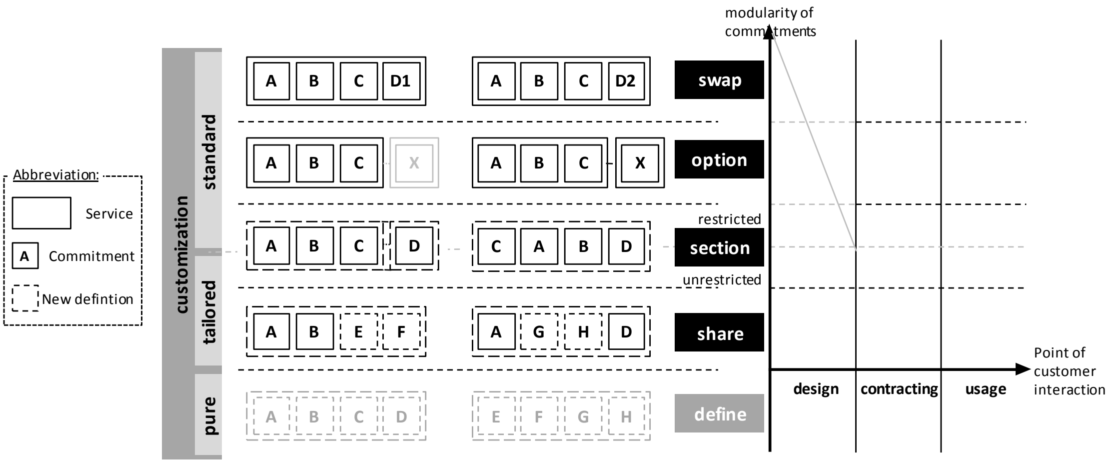

Figure 1a. Types of commitment modularity *Figure 1b. Matrix of customer configurations*

2.2 Points of customer involvement

In order to identify different points of customer involvement to customize the service agreement, we analyze the life cycle of an IT-service from its design to the point of its removal. Since the five generic stages to structure the ITIL framework (OGC, 2007b) is rather focused on IT-operations, Goeken et al. (2008) specify an ITIL service value life cycle that focuses on the customer. In addition Garschhammer et al. (2001) as well as Hegering et al. (1999) define a service life cycle as the stages 'design', 'negotiation', 'provisioning', 'usage' and 'deinstallation'. Along these life cycles, we identify the three stages of '*design*', '*contracting*' and '*usage*' as points of possible customer interaction to individualize an IT-service. (In practice, some non-functional commitments may also be defined at the 'provisioning' stage. Though, we simply attach all definitions to the 'contracting' stage. The 'provisioning' stage may involve the customer for cocreation but not to specify the agreement.)

The '*design' stage* is the starting point within the service life cycle and includes the specification of the functionality and nonfunctional properties like quality parameters. The development of a new service may arise because of two possible triggers: either the service provider enhances its portfolio because of innovative business ideas or optimization issues. Following the ITIL, its commitments shall be described in a service catalogue. Alternatively, a customer's specific demand initiates the development of a new service that would be defined exclusively along the requirements of the customer. It depends on the provider's service strategy if this kind of direct customer involvement exists. If this is the case, a 'tailored' rather than a 'pure' customization may be executed to gain communalities in agreements and to raise the chance of reusing already standardized processes in IT-operations. Therefore the 'sharing' or 'sectional' modularity type may be employed.

Following the service cycle, the '*contracting' stage* aims to sign a service agreement with the customer - often on the basis of predefined (catalogue) services. In most cases, those services are to be modified to the customer's needs when negotiating a specific service agreement. Dependent on the customer's power and the provider's strategy, this modification will either equal a 'pure' or 'tailored' customization or else just a choice of functionalities and service levels. The former may employ sectional or sharing modularity while the latter uses swapping or optional modules to achieve a 'standardized' customization. As an example, a 'standard' customizing provider in the 'contracting' stage would offer a shared or a dedicated environment for the service "Database Application Hosting My SQL" and allow a choice between basic, silver or gold service levels. Choosing between those predefined variants causes a swap between modules of agreements. Yet requirements of the customer may differ to the offered variants. In that case, the provider has to decide if modules may be altered unrestrictedly in their commitment - to agree for example to an individual availability of 98.5% instead of going for a predefined service level.

Based on the negotiated and agreed-on contract, orders/calls are made in the '*usage' stage*. After initial orders have been provided, its usage may take place. However, IT-services are operational over a long period of time, while business demands and requirements on the IT-services change during their term. As a result the necessity to change a service agreement in functionality or quality is likely to occur and changes are requested to adapt the service on the altered conditions. This is why service life cycles differentiate between 'operation' and 'change' within the 'usage' stage (Garschhammer et al., 2001). Standard changes could be offered that would add or swap specified modules of an existing service agreement. In the example, an uplift of the database operations to "medium" would expand the database application hosting to databases with medium complexity of schemas, sessions and users. But again the customer requirements may not fit to the offered and predefined standard changes. So the provider has to decide once more if a 'pure' or 'tailored' customization may be executed.

In summary we have argued, that two dimensions are critical to differentiate between types of mass customization in service agreements. Distinctions occur based on the point of customer interaction within the service life cycle and the type of modularity employed to reuse components and achieve economies of scale. Since these two dimensions are interrelated we juxtapose them in a matrix to classify mass customizers of service agreements in the IT sector, as shown in figure 1b. Whilst the provider may or may not involve the customer to define a new service in the 'design' stage, the 'contracting' and 'usage' stages allow a 'standard' customization through options and swapping to achieve efficiency and optimization in the order processing and in IT-operations. Additionally or alternatively, a 'pure' or 'tailored' customization may be employed in theses stages to allow a higher degree of individualization. Nevertheless, an unrestricted change of a commitment may probably entail changes in the originally standardized processes of IT-operations and will surely lead to extensive order processes. Its unpredictability leads to vague estimations in controlling and operational planning. In this regard, changes of modules should be banned in the 'contracting' and 'usage' stages. The challenge is then that in many cases the power of customers and their demand for highly individualized services provoke the service provider's salesmen to change modules and define new commitments at all stages of customer involvement. In this area of conflict, providers have to position themselves within the matrix of customer involvement and modularity that is shown in figure 1b.

3 CLASSIFYING IT ORGANIZATIONS AS MASS CUSTOMIZERS

Dependent on the service provider's strategy and rigidity to stick to defined commitments, different archetypes of providers can be identified – namely the *Assemblers*, *Individualizers*, *Modifiers* and *Engineers*. In figure 2 we position the archetypes within the classification matrix. To demonstrate their characteristics with examples, we first introduce selected contract situations at IT providers with regard to their usage of modules and involvement of customers. We then explore the archetypical groups and refer to these examples. They are based on our insights on service-catalogues and agreements of seven external, internal or shared IT service providers acting for mostly international publicly-traded companies that are predominant on the German-spoken market. In whole, we considered some 450 catalogue services, analyzed selected extensive SLA situations, including change requests, and considered workshops and informal interviews with IT experts.

Regarding the examples, we consult *SalesForce* as a representative for distributing business solutions on a subscription and offsite hosting model (software as a service). Within its customer relationship management solutions (excluding force.com), the provider offers highly standardized services without directly involving the customer in the 'design' stage. A public and fix master subscription agreement has to be accepted without negotiation before being able to order services. Four editions form ascending levels of functionality coverage of different modules like "Sales" and "Marketing". To ensure scalability in the 'usage' stage, further user subscriptions and functionalities are purchasable.

We further introduce *Beta*[i] as an internal IT-service provider of an international industrial concern. A Corporate Service Catalogue is cultivated, in which services are well defined. Whilst different service level classes like "silver" and "gold" are offered, there is also the predefined possibility to select the service level "individual" to allow customer specific definitions of any quality value. To order one of these defined services, an SLA is individually negotiated that refers to the catalogue but specifies further detail. Therefore, predefined free text sections are deleted, added and reshaped along customer demands. In the stage of ongoing usage, changes are requested by free text forms.

As IT-infrastructural outsourcing partner, *Gamma*[i] shows similar contractual situations: existing catalogue services like "Managed Unix" serve as suggestions for individually negotiated commitments of agreements rather than becoming part of contracts. Variants of catalogued services include the selection of "Nonstandard" options to negotiate individual solutions.

Furthermore, we take *Delta*[i] as a multinational IT supplier into account that acts as both external and internal service provider. To optimize IT-operations, an internal Corporate Standard Service Catalogue has been developed that simply lists typical services like "monitoring of applications" or "server maintenance". In addition, further service catalogues are defined as master agreements in collaboration with each business unit to cover specific topics like "support of financial processes". They consist of basic services like "trend analysis for SAPS" and optional services like "installation of ABAP support packages". Some of the services are selected from the Standard Catalogue, others are newly defined by sometimes sharing some text. Different service level, measuring points and reporting possibilities are defined to be selectable at the 'contracting' stage. Individual agreements are defined that refer to the Corporate Standard Catalogue as well as the business unit specific catalogue. Amounts and prices per service are defined and one of the predefined service levels is selected. Yet distinct service numbers are missing, so the called services are rather roughly referred to the predefined ones. Further individual special assignments are defined as projects. Although some predefined optional catalogue services are clearly aimed to standardize change requests in the 'usage' stage, our selection of contract situations solely included free text forms for defining change requests.

As another example, we introduce the division of IT-operations at *Zeta*[i] as service provider of an international concern. It takes great care in offering a globally consistent Standard Service Catalogue. Services such as "Managed Archive Storage" and separately its "Provisioning and Setup" are composed of orderable service modules with distinct order numbers. While some modules are optional to be added, others are mandatory to be selected to represent variants. Service level classes are also predefined. Inauspiciously, the product management did neither involve the customers into the design of the catalogue services, nor did they interview the own sales department. As a result, in the daily sales routine the predefined service agreements of the catalogue are sometimes reshaped or used as sales assistance to define tailored or purely individual agreements. The same is true for standard change requests that are defined as service modules but not always used.

Positioning these examples within the proposed matrix of Figure 1b, four different types of contract situations and offerings at IT-service providers may be distinguished as follows:

The first group includes situations in which providers neither involve the customer in the ‘design’ stage nor allow to design or alter modules customer-specifically. Instead, customers are deeply involved in the ‘contracting’ and ‘usage’ stages in order to assemble service agreements to their needs on demand. This is why we call this group “*Assemblers*”. Assemble-to-order IT providers consider mass customization by using predefined sets of modular agreement components to present a wide range of choices to the customer. All possible service variants have been predesigned so that a standardized producibility is assured. Therefore assemblers have best chances to reduce costs and achieve economies of scale. However, the restriction on standard customization precludes highly customer individual solutions, which is why this group concentrates on standardized services and commodities while addressing mainly small and medium business companies. Take SalesForce as typical example.

The strategy of the second archetype we name “*Individualizers*”. A potential service catalogue and existing agreements are taken as sales assistance for tailored or pure customization. Through deleting whole paragraphs from templates and modifying single phrases, new agreements are generated efficiently and commitments may be defined according to the customer’s demands. Though, the high degree of individuality in commitments leads to cost- and time-consuming project-based IT-operations rather than efficient producibility. The selected examples at Beta and Gamma represent this group.

The third archetype tries to increase the share of predefined services by implementing option and swap modularity. The according standard customization allows efficient, predefined IT-operational processes and reduced efforts of contracting. However, in many cases customers have further requirements, so commitments may also be modified or added individually at the ‘contracting’ stage. Change requests are usually instructed at the service desk and often highly individually. Thus, individual solutions are realizable to the detriment of standardized IT-operations. We call this group the “*Modifiers*”, since the approach of standardized modules is softened through individual modifications at the points of contracting and usage. They are represented by agreement situations at Delta and Zeta.

The fourth group we call “*Engineers*”. Services are defined and fully engineered at the ‘design’ stage, i.e. working instructions and standardized processes are defined for every service. To specify a service, commitments are shared or newly defined. In the ‘contracting’ stage, the service may be altered in its commitments within the space of restricted sectional modularity. However, modules shall not be altered or unrestrictedly combined in this stage to ensure standardized IT-operations. Instead, extensive changes will result in an engineering process for a new service. In the ‘usage’ stage possible changes of commitments are predefined and orderable on demand. By implementing this strategy, both individualization and standardization shall be achieved. However, the IT providers in our sample have difficulties to implement this pure strategy. A product manager of a worldwide operating ICT provider explained: the power of the customers is too big to sell just predefined services. And the sales department just freely modifies commitments without involving IT-operations. As a result, standard modules are hardly used nor are many processes repeatable. In the next section we therefore introduce a service model to achieve the stage of an “Engineer” in the sense of this typology.

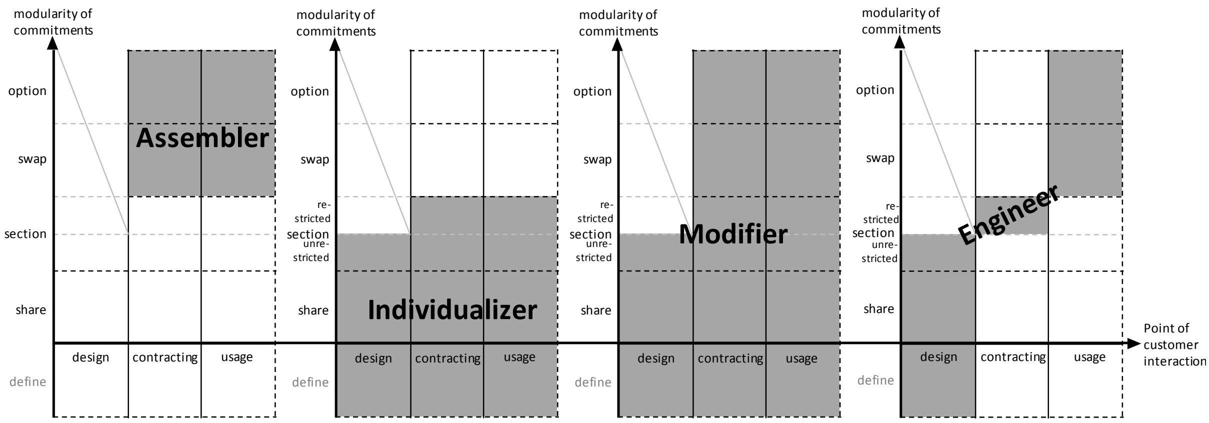

Figure 2. Positioning the archetypes within the matrix of customer configurations of figure 1b.

4 GAINING THE "MASS" IN MASS CUSTOMIZATION

4.1 Elaborating the "Engineer"

The strict appliance of modularity is the critical aspect for gaining scale volume or "mass" in mass customization, decreasing the possible variety of agreements and allowing for repetitive manufacture (Pine, 1993; Duray, 2002). Thus, we aim to elaborate the above introduced "Eng-ineer" archetype and therefore define the three identified customer inter-action points as individualization layers applied in different stages (see fig. 3).

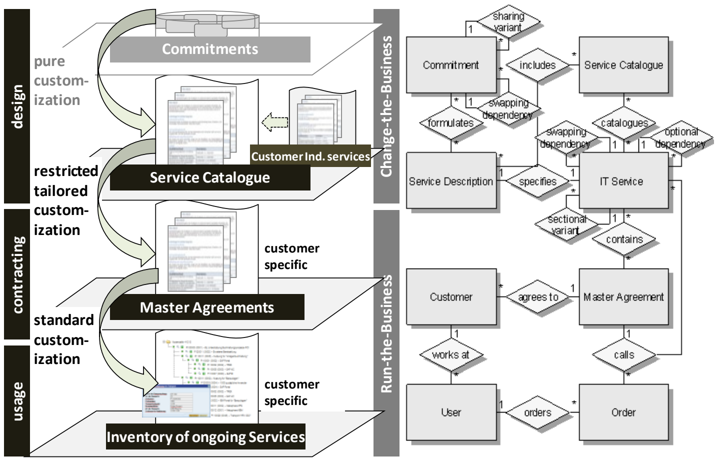

Figure 3. Levels of Individualization and related Data Model

The usage layer contains the inventory of ongoing service that is made up by orders and provided to a specific customer. Additional or swapping commitments are orderable on demand in the range of the master agreements in order to change the current service extent. A self-service portal allows the cust-omer a view on his inventory and ensures compatibility with new orders and the master agreement.

The master agreements are defined in the 'contracting' stage and serve - based on sectional modularity - as pre-definitions of the basic service extent, orderable variants and add-on commitments. Figure 4 shows an example: the agreement defines that *remote support* shall be part of the basic service, *onsite support* shall not be available, whereas *24/7 support* may be additionally orderable. This eliminates ad hoc changes in the service provisioning and operation processes, since all possible commitment assemblies and operational processes are predefined. This is also true for non functional commitments as individually definable quality values would potentially require changes in IT-operational processes.

Every change, development and new assembly of predefined modules that is necessary to fulfill the customer's requirements shall not be in the salesmen's power of decision but leads to a specification task in the design layer. This is executed through service engineering that would possibly result in a further predefined IT-service - be it to supplement the standard service catalogue or to offer a customer individual service. Within this design task a close collaboration with the IT-operational engineering ensures that working instructions and standardized processes are defined for every possibly orderable service. In the example of figure 4, *24/7 support* had to be engineered to comply with a customer's demand. But this was not done by adapting the agreement text at the sales point but rather by engineering each necessary step of IT-operations to fulfill this commitment. Accordingly, we firmly separate the time of service definition from the time of service ordering, which Winter and his colleagues (2008) call a separation between "change the business" and "run the business". Therewith the model ensures that no new commitment is taken when defining the master agreement without running through a design process. In the following, we will define how commitments shall be modul-arized to achieve these advantages and how the customer may choose between variants and options.

4.2 Modularizing Commitments

To achieve mass customization in service agreements, sections of service descriptions are reused, interchanged and therefore modularized. Simply reusing just any text section however would have no advantages to standardize the service provisioning and operation. Adapting the characteristics of modularity to the description of service agreements, commitments need to be distinct, self-contained and loosely coupled with each other, while their relationship has to be clearly defined (Wolters, 2002). Each selection, interchange or addition of a commitment shall ensure a specific value at the customers business. ITIL identifies two primary elements to create permanent value (OGC, 2007a, p.17): for one, *utility* as the right functions for the right user; for another, *warranty* as the right performance at the right time. A self-contained value-oriented commitment therefore needs to specify more than just functionality: non-functional properties like the availability, quality, service transfer point and obligations on cooperation also need to be set to complete the commitment (O'Sullivan et al., 2002; Dumas et al., 2003).

To transfer the model of modularity to service agreements, we therefore define a commitment as a self-contained, distinct module that contains the definition of a specific functionality and output, the obligation to cooperate to enable it, its transfer point and the quality values to be kept for this functionality. The service agreement that defines an IT-service consists of a number of commitments. As an example, the commitment “Login” in figure 4 would commit the possibility to log into a specific portal within two seconds if the user does not miswrite the password. Sectional variants of an IT-service differ in optionality or inclusion of commitments. Relations between the commitments like conflicts, swapping dependencies and interdependencies are defined to allow configurability. This can be implemented through dependency graphs like those introduced by Hiltunen (1998).

4.3 Productizing Services

Following the introduced “Engineer” archetype, commitments shall be addable and swappable at the ‘usage’ stage to allow a continuous customization according to changing business requirements. Such an on demand modification of the service agreement is carried out through orders. At the point of order, information requirements of the added commitments are to be declared. Moreover, the consequent modification of the agreement may cause a change in the customer’s expenses for the IT-service.

To handle these characteristics and achieve transparency at the customers and users point, we adapt the productization principle of IT-services (Salmi, 2008; Bullinger et al., 2003; Nieminen & Auer, 1998) to the ‘usage’ stage: each possible swap and addition of commitments is defined as an orderable, associated service product. Associated service products change or add commitments of the basic service, which is also productized. Those service products do not represent software or hardware but standardized services. They are developed in the ‘design’ stage, consist of one or several commitments, are priced and dependencies of orderability are explicit. In figure 4, “24/7 support” is orderable as an additional commitment (SD113). Its order results in a swap of the standard remote support commitment that is part of the basic product (SD100) and limited to support on weekdays. Such a productization of services allows the ordering by ‘service numbers’ instead of textual change requests and is therefore an opportunity to standardize its order processing. Moreover, provisioning efforts of change requests are no longer unpredictable: a sales planning of optional products that represent change requests allows scheduling efforts in IT-operations and shortens provisioning times.

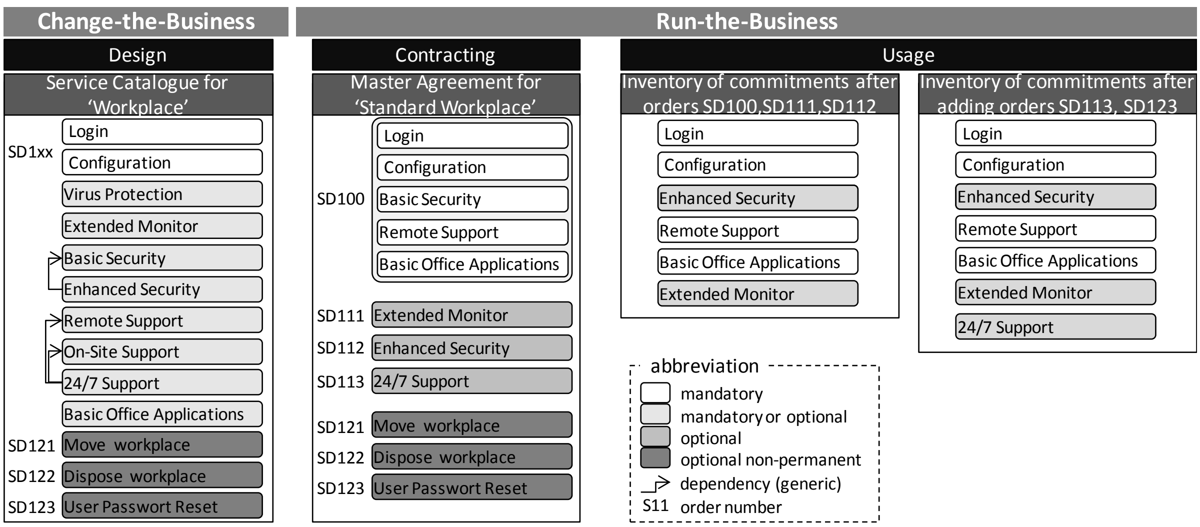

Figure 4. Example of a service that is designed by sharing commitments and individualized in the contracting and usage stages by predefining and ordering productized commitments.

4.4 Implementation and Empirical Validation

The introduced model to elaborate the "Engineer" archetype and achieve individualized on-demand offerings has been developed in close cooperation with four overall and internal IT-service providers of international corporations. Due to the direct interaction between researchers and representatives of the corporations, it follows "action research" as promoted by Checkland and Holwell (1998).

We identified, that at all providers similar problems occurred: inefficiency through highly customized service agreements, while laboriously defined service catalogues were hardly utilized. In addition to relevant literature and interviews with experts, we analyzed some existing service catalogues and service level agreements of diverse divisions and subsidiaries. On this basis we developed a sample of a service description that consists of self-contained commitments. We extended the model based on several iterations of design, prototyping and informal evaluations through interviews and workshops with diverse IT professionals and a questionnaire supported field test with experts and customers. We then adapted the model to real SLAs and developed commitments, service descriptions and according service products for very different kinds of services, such as "End-to-End Accounting", "Company Connectivity and Internet Access", "Application Hosting for Telecommunication Services", "User Administration for Applications" and "License Services". The service descriptions we developed of this kind surmounts to 239 pages. Numerous in-depth interviews and workshops with product managers, delivery managers and further IT professionals were used to evaluate and enhance these service descriptions.

Finally, the service model is currently being applied within a pilot project in order to change existing IT-service agreements of a provider section and customize a service master agreement for a real customer of the IT provider. In close cooperation with Managers of the customer organization, we verify the required service products that shall be orderable in the 'contracting' and 'usage' stages. Some requirements cause to loop into the 'design' stage and define some new commitments. In that case the work instructions and operations for provisioning the newly defined service are also to be engineered to allow standardized IT-operations in the later stages. If the pilot project succeeds, agreements of further customers shall be converted into the new model which now serves as reference model following Fettke and Loos (2004) and vom Brocke (2006). First interviews with experts reveal that due to high reusability just a few new commitments will be needed for these conversions.

5 CONCLUSION

This study adapted the principle of mass customization to the description of IT-service agreements, contracts and change requests. We therefore developed a typology of mass customization that provides an explicit means for positioning and categorizing IT-service providers' strategies. Adopted from the industrial mass customization, we suggest the types of modularity and the points of customer interaction as key criteria, which we deducted from the IT-service life cycle. We distinguish four generic archetypes of mass customizers: the Assemblers, Individualizers, Modifiers and the Engineers. We positioned examples of existing service agreements at different IT-service providers to these archetypes to demonstrate their characteristics. One of the archetypes, the Engineer, shows an extraordinary attractive balance of standardization and individuality of agreements but seems difficult to implement according to experts. Based on extensive research in cooperation with service providers, we therefore developed a service model that suggests strictly separating the run and the change of the business, modularizing self-contained commitments and productizing options, variants and changes.

This study takes a step forward in research for mass customizing service agreements by providing a conceptual typology, identifying generic archetypes and suggesting a reference model as way of implementing the *Engineer* archetype. However, our small sample of contract situations provides a onetime snapshot of company practice and is far too small to be representative. Regarding the introduced archetypes, an extension of this research would be a voluminous and longitudinal look at IT-service providers to further evaluate the archetypes as well as the demand and difficulties to implement the Engineer archetype in practice. Moreover, this paper has – besides highlighting advantages and disadvantages - neglected to make specific value judgments to the inherent worth of the different archetypes and modularity types. Future research may wish to explore the market implications concerning the effects on customer satisfaction and associated costs.

Regarding the further research on how to implement the *Engineer* archetype, we will gain additional insights with the ongoing pilot project in cooperation with an international ICT service provider and its customers. Specific principles of specifying and productizing services and commitments as well as their modularity will be developed further and completed by methods to deduce work instr-uctions for provisioning and operating IT resources to keep commitments according to their context.

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