

Managing the Current Customization of Process Related IT-Services

Henrik Brocke
University of St.Gallen
henrik.brocke@unisg.ch

Falk Uebernickel
University of St.Gallen
falk.uebernickel@unisg.ch

Walter Brenner
University of St.Gallen
walter.brenner@unisg.ch

Abstract

IT service providers are increasingly required to orientate their service portfolio towards the IT support of their consumer's business processes. This enables diversification as well as transparency in costs and services vis-à-vis the customer to be achieved. Such services however, appear too customer specific for a standardized service provision within the context of IT-industrialisation as they are subject to constantly changing customer demands. To combat this, a concept is envisaged that keeps business process orientated IT-services modifiable and configurable by concretely defining additional Associate Services in advance. In order to maintain transparency and influence in IT expenses, these services orientate themselves towards business objects in the customer's business. The concept is illustrated with the aid of examples from its application and further development together with two associate IT-providers.

1. Introduction

The suggestion of systematically aligning the IT service portfolio with the business processes of the customer is consistently reiterated in IT-literature [1-4]. It is believed that three problem areas of the IT branch can be addressed with such an alignment: Firstly, IT providers can avoid a rising cost pressure and the increasing comparability that arises from the commoditization of IT [5, 6]. Secondly, the technical orientation of commitments and Service Level Agreements create mismatches between customers' and producers' perceptions of services [7] and their quality [8-10]. Furthermore, the customer's employee as actual service beneficiary is not considered into the commitments agreed upon by IT provider and Demand-IT, nor can he influence it upon his request. The offer of business- and customer-oriented value propositions [11] and the inclusion of end-users as co-producers [12, 13] shall eliminate these mismatches. And thirdly – especially in the context of the current financial crisis – IT is understood as a black box of costs by the customer, which cannot easily be

influenced and whose added economic value is unclear [2, 14]. Business process orientated IT services would enable a transparent cost accounting or charge-back [15-18].

Alongside, the industrialization of IT service provision via an efficiency driven standardization and automation is also receiving increasing interest [2, 19]. To archive cost efficient and automated operations appropriate to the needs of the customer, standardization and systematic structuring of the offer of a fixed Service Product catalogue is required. Such a catalogue consists of services, which are *productized* [20, 21], and developed in advance. We label these services 'Service Products' [4, 22]. The ultimate goal is thereby to offer both business process orientated and standardized Service Products.

Yet the service portfolios of today's IT providers are dominated by offers of technical resources and personnel service provision on a much larger scale than the literature assumes. In addition, originally standardized Service Product offers are often „customized beyond recognition“ [9]. A service bundling of application, storage, server, WAN/LAN and client services that forms an integrated overall service and is orientated towards the actual customer's needs is offered only rudimentarily. The field of application thus limits itself to very general, uniform processes such as Customer Relationship Management (e.g. Sales Force). Why is this so?

One main reason that is referred to is the high individuality in the demands of customers regarding function and performance, which moreover change as a result of the constantly shifting parameters. It seems that such services must be developed customer specifically. Therefore, demands of adjustment result in individual reengineering activities and will be charged according to utilized personnel and technical resources. While resource-oriented services are on their way to become standardized offers, the conceptual basis for the standardization of adjustable process oriented services is missing.

In the following, this research gap shall be addressed through an approach to define standardized Associate Services to manage current customizability regarding functions and performance of a Service Product. After a short description of the research process we focus on the current customizability of permanent services and identify additional services to manage it. Thereafter we explain in six steps the development of those services in a sample of projects with two associate IT-providers. Finally we conclude the findings and discuss further research needs.

2. Research Process and Methodology

This research arises from two research projects, one conducted with a large German overall-IT-Service Provider and one with an internal service provider of a DAX-noted company. Based on this direct interaction between researchers and representatives of corporations, the appropriate research method is “action research” according to [23, 24]. One of the projects’ goals within the development of a prototype ERP System for a provider of IT-services was the definition of a portfolio of integrated customer- and business process-oriented service bundles. Since the provision of the services should be standardized, all customer-specific changes in functionality and sizing had to be defined in advance. From our SLA analysis and multiple in-depth interviews with an IT Manager we identified the need to create - in addition to the core IT service product offerings - additional services that represent standard changes within the lifecycle of an IT product. The engineering of appropriate aligned services was developed in several iterations of design, prototyping and informal evaluations through interviews, including a workshop with six IT professionals and a questionnaire-supported field test with further IT-professionals. Having defined not only the prototypes but also the concept, we instructed two IT product managers to define further services in the same way and did so ourselves for another IT-service provider of wholly different kinds of IT-services. The concept is currently used within a pilot project to change the whole IT-service portfolio of a provider section.

3. Process related Services Products

A customer- and business process-orientated Service Product, as we understand it, shall cover the overall IT-demand to support a business process with all the required IT-based functionality. A bundling would therefore be necessary to deliver one defined value proposition to the end-point of delivery - the consumer or user of the IT.

For that purpose we adapt the end-to-end design principle, which has its roots in the design of distributed computer systems [25]. It suggests that the definition of requirements for a communication system necessitates an understanding of the end-points of this communication system. A communication system for a video-conferencing application for example, requires different control mechanisms at different levels to those of a tele-surgery application.

Transferring the end-to-end principle to the delivery chain of Service Products, the end-points would be the IT service provider on one hand and the customer on the other. All the resources and components involved in the service's provision are to be bundled and together ensure the compliance with the defined functionality and agreed upon service levels. As a result, the end-to-end commitment of business-oriented Service Products does not limit the provision of storage and application hosting but instead adds WAN/LAN, client provision etc. If one of the components fails to deliver, the end-to-end-commitment does so too.

4. Servicing the Installed Base of Core Services

The development of customized B2B Service Products is a common theme in literature [21, 26]. Since the demand of IT-support is often highly customer-individual, a standardized portfolio offer and its efficient operation is a big challenge. Service Engineering research, coined in the mid-nineties [27], adopts a “technical-methodological approach” to develop IT-services out of reusable service-modules [20, 22].

Although we acknowledge the importance of this theme, our research revealed the need to consider a further requirement when developing a Service Product: its current customizability after its initial provision. Service Products are operational over a long period of time, while business demands and requirements change during their term. As a result changes are requested to adapt the Service Product on the altered conditions. Efforts in changes of already provisioned and permanently operated Service Products cause a significant part of the overall costs in the IT-operations, which make up about 80% of the overall IT costs [29]. To allow efficiency in those procedures, we shift the focus onto those changes in this article. Services shall be well-defined fully in advance to provide them on a standardized way when ordered [20]. This particularly implicates current adjustment possibilities on commitments in the case of altering circumstances in the customer’s business.

Following [4] we therefore distinguish between a *Core Service Product* (shortly *Core Service*) and its *Associate Service Products* (shortly *Associate Services*). The former labels a process related Service Product that covers the overall IT-demand to support a business process and therefore bundles all necessary server, storage, hosting, application, net and client provisions (see chapter 3). Regardless, if it had been developed specific to the customer, it is well-defined and priced in its later permanent operations stage. A customer orders different Core Services dependent on his processes. The customer's *Installed Base* is the total number of permanent services currently in use.

During their term, requirements for the IT-support of the processes change due to altered conditions and the business situation. This is why service lifecycles differentiate between 'operations' and 'change' within the 'usage' stage [28]. Associate Services is the range of services required by the customer over the useful life of a Core Service in order to adjust functionality or performance of the IT-support. Therefore, an Associate Service itself does not provide value for the customer's processes but configures or modifies the commitments of its Core Service.

Two primary elements ensure the permanent value of the Core Service (see [30], p.17): for one, *utility* as the

right functions for the right user; for another, *warranty* as the right performance at the right time. Both utility and warranty of a Core Service shall permanently be manageable through the order of Associate Services.

A fundamental aspect to archive standardization and efficiency in the operations stage of the Core Service is to productize Associate Services so they are well-defined in functionality and performance, documented in the product catalogue, possibly priced and ready to order together with the deployment of the Core Service. Thereby the following effects shall be gained:

- The customer can follow and influence the IT-expenses along with each Core Service and its supported business process(es). The on-off and current expenses per Core Service and its Associate Services become transparent to the customer.
- Representing change requests as standardized services opens up the opportunity of standardizing repeatable processes in IT-operations and provisioning tasks.
- A view on the Installed Base of services results in a transparency in the commitments and allows users to align their expectations. Each service on duty can be inspected regarding its continuous compliance to the commitments.

Table 1: Associate Service Space

Service Orientation	Resource-oriented Services	▪ Provision /Setup / Launch ▪ Abandon / Shutdown / Removal ▪ Transport ▪ Migration ▪ Update / Downgrade ▪ Restore / Recovery / Repair of resources ▪ Resource based tests ▪ Configuration change ▪ Exchange / Replacement of resources ▪ Inspection / Diagnose of resources ▪ Reset ▪ Technical fault clearance	▪ Software-Support ▪ Monitoring ▪ Tuning ▪ License management ▪ Load Balancing ▪ Network-/Server-Operations ▪ Preventive Maintenance
	Business-Object-oriented Services	▪ Allocate roles ▪ Setup a workplace ▪ Register / lock / unlock user ▪ Reset password ▪ Setup a process-oriented service provision ▪ Recover the workableness ▪ Move ▪ Generate a report ▪ Send an e-mail ▪ Business-oriented Consulting/Training	▪ Provisioning a location / workplace / user ▪ Support / Service Desk ▪ Service access control ▪ Extended usage time period ▪ Provisioning a self-service portal ▪ Personal data backup ▪ Extended attendance
		One-time services (transaction-based)	Permanent Services (relationship-based)
Service Permanency			

5. Business Objects as Driver Units of Service Amounts

As the portfolio-analysis of four German IT-providers shows, some services offered serve the purpose of changing or configuring other permanent services at run time. Predominant are services that have to be executed on a one-off basis, such as a migration or installation, a release change etc. The ITIL (IT Infrastructure Library) labels such services *Standard Changes*, which are defined as “a change to the infrastructure that follows an established path, is relatively common, and is the accepted solution to a specific requirement or set of requirements.” ([31], S.48). In practice, they are labeled as *IMAC/R/D*-services (Install, Move, Add, Change, Remove) ([32], S.479) and common in the area of client and desktop provisions. Although such standard requests allow ordering a change within the IT-support and a standardized processing of orders, direct reference to the value at the customer’s processes is missing. The decision to change a release or renew other resource-oriented components is not considered a core competence of the customer [2]. Transferring the service dominant logic to this context¹, the shift towards customer orientation would include a “relation orientation” [13]. With that, at least, such resource-oriented change services should be shifted from transactional-based to relationship-based, as also identified as factor of diversification in other industries [33]. The main benefits that are cited, are relieving the customer of permanent worries about IT-resources as well as the IT-provider’s gain of higher planning reliability profit margin [34]. As an example, consider a permanent release change service dependent on the customer’s functional needs (see horizontal axis of table 1).

However, those permanent services still lack the orientation towards customers business that is claimed. The monitoring capability per se does not add value to the end-user and has no direct business relation. It is only when the capability is transferred into an offer of higher overall availability of the Core Service that the customer has the ability to quantify the value of the offer for its business [34]. The same is true for resource-oriented performance definitions: The feasibility of customizing commitments about jitter-

parameters of a network does not match the customer’s real need or his core competence. As a result, he cannot actually manage or relate to IT-expenses on the basis of resource orientation: Imagine a cost cutting decision in the business to reduce used data storage amounts, the number of SAP-transactions or less monitoring.

This is why the second, more fundamental change demands a shift in focus towards business objects (vertical axis of table 1). A business object in this understanding represents entities in the actual customer’s business domain with direct influence on the overall amount of IT-support demanded and its expenses. Along with the real business entities, the number of business objects varies according to the customer, its actual business situation and is controllable by customer’s management decisions. By having these characteristics, business objects can be used to manage the IT-support in customer’s business regarding functionality and performance. Ordering the Associate Service to add, change or delete a business object towards the IT-provider would lead to the installation and operation of IT-infrastructure. Since the customer has a direct competence in and influence on its business objects, expenses for IT become traceable, relatable and manageable.

To archive this, business objects should not be defined on too closely. The customer can’t really manage his amount of small entities like invoices, purchase orders or e-mails. In contrast, more static entities like the workplace allow the customer expense transparency in variation of time. At the same time, the provider can offer a permanent service which bundles the setup, provisioning and operations / maintenance of the business object related IT-support.

6. Towards a Standardization of Current Customizability

This section summarizes our findings on how Associate Services in our project samples were defined to allow a customization of Core Services through the reference of business objects. The actions taken in collaboration with the associated IT-providers revealed a recurring pattern in the adoption of Associated Services. Independently of the Core Services that were analyzed, commonalities could be observed with regard to the nature of the activities and their adoption sequence (see Figure 1).

In a first step, the relevant business objects have to be identified. Each business object needs to become

¹ Although called ‘service dominant logic’, its adaption does not contradict the productization paradigm, since both services and service products may or may not represent relation- and customer-oriented value propositions.

manageable through Enabling and Administrative Services. Furthermore, Service demands to customize the functionality and performance parameters have to be met. Finally, the Service needs are to be well-defined and documented to become ready to order. While these definitions are made once within a 'Change the Business'-stage, in the long run, while consuming the permanent Core Service, the customer shall become able to order these defined Associated Services with the help of a self-service portal. As we will see, such a portal would ease assigning the necessary references of new service orders to the Installed Base.

Space constraints do not permit us to illustrate the whole process in detail. Instead we focus on the main issues per activity and illustrate them with examples from the projects. Conditions triggering the moves, their goals and sequence are summarized in Figure 1.

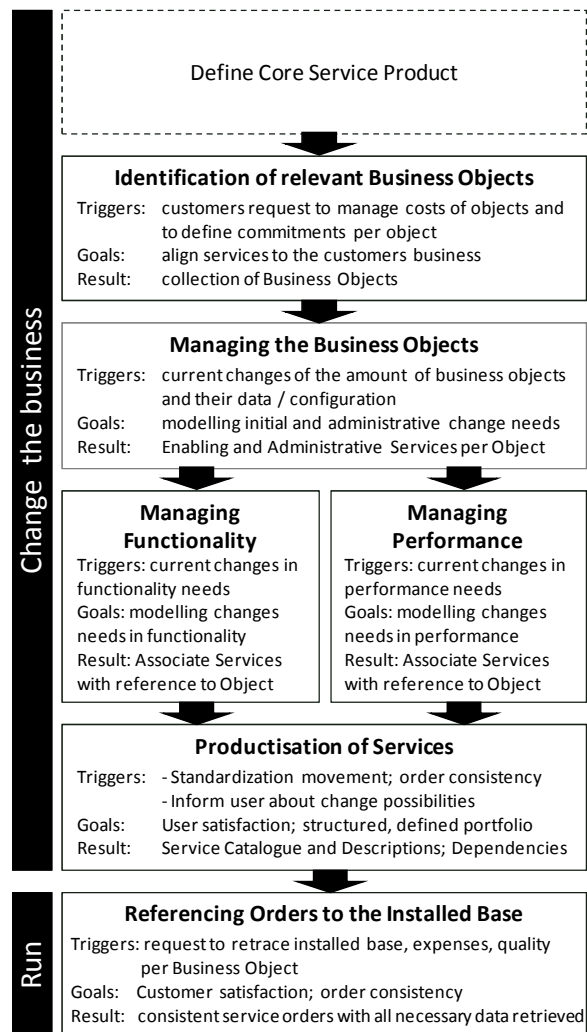


Figure 1: Actions to develop and order process related Associate Services

6.1. Identification of relevant Business Objects

As shown, objects of the business-management shall be identified, which are costly to support with IT and which can be managed in their amount through business-management. With these criteria, business objects shall serve as a bridge between real objects in the customer's business and the efforts of the IT-provider.

This is particularly true for entities of the organizational structure of the customer's business, if they request IT-infrastructure connection. The analysis within the mentioned projects consistently yielded the same relevant entity types, independent of the business process supported.

Among the set of entity types used by [35] to model an organizational structure, the relevant business objects were the *customer organization* itself, the *countries* and *locations* it operates in, the *workplaces* and employees as *users* of the Core Service as well as their *roles*.

A change within the organizational structure - the employment of further users of a Core Service for example - induces both initial efforts like the setup of user-accounts, and current efforts like obtained licenses and higher access demand. But instead of charging the individual resource efforts, the IT-provider now offers the registration and service provision per user.

6.2. Managing the Business Objects

Business objects represent real objects of the customers' business in IT. If changes to those objects, their data or properties occur in the customers' business, an adaption of the business objects has to take place. For that purpose a customer can add a new business object or delete an existing one, change its properties or temporarily inactivate it. Characteristically representing an IT-cost driver, those changes have fundamental impacts on the complexity and efforts in the IT-operations to provide the core service.

Referring to service types in [36], we distinguish the manageability of business objects in *enabling services* and *administrative services*. Enabling services are meant to install, setup, register, add or delete / dispose necessary IT-infrastructure, to have the business object ready to receive the core service support and keep going continuous IT-operations if necessary. In addition, administrative changes can be applied; these services include changes to properties or data as well as the disabling/enabling of a business object's ability to receive the core service support.

Table 2: Shortened portfolio-example of tasks to manage the service extend per business object

Business Object	Managing the Business Objects		Managing Functionality/Utility	Managing Performance
	(Enabling)	(Administrative)		
Location	- provide service access - chancel service access	change responsibilities		- expanded service period - fast operations
Workplace	- provide service access - chancel service access		expanded display	expanded security
User	- setup - terminate	- change roles - reset password - locking/unlocking access	- provide shared data storage space - online backup personal data	expanded data storage space
Role	- define - delete			

It is worth noting that the transaction of an applied enabling service can strongly differ in its complexity which depends on the type of business objects: Registering a user to be able to access a multi-user IT-system is easily done by setting up a new environment in predefined job steps and by assigning a role. This could – referring to the efforts of IT-industrialization - even be realized automatically to a predefined price. In comparison, the access supply of a location has to be done as a project and cannot be fixed in its price because of its individual complexity. Nevertheless, it should be predefined in its activities and engagements regarding personnel etc. The mere definition of typically needed data and assistance on the part of the customer enhances the efficiency in the execution of such a project.

Extending the later on mentioned examples, Table 2 shows a shortened portfolio-example of tasks to manage the business objects and govern the extend of the Core Service per business object. Enabling and administrative tasks manage the business object itself. Functionality and performance of the Core Service may be controlled on the basis of specific business object instances, as explained in the next two sections.

6.3. Managing Functionality

To manage the utility-aspect of the IT-support, a customer shall be able to order functional expansions of the basic functions of the Core Service. In this regard, business objects can act as *points of reference* to a function. As an example, an hourly data backup could be a reference for the user's data or the local data of a workplace.

If the required functional range differs between business objects of the same type, this is an indicator for defining Associate Services referencing to that object type. An expended monitor-display for designers therefore can be ordered for a specific

workplace, while all other business objects still get the same basic setting.

As a result, the IT-support can be customized in detail and currently changed in its specific configuration of functionality extent. Ordering the changes as priced services allows analyzing and controlling IT-expenses for extended functionality per business object within a customer's organization.

6.4. Managing Performance

The customer-individual request of performance is commonly defined within negotiated service level agreements (SLA). A classification of the therein defined parameters shows the dimensions availability, capacity, continuity, security, latency, performance and support [30]. But those technical definitions are neither user-comprehensible and business value oriented nor fully standardized in their parameter value [8]. Moreover, once negotiated, a short term change along with business needs is seldom possible.

As our projects demonstrated, the customer's need to change agreed performance parameters are, - from the view of customer's businesses - especially time periods, but also capacity volumes, security and support levels.

As for functionality commitments, the need for performance parameter values can also vary with and reference to a specific business object. As an example, the operation time of the on-site support can vary location-based. A permanent or temporary upgrade for a specific location can then be ordered by a priced Associate Service that will be linked with that location and that enhances its IT-expenses. The same concept works with a change, update or optimization in other performance issues as long as the business objects correspond with the cost drivers of the changed provisioning in the IT-support.

6.5. Productization of Services

According to the productization principle, each of the Associate Services shall be “clearly defined with a-priory business-relevancy features and implementation processes”[37] and available for order. Each one is related to one defined Core Service to shape or configure it in its properties and commitments.

Figure 2 shows shortened portfolios of Associated Services for the two Core Services “IT Support for Merchants” and “IT-Support for Accountants”. The former Core Services provides a basic workplace-access to support all kinds of generic tasks of merchants. The latter Core Service enhances this service to support the accounting business processes of the customer. It therefore requires the former one to be orderable. Both Core Services are manageable in their commitment extend through ordering corresponding Associate Services with defined order-numbers.

Each of the productized services is well-defined in price and its commitments with regard to functionality, quality and cooperation obligations. Dependency tables define what other services already have to be part of the Installed Base of the customer to order the service. The provisioned disposition of a specific location (order-no. AS112) is for example a precondition to order the service “extended Service-period” (order-no. AS161), since it needs a reference to a specific business object of the type ‘location’.

All services are to be documented in this extend of definition in a Service Catalogue [1], which shall also be accessible to and understandable by the service consumer (see [38]). It creates a vehicle that enables users to proactively select the Associate Services that suit their needs. To archive a standardized, efficient service provision, each Associate Service is preferably predefined in its work schedule and instructions, that are ideally carried out automated (see [39]).

		IT-Support for Merchants		IT-Support for Accountants	
Core Service		CS100 IT-Support for Merchants	Company	CS200 IT-Support for Accountants	Company
Managing the Business Objects	enabling	AS111 Provide Core Service-Access at a Country	Country	AS211 Configure Basics for Accounting	Company
		AS112 Provide Core Service-Access at a Location	Location	AS212 Register Location for Core Service-Access	Location
		AS113 Provide Core Service Access at a Workplace	Work-place	AS213 Provide Core Service-Access at a Workplace	Work-place
		AS114 Register User for Core Service Access	User	AS214 Register User for Core Service Access	User
		AS115 Remove User from Core Service Access	User	AS215 Remove User from Core Service Access	User
		AS116 Cancel IT-Support for Merchants	Company	AS216 Cancel IT-Support for Accounting	Company
	administrative	AS117 Define a new Role	Role	AS217 Define a new Role	Role
		AS131 Assign a Role	User	AS231 Assign a Role	User
		AS132 Lock / Unlock User Access to Core Service	User	AS132 Lock / Unlock User Access to Core Service	User
		AS133 Reset Password	User		
Managing the Service Extend per Object	functionality performance	AS161 Extended Service-period	Location	AS261 Extended Service-period	Location
		AS162 Fast Operations in Mechandising Tasks	Location	AS262 Fast Operations in Accounting Tasks	Location
		AS181 Platform for Software Distribution	Company	AS281 Special Reports for Accounting	Company
		AS182 Online Backup Personal Data	User		
		AS183 Shared Data Storage Space	User		
Abbreviation:		Order-no. Service name (C=Core / A=Associate)			Business-Object

Figure 2: Portfolio-example of two Core Services and their corresponding Associate Services

6.6. Referencing Orders to the Installed Base

Once defined, the Associate Services are to be orderable over the period of time the Core Service is served. This allows customizability and configurability along changing demands. The service catalogue documents the possible changes but it does not retrieve the corresponding business object nor does it ensure its consistency to the Installed Base of services. For that, an order of an Associate Service has to refer to an existing service within the Installed Base, according to the defined dependency table. For example, ordering an extended service-period (order-no. AS161) would refer to a specific, already provisioned location (order-no. AS112). Even more complex, providing Core-Service-access of Accounting at a specific workplace (order-no. AS213) would require a provision of that workplace as Associate Service (order-no. AS113) of the Core Service “IT-support for Merchants”. Such complex interdependencies of new orders to the Installed Base of services must be IT-supported.

As a single common user-interface to manage the Installed Base, a self-service-portal seems suited to managing the reference and checking the consistency [40, 41]. It offers a view on the Installed Base and its costs per business object as well as compliance of performance parameters over time. Within the projects carried out with one associate IT-provider, such a self-service portal was implemented. Having prototyped it together with another IT-provider it will now be implemented within a piloting project.

7. Entities and Data Model

Having described the concept and the method to manage the current customization of core service products, we will now give an overview to the introduced entities and their relations in a data model section (see figure 3). We therefore apply the entity-relationship modeling according to [35, 42].

As explained we differentiate the Core Service Product (1) and its related Associate Service Products (2) to configure and enhance the core service extend. Both are subclasses of a Service Product (3). To be orderable (4) by the customer it is priced and specified by a unique order number. Furthermore, a service description (5) defines its commitments in functionality and non-functional properties like quality values. The descriptions are accessible by everyone through a service catalogue (6).

The task of a Core Service Product is to support a specific business process (7) in the customer’s business (8). Corresponding business objects (9) typify real objects in the customer’s business that represent effort and cost driver for the IT-operations when providing the core service for the business process. We identified a subtotal list of six typical business objects in our projects (10).

To enable and administrate the business objects specifically to the needs within a specific business process, the customer may order corresponding Associate Services (11). Another type of Associate Services enables to manage the service extend regarding either functionality or performance per business object (12).

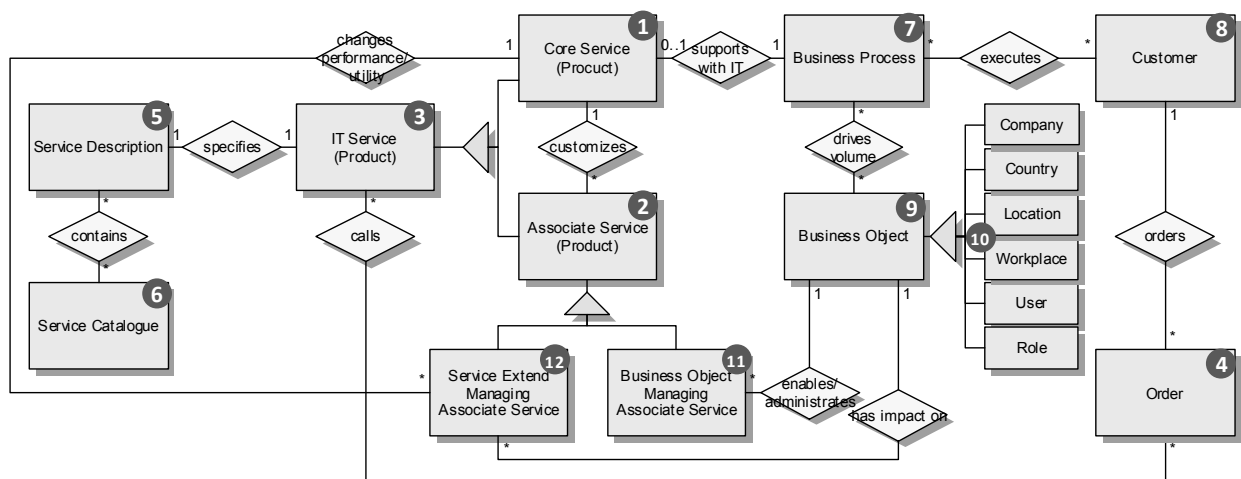


Figure 3: Entity-Relationship diagram section of the Service Product Model to manage the current customization of process-related IT-Services

8. Conclusions

Business process-oriented IT services are often defined highly customer-specific and are subject to continuous change. Moreover, their value to the business seems unclear and the expenses cannot be directly influenced. To resolve this and to allow for a standardization of the IT-operations, this article suggests utilizing Associate Services to configure and change commitments of Core Services.

It identified different types of such services to cover different needs of customization. Through the reference to business objects of the customer's business, commitments can be individually tailored to the business object needs and their expenses become directly traceable. Furthermore, this concept enabled customers to refer to the agreed commitments / services and know about the range of Associate Services to adjust commitments. Interviews with experts and customers suggest achievements in gaining diversification and customer loyalty, while the opportunity of standardizing the ordering and provisioning processes open up.

Further findings to enhance the concept of current customizability of IT-services will be incorporated into an ongoing additional project, which shall apply the concept to change the whole service portfolio of an IT service provider section.

However, our sample of projects in which this concept has been applied is still quite small. An extension of this research would be a voluminous look at IT service providers to further evaluate the problems in managing the individualization and current customization of IT service agreements and IT services. Furthermore, the analysis of longitudinal effects at several IT service providers when applying this concept would advance the research.

Furthermore, a detailed concept and implementation of the adumbrated self-service portal for Installed Base-dependent Associate Services shows up further research necessity, especially regarding usability-issues to allow references between new service orders and the Installed Base of service instances. This involves two further research areas regarding to the specification of such services: firstly, the definition of dependencies between productized services and their instances in the Installed Base needs to be investigated. Secondly, information requirements to manage the business object data are crucial for this topic, since they influence the interdependencies between service instances in the Installed Base.

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