The Service Experience Modelling Method: An Innovative Three-Level Approach for Effective Service Modelling

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The artefact of this research paper is stated by the service experience modelling method developed on a constructed mixed methodology. It represents an innovative three-level approach for effective service modelling. The first level service classification provides an overview over the services of the provider. The second level service conception aids to model situational service scripts of different service domains. The third level service process modelling is based on service blueprinting to model the highest information degree. For modelling practice the service experience modelling method application is validating its service modelling effectiveness.

1. Research Background and Objectives

For service modelling many directions are possible and the problem is how to model services effective. To demonstrate or in some cases to reduce the complexity of services various types of service modelling techniques can be applied. These are covered by service classifications, service conceptions, and service process modelling.

In the service science literature there are numerous different types of service classifications developed with highly diverse dimensions, scopes, and representations. The service technology use, service encounter, and service time consumption are important scopes of service classifications. The modelling of the service technology use during the service production process at the service encounter must cover the service time consumption (Kolek et al., 2015).To give some examples, an established service classification is described by active and passive roles for customers (Mersha, 1990). The digitalization of services is categorized into four groups: differentiation services, service modularization, add-on-e-services, and core e-service customization (Meier; Piller, 2001). Service systems are classified by a range of customer contacts required during the service production process: the pure services, mixed services, and quasi-manufacturing (Chase, 2010). Another service classification is developed to grasp the service customization degree (Salegna; Fazel, 2013). The dimensions of service classifications are deepen in section 2.3 as a first dimension of the Service Process Modelling (SPM) Element Framework constructed.

Service conceptions can be represented by service business models or service scripts (Schank; Abelson, 1977; Gibbs; Tenney, 1980). Service scripts can be treated as stories of services (Gibbs; Tenney, 1980). These service stories are told with the aid of added or deleted script implication changes (1) and script variable changes (2). The customer sat down (1) at the table (2). He paid the bill (1) and gave a tip (2).

Schank and Abelson (1977) introduced a service script explained with a restaurant script for the application example of a coffee shop. The service script elements for modelling the restaurant service effective are track (e.g. coffee shop), roles (e.g. customer), props (e.g. tables), entry conditions (e.g. hungry), and results (e.g. no longer hungry). They also differentiated the restaurant service into different service scenes: entering, ordering, eating, and exiting. This scenes or episodes are described based on the service production process of the restaurant. For the application of service scripts it is important to define service events for a better understanding of the service business model – like in the restaurant when the customer has to pay the bill. Also interferences and distractions can occur during the service script application meaning missing fits with the planned or implemented service script. For instance, the customer leaves before he has paid. Such not-expected actions of roles – like customers or employees – are beyond of the service script. For being successful it is important to try to fulfil or to return to the service script. Different service scripts can interact with each other meaning that the start and ending of service scripts can be linked together. There are also different types of service scripts, which are involved in section 2.3 as a second dimension of the Service Process Modelling (SPM) Element Framework created.

For enterprise modelling there are several modelling techniques developed for modelling business processes or business cooperation, which can be also used for effective service process modelling, like the Unified Modelling Language (UML), Business Model and Notation 2.0 (BPMN) (OMG. 2016), extended Event-driven Process Chain (eEPC) (Nüttgens; Rump, 2002), flow diagram, SCOR-Model, FlexNet Architect (Becker et al., 2011), Knowledge Modelling and Description Language (KMDL) (Gronau; Fröming, 2006), Mind Mapping, e^3-value, service blueprinting (Fließ; Kleinaltenkamp, 2000), and other modelling techniques. These selected modelling techniques for effective service process modelling are presented in section 2.3 as a third dimension of the Service Process Modelling (SPM) Element Framework built.

This research background leads to the objective to develop an innovative approach important for effective service modelling. This approach stands for a well-grounded mixed method on a methodological foundation e.g. for modelling immaterial service but also service-product-bundles (Kolek et al., 2015). To answer the question how to model services effective several objectives must be achieved. Therefore, the three main objectives of this research paper are stated as:

(1) *The construction of a mixed methodology for the development of service modelling methods*. This mixed methodology combines the concept of the innovative cooperation experience modelling method to model cooperation on three different levels with a raising degree of information, results of a literature review as a selected research method for clarifying service classification concepts (Kolek et al., 2015), and a morphological box called the Service Process Modelling (SPM) Element Framework as a basic for a specific decision for each level of the service modelling method to be developed.

(2) *The development of a method for effective service modelling*. Based on the Service Process Modelling (SPM) Element Framework an innovative three-level approach for effective service modelling is developed. The development starts with the first level. Here, a service classification is selected or developed on a conceptual basis as a kind of regulatory framework. Then a type of a service script modelling technique is ordered through the second level to allow the modelling of different service

scenes. Then a service process modelling technique is chosen to define the third level because of its lines for the detailed documentation of service production processes.

(3) *The application of the developed service modelling method*. The selected application examples are different services like health services, education services, food services, construction services, and others. These different services types are modelled to demonstrate and to evaluate the developed service experience modelling method. The raising degree of information should simplify its practical application.

For the achievement of these main objectives this research paper is structured as follows. First, the mixed methodology is constructed (section 2). Then the service experience modelling method is developed (section 3) and applied (section 4). In a last step, the research results are discussed (section 5).

2. Mixed Methodology Construction

2.1. The Cooperation Experience Modelling Method

The cooperation experience modeling method was developed to plan and to document the operation of cooperation. The cooperation experience modelling method consists of three levels. The three-levels are linked by the degree of information on each level, which is increasing from the first to the third level (Strotmeier et al., 2015). The cooperation experience modelling method is transferred to the service experience modelling method developed in section 3, because of its innovative three-level approach which is beneficial to apply and retain. Therefore, this innovative three-level approach must be described first.

To support the cooperation experience modelling method with its characteristics perfectly, also a specially developed software tool has been developed – the cooperation manager[1]. It represents a software prototype for effective cooperation modelling.

The first level of the cooperation experience modelling method is so called the regulatory framework (see figure 1). It provides an overview about the processes of the cooperation and it is integrated within the cooperation manager also on the first level. With the cooperation manager three different process types can be created, processed and deleted: management, core and support processes. The first level of the cooperation manager includes the regulatory framework with its management, core and support processes that is similar to the structure of a house. The management processes are forming the roof (e.g. controlling, strategic planning, and value and culture planning). The core processes are displayed as pillars (e.g. completely renovation). The support processes are building the foundation wall (e.g. legal management, human resource management). Within each core process the

[1] The cooperation manager can be downloaded on the project website: http://www.cooperation-experience.de/content/prototypen [Accessed on 28.06.2016]

process step information like involved roles are modelled e.g. tiles company, houseowner, kitchen & co., sanitary-technic company, and electro company.

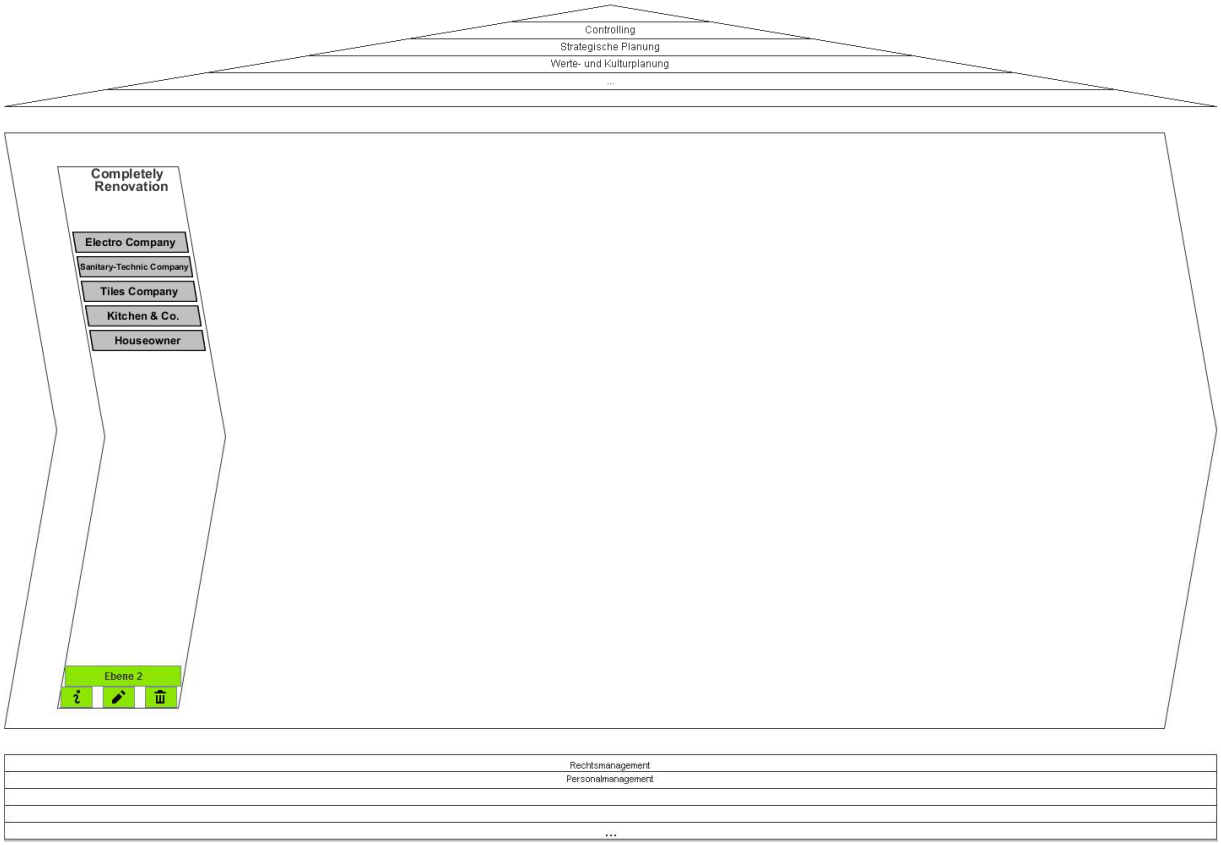

Figure 1. Level 1 – Regulatory Framework.

The second level of the cooperation experience modelling method is termed cooperation scenarios (see figure 2). It describes the activities between the cooperation partners defined as involved roles (e.g. tiles company, houseowner, kitchen & co., sanitary-technic company, and electro company). The second level is used to display cooperation scenarios of core processes. In the foreground of this level the information flow between actors (roles) are especially focused and it is shown, who in what order must whom send an information object. At the beginning this level is only with the roles, which are standing in the rectangles around the cooperation activities, filled, because they are taken from the first level (regulatory framework). In the example, the tiles company, the houseowner, the sanitary-technic company, the electro company and kitchen & co. New cooperation activities can be created, which are then arranged among themselves – for example *result: electronic*. In the next step, the roles have to be linked to the cooperation activities. This is made possible by the symbols on each role.

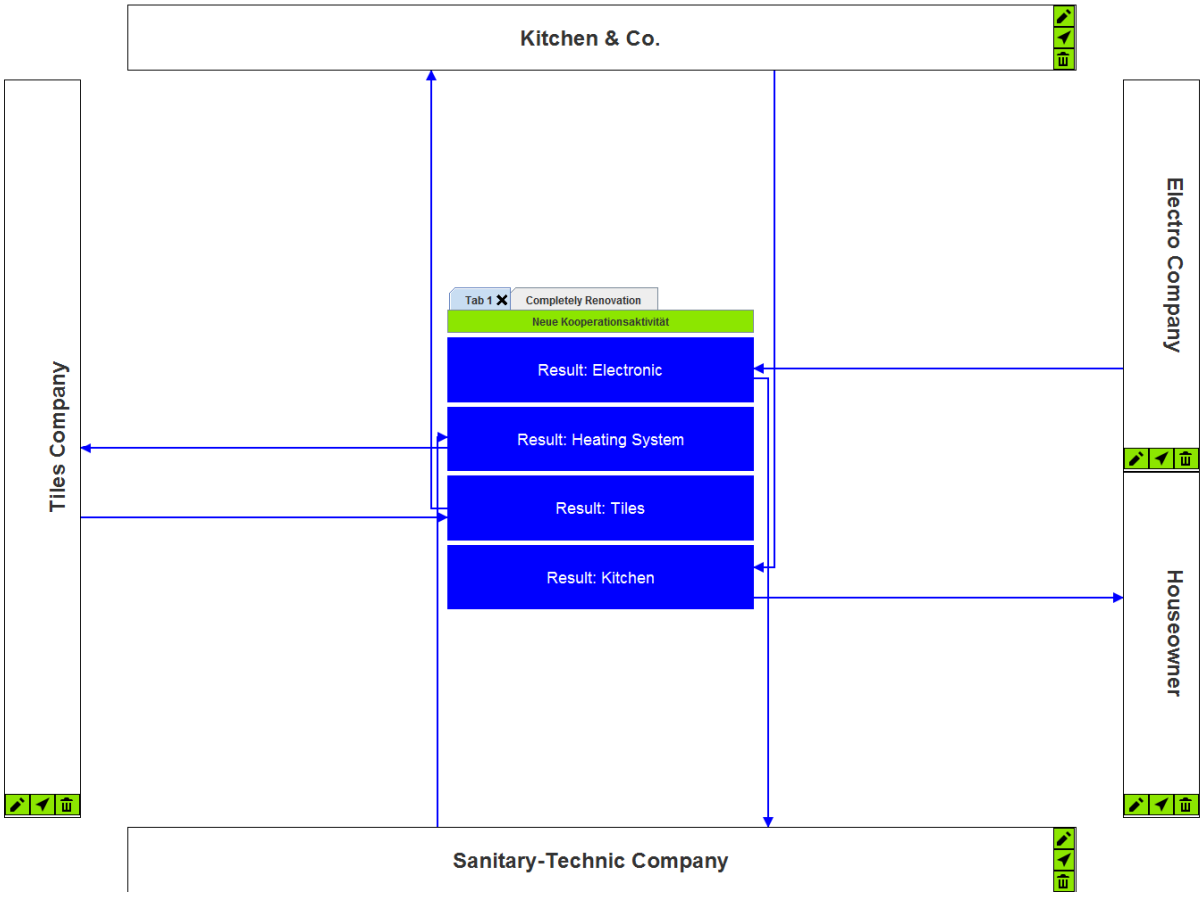

Figure 2. Level 2 – Cooperation scenarios.

The third level process detail modelling (automatic generated) (see figure 3) exists of BPMN (Business Process Model and Notation) choreography-diagrams (OMG, 2016), which are automatically generated based on the information of the second level cooperation scenarios. The BPMN choreography-diagrams detail the description of the activities between the cooperation partners. The third level is designed to include sequences, loops and branches in the models and to prepare those models for a simulation.

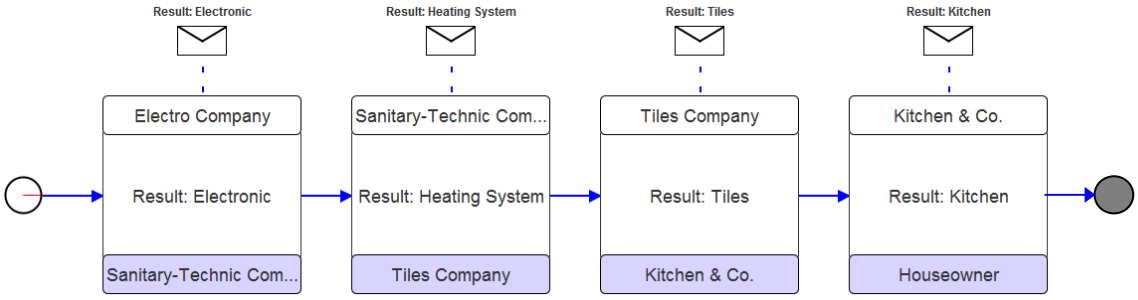

Figure 3. Level 3 – Process detail modelling (automatic generated).

2.2. Clarifying Service Classification Concepts

Different research methods can be applied as a construction foundation of the mixed methodology for the development of innovative methods for effective service modelling. The research method variety of information systems research covers formal/ conceptual and argumentative-deductive analysis, simulation, reference modelling, action research, prototyping, ethnography, case study, grounded theory, qualitative/

quantitative cross analysis, and labor/ field experiments (Wilde; Hess, 2007). In this research paper, the argumentative-deductive analysis is applied by focusing on the research results of an in-depth literature review clarifying service classification concepts (Wilde; Hess 2007; Kolek et al., 2015). This research method is selected because it is a main goal of this research paper to link existing modelling techniques on different dimensions or levels rather than to develop new modelling techniques.

The in-depth literature review evaluates the time-based development of service classifications. The analysis of the concept matrix based on a conceptual foundation visualizes the required further research as a meaningful service classification research agenda (Kolek et al., 2015). This research paper closes some current research gaps.

Service classifications must cover the scopes service technology use, service encounter, and service time consumption. They should be also able to represent service-product-bundles. For clarifying services three- or better multi-dimensional representations are recommended to structure a service classification. They are developed first on a conceptual level and second on an empirical level (Kolek et al., 2015).

Innovative service business models or service scripts (Schank; Abelson, 1977) can be modelled with the aid of the literature conceptualization framework (see figure 4). Strengths, weaknesses, opportunities, and threats are obvious, if the service classification scopes are transferred into the service script. For example, a restaurant script can involve the scopes service individualisation (e.g. offering exclusive food), service technology use (e.g. using tablet computers), service immateriality (e.g. an installed open kitchen), service interaction (e.g. conversations with other guests over the tablet computer), customer integration (e.g. customers are ordering and paying with the tablet computer), and service complexity (e.g. food recommendations are displayed on the tablet computer) (Kolek et al., 2015).

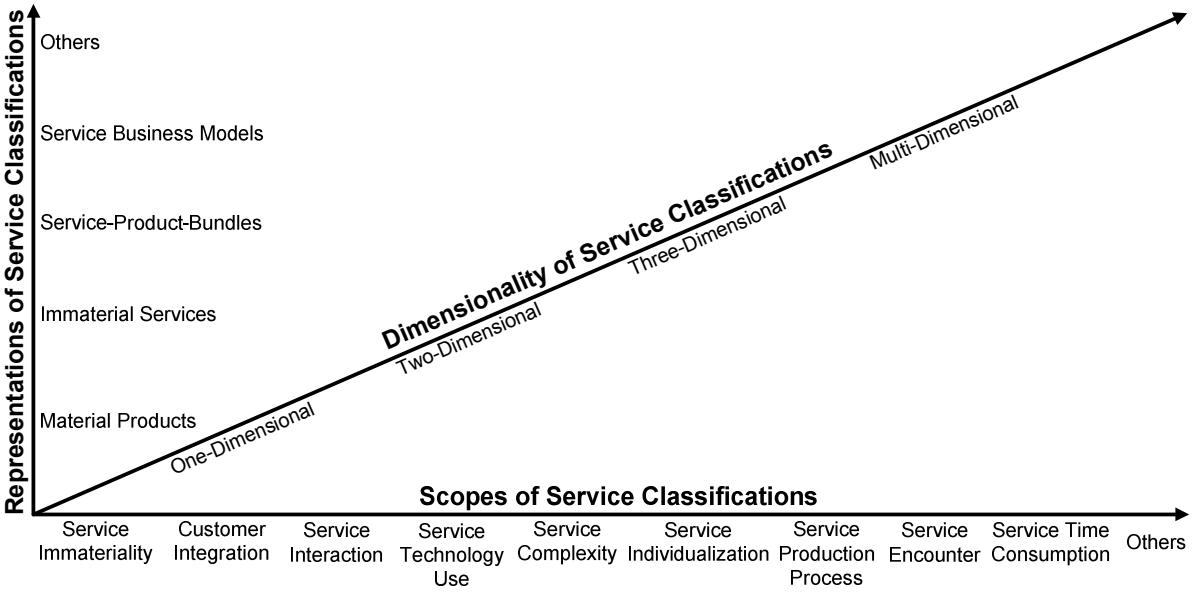

Figure 4. Literature Conceptualization Framework (based on Kolek et al., 2015).

2.3. The Service Process Modelling Element Framework

The Service Process Modelling (SPM) Element Framework (see figure 4) developed based on the Business Process Management (BPM) Context Framework of vom Brocke et al. (2015) represents a special type of a morphological box. This morphological box is constructed to combine existing service modelling techniques on different dimensions. It stands for a methodological basis to decide for characteristics on each dimension. It contains the four dimensions service modelling goals, service classification, service conception, and service process modelling.

Its first dimension is a goal dimension for service modelling: Service (process) development or service (process) optimization. Depending from the modelling focus of the development of the service modelling method it can be applied for service (process) development or service (process) optimization. The second dimension of service classification is based on existing literature review results of Kolek et al. (2015). Therefore, representations, dimensions, scopes, and development are integrated into the SPM Element Framework for the selection or construction of a service classification. The third dimension of service conception covers the service scripts types of different service domains. The fourth dimension of service process modelling involves the different modelling objects, which allows selecting an effective modelling technique also usable for effective service process modelling.

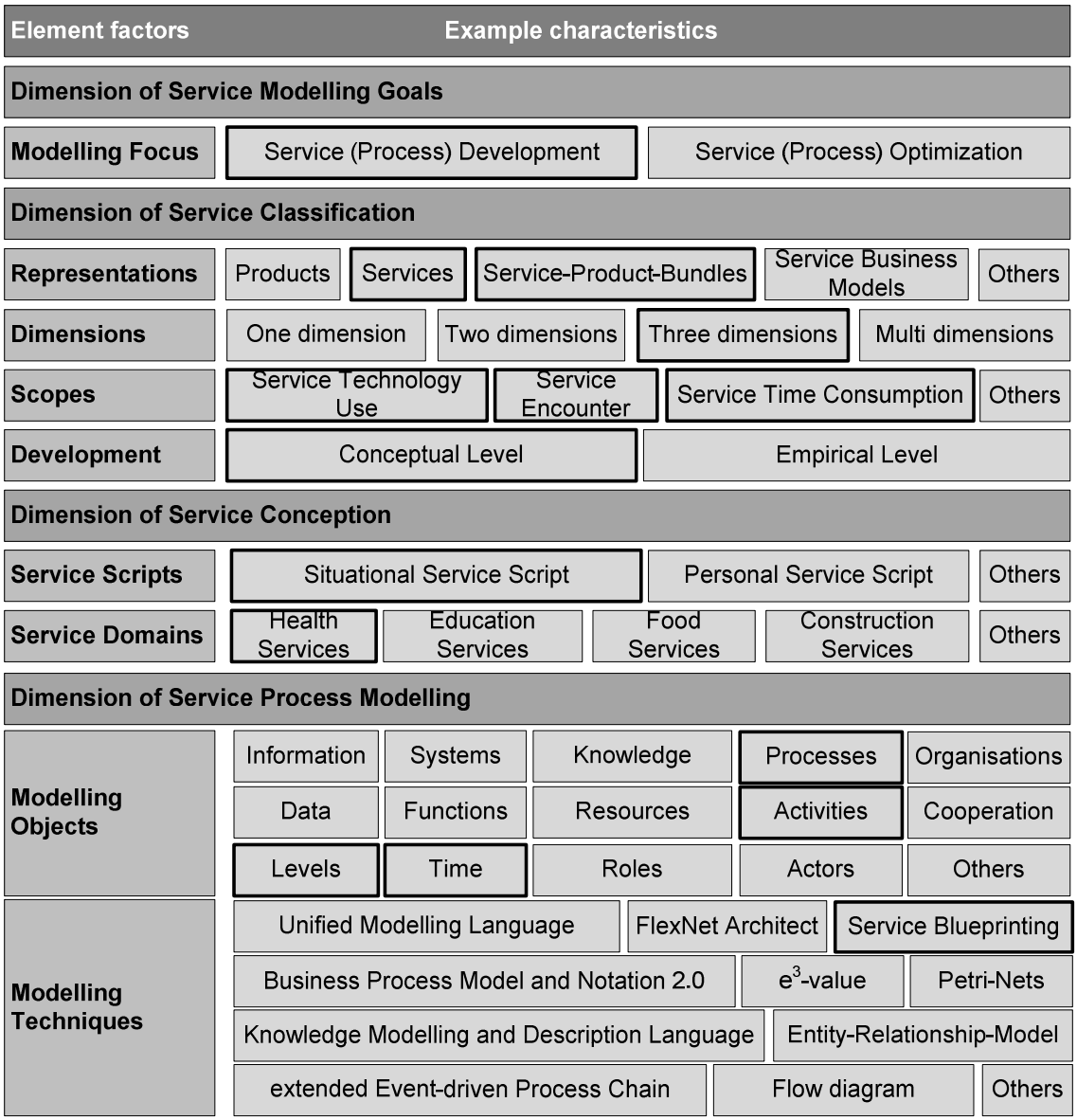

Figure 4. The SPM Element Framework: A Morphological Box to Define the Elements of Service Modelling Methods (based on vom Brocke et al., 2015).

The service experience modelling method focuses on the goal to enable the service (process) development. A service classification is integrated as a special type of regulatory framework for services and service-product-bundles. This service classification should represent immaterial services but if possible also service-product-bundles on three dimensions with the aid of the scopes service time consumption, service technology use, and service encounter. The service classification is developed on a conceptual level. For service conception a situational service script of the health service domain is described. Situational service scripts are describing the actions of the employees and customers. Personal scripts are not selected because of their high variety caused by the highly different beliefs of customers towards services. For service process modelling it is decided to model processes, activities, and times on different levels. Instead of Business Process Model and Notation 2.0 (BPMN) choreography diagrams (OMG, 2016) like in the cooperation experience modelling method the service blueprinting (Fließ; Kleinaltenkamp, 2000) is included into the service experience modelling method.

3. Service Experience Modelling Method Development

3.1. Overview of the developed Innovative Three-Level Approach

The artefact of this research paper is stated by a developed innovative three-level approach – so called service experience modelling method – valuable for effective service modelling. These three levels are built upon and detail information for service planning, coordination, and controlling. As a mixed approach this developed modelling method exists of the three levels: service classification, service conception, and service process modelling. The level 1 service classification has the goal to provide an overview over the services classified. Therefore, the developed service classification assists to clarify planned or existing services. The level 2 service conception follows the goal to describe situational service scripts. Therefore, the planned or existing situational service scripts are described and linked over the different scenes also adding important roles, props, entry conditions, and results. The level 3 service process modelling delivers a detailed description of the activities of the customer and service provider. Therefore, service blueprinting is applied to detail information about the service production process. The goal between the level 2 and 3 refers to forwarded information objects to enable service blueprinting. The service experience modelling method is developed to improve the planning, coordinating, controlling of services, service business models and service production processes. It is practical for representing immaterial services and service-product-bundles. An overview of the innovative three-level approach for effective service modelling is provided in figure 5. Each level will be detailed in the next sections.

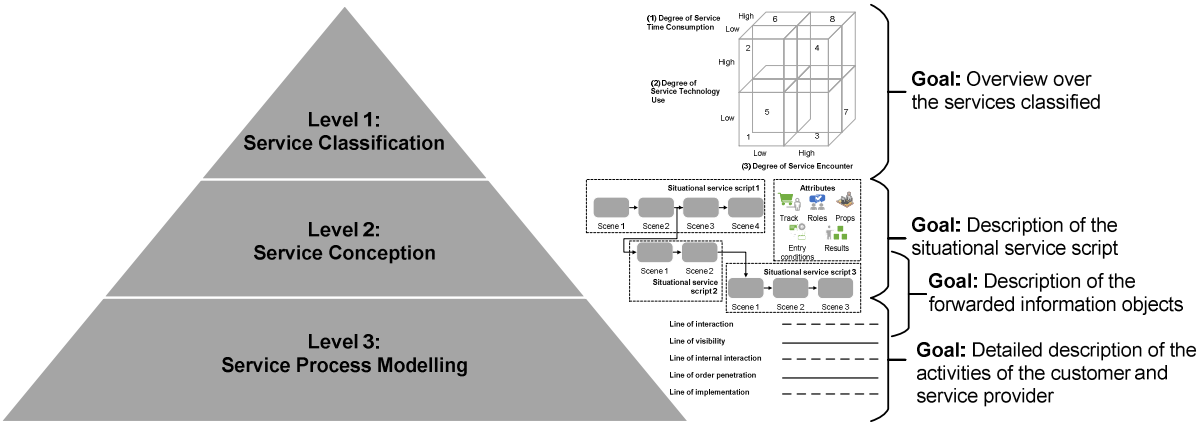

Figure 5. Three-Level-Approach of the Service Experience Modelling Method for the Documentation of Services, Scripts and Processes (Illustration based on Strotmeier et al., 2015).

3.2. The First Level: Service Classification

The first level service classification based on the SPM Element Framework (see figure 4) focuses on the dimension of service classification with its element factors representations, dimensions, scopes, and development. Regarding the literature review results from Kolek et al. (2015) no service classification fits into these scopes directly. Therefore, a new service classification is constructed based on the three scopes service time consumption, service technology use, and service encounter (see figure 6).

These scopes are integrated as three dimensions of the service classification developed on a conceptual level. The service classification constructed aided to clarify different services and services bundled with products into two main groups of services: time-saving services and time-consuming services. This time-based service groups are differentiated as follows:

1. Time-saving services with less technology use and few encounters
2. Time-saving services with much technology use and few encounters
3. Time-saving services with less technology use and many encounters
4. Time-saving services with much technology use and many encounters
5. Time-consuming services with less technology use and few encounters
6. Time-consuming services with much technology use and few encounters
7. Time-consuming services with less technology use and many encounters
8. Time-consuming services with much technology use and many encounters

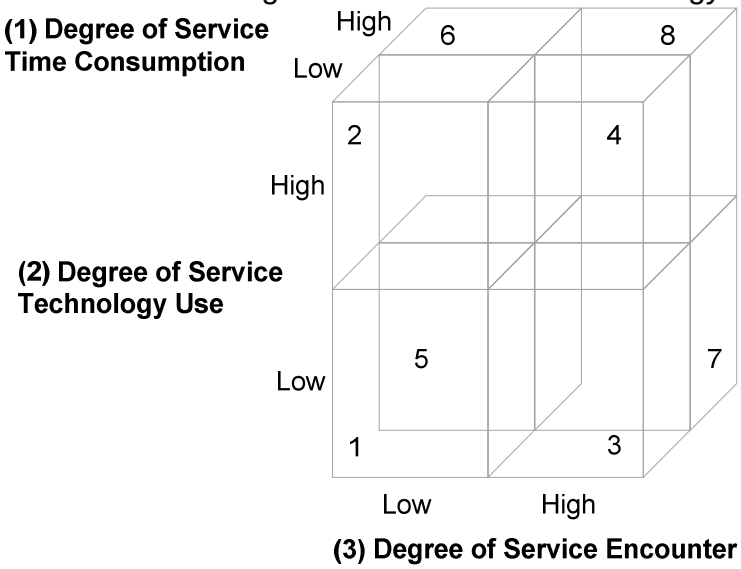

Figure 6. Time-based Service Classification (Development based on Haywood-Farmer, 1988; Kolek et al., 2015).

3.3. The Second Level: Service Conception

The second level service conception is based on situational service scripts. In situational service scrips different scenes are described – like in a movie script – the roles or actors (like employees and customers) are involved into the service and fulfilling tasks or activities. These service scenes are based on different service settings enriched with different characters, facilities and objects. For the application case of modelling situational service scenes modelling techniques are often not visual enough, because they are developed for other purposes like process or cooperation modelling. Therefore, a storyboard for modelling situational service scripts represents the modelling technique of choice (see figure 7). Storyboards are often containing comic with characters or photos with person. All of these storyboards are combining

headings, pictures, and describing texts. The schematic diagram below demonstrates the idea of modelling situational service scripts as a storyboard. This is useful for modelling service scenes of different service domains like the health service domain.

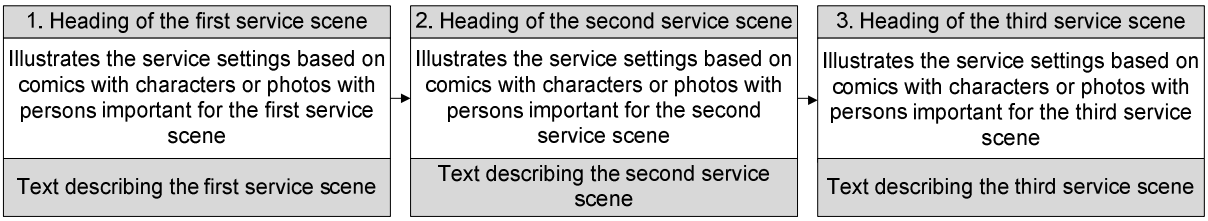

Figure 7. A Situational Service Script Modelled as a Storyboard.

3.4. The Third Level: Service Process Modelling

On the third level service process modelling service blueprinting is chosen based on the SPM Element Framework (see figure 4). Service blueprinting with its different development stages (e.g. Shostack, 1984; Shostack, 1987; Kingman-Brundage, 1989; Fließ; Kleinaltenkamp, 2000) characterizes an explicit developed approach for modelling service production processes effective. Service blueprinting can be combined with time management aspects. For example, by using the net plan technique for modelling the needed times of process steps and their start and end time points (Fließ et al., 2004).

Service blueprinting is constructed based on five lines for modelling service production processes effective. It is first established by Shostack (1984, 1987) using the line of visibility to separate for customers visible from invisible service production processes. Kingman-Brundage (1989) added the line of interaction, line of internal interaction, and line of implementation to service blueprinting. The line of interaction separates the tasks or activities of customers and service providers. The line of internal interaction located below the line of visibility separates the support functions from the backstage activities of the service provider nonvisible for customers. The line of implementation differentiates the management functions from the support functions. Activities of the customers are placed above and all other activities of the service provider are located below the line of interaction. Fließ and Kleinaltenkamp (2000) introduced the line of order penetration located between the line of internal interaction and line of implementation. The line of order penetration splits the customer-dependent from the customer-independent support activities. The support functions are linked with the service potential in the production-theoretic view based on external productions factors from the customers (customer-dependent) and internal production factors from the service provider (customer-independent).

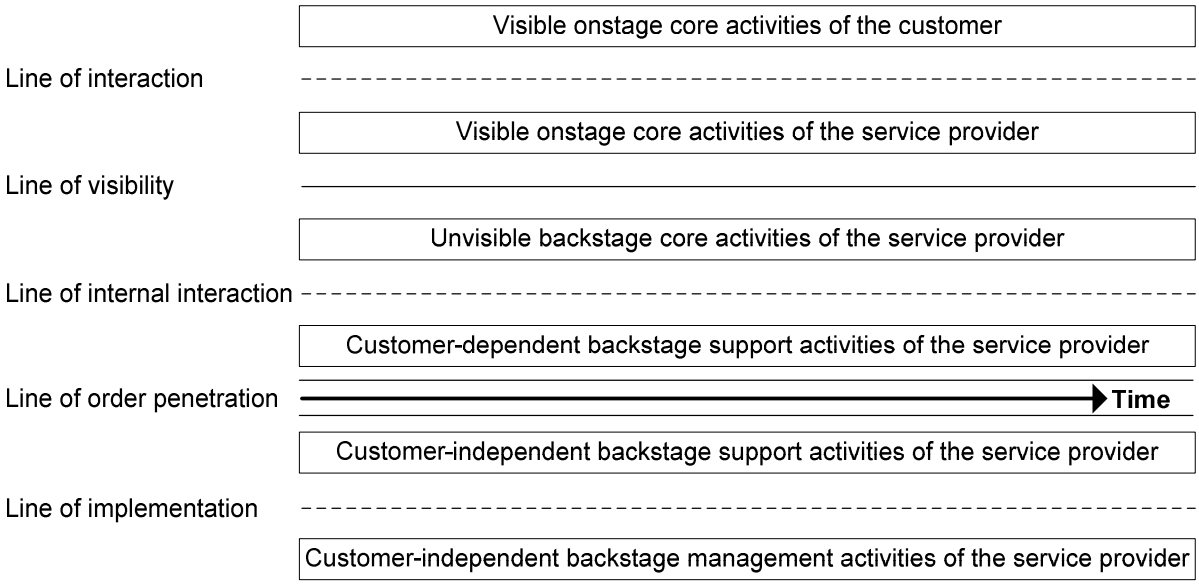

Figure 8. The Lines of Service Blueprinting (based on Shostack, 1984, 1987; Kingman-Brundage, 1989; Fließ; Kleinaltenkamp, 2000).

4. Service Experience Modelling Method Application

4.1. Overview of the applied Innovative Three-Level Approach

The application of the service experience modelling method is based on the applied innovative three-level approach. For this reason, the application goals are described to provide an overview. First, an overview over the service domains placed into the time-based service classification is presented. Second, a situational service script of a selected service domain is modelled. Third, for modelling the service productions processes of the selected service domain the needed information objects are described. Finally, a detailed description of the core, support, and management activities is modelled effective with service blueprinting. Further evaluation of the service experience modelling method is needed for testing the understandability and other criteria of the services and services bundled with products modelled. A selected evaluation framework or existing modelling framework of Gemino and Wand (2004) or Schalles (2011, 2013) can built the methodical foundation for evaluating the effectiveness and efficiency of the service experience modelling method.

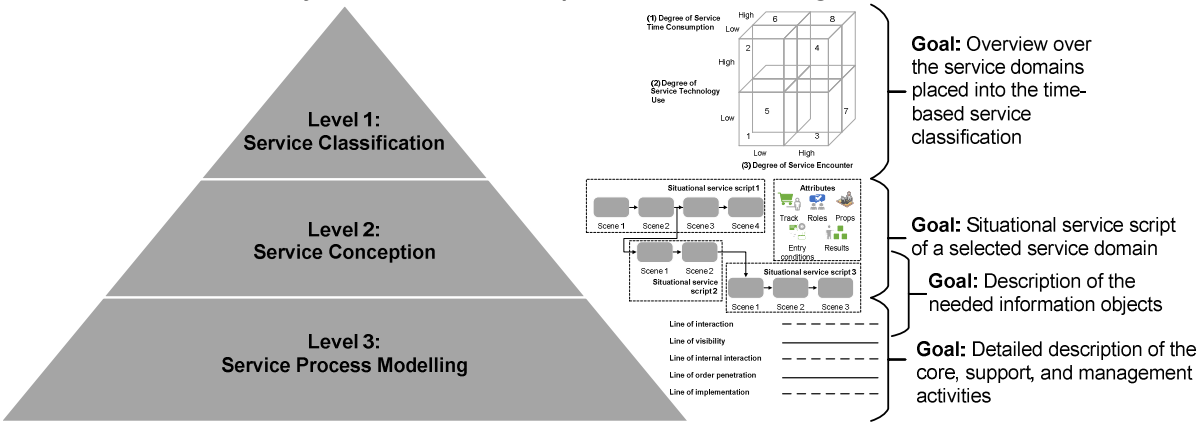

Figure 9. Application of the Service Experience Modelling Method: An Innovative Three-Level-Approach (Illustration based on Strotmeier et al., 2015).

4.2. Application of the First Level: Service Classification

To illustrate the application of the first level service classification selected application examples are different services of the health, education, food, construction, and other service domains. These different types of services are classified conceptual with the aid of the service classification developed. This service positioning is reasoned based on the two time-based service groups with four possible characteristics per service group:

1. *Food services*. Time-saving services like fast food restaurants are often using less technology (e.g. an information system for order acceptance) and have few encounters (e.g. personal at the cash desk when paying the bill).

2. *Transport services*. Time-saving services like provided public transport services are mostly linked with a lot of technology use (e.g. trains, rails, information systems) but have only few encounters (e.g. online at the booking system or at the pay machine to get the ticket).

3. *Online services*. Time-saving services like online auction houses are commonly using less technology (e.g. a website installed on a server) and often have many encounters (e.g. logins or questions of the users).

4. *Smart services*. Time-saving services like production process information services are frequently using much technology (e.g. data repositories, network technologies, information systems) and are specified by many encounters (e.g. contacts over online platforms with developers, operators, and users).

5. *Repair services*. Time-consuming services like automobile repair services are commonly using less technology (e.g. tools, software) and have few encounters (e.g. providing the automobiles/ objects as external production factors for repair).

6. *Construction services*. Time-consuming services like a construction planning service of an architect are using much technology (e.g. building information modelling) and characterized by few encounters (e.g. planning discussions with the customer at the beginning and reporting of planning documents).

7. *Education services.* Time-consuming services like higher education services of a university are using less technology (e.g. a campus management system) and are typically characterized by many encounters (e.g. personal, telephone, and online contacts from start to finish of the education service).

8. *Health services*. Time-consuming services like hospital services are generally linked with a high degree of technology use (e.g. hospital information systems, electronic patient records, medical equipment) and are combined with various encounters (e.g. personal, telephone, and online contact several times as long as the health service takes).

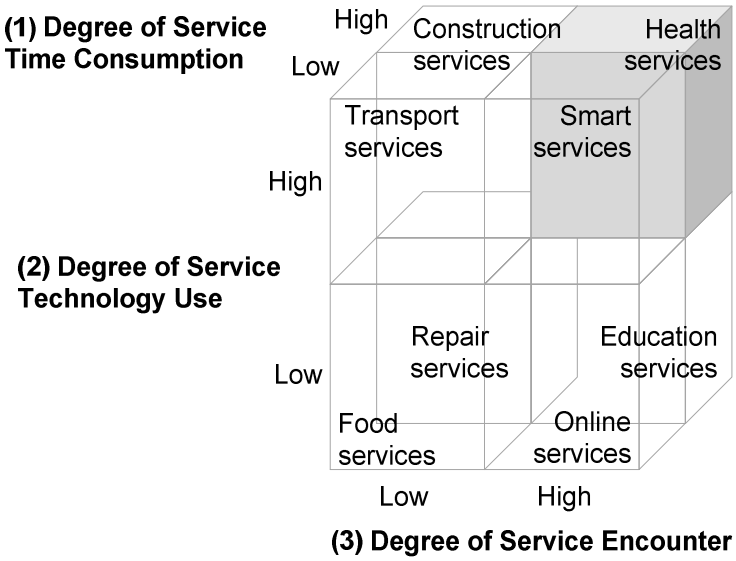

Figure 10. Service Domains placed into the Time-based Service Classification (Development based on Haywood-Farmer, 1988; Kolek et al., 2015).

4.3. Application of the Second Level: Service Conception

A situational service script of the selected service domain health services is modelled. Therefore, a service conception is conducted. The service production process of an ambulatory treatment is very similar in many hospitals and it is used as a suitable application example. The scenes of the health service being modelled consist of the six service scenes: Patient fills in a form, patient registration, patient waiting room, medical treatment, medical data input, and medical consultation. About the service script within the hospital more detail information are visible directly because of the used headings, comics or pictures, and text descriptions for each of the situational service scenes. For developing situational service scripts effective, it is useful to include elements of a modelling technique like the Business Process Management and Notation (BPMN) choreography diagram (OMG, 2016) to illustrate the planed or existing service production process.

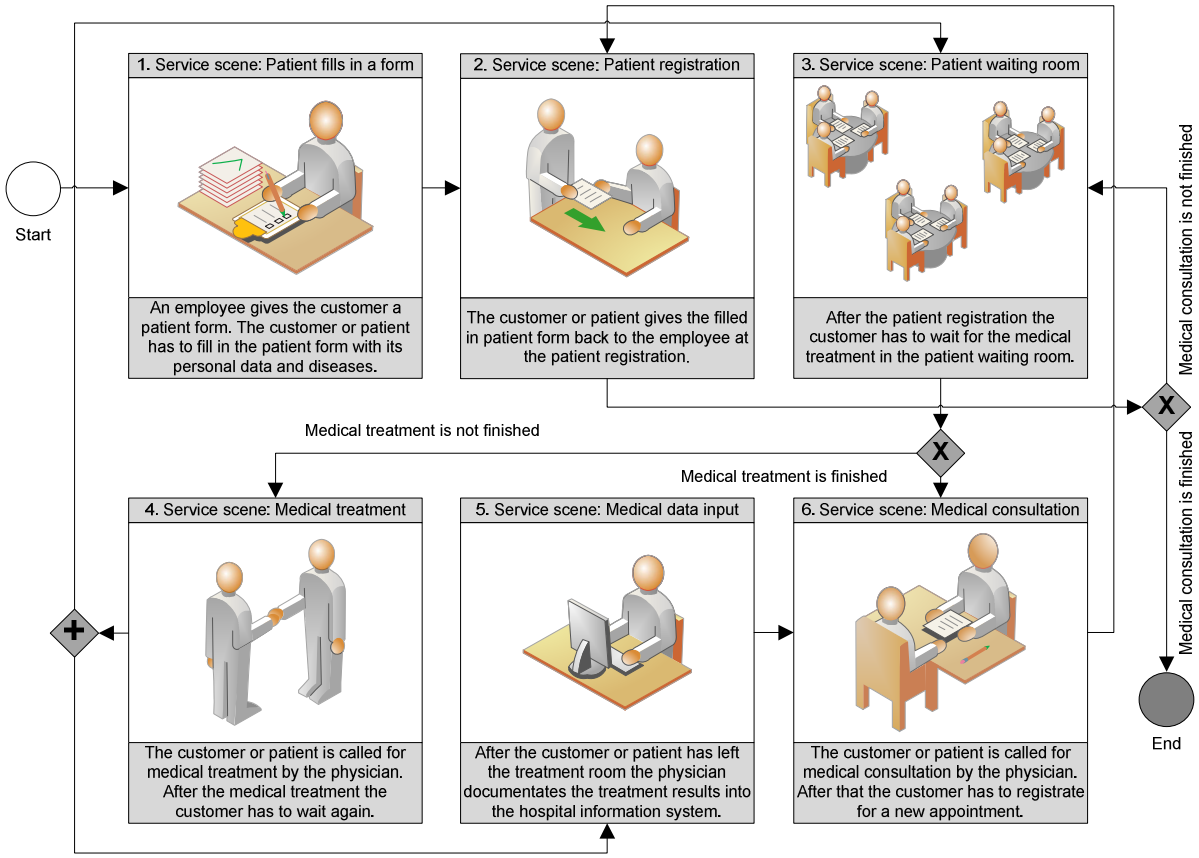

Figure 11. Situational Service Script of a Health Service Modelled as a Storyboard.

4.4. Application of the Third Level: Service Process Modelling

The third level service process modelling details the second level service conception. Therefore, the modelled situational service script is the basis for service blueprinting. Above the line of interaction the health service activities of the customer are located (e.g. patient fills in a form). The activities of the service provider are placed below the line of interaction (e.g. medical treatment). Additional to the service scenes of the health service within a hospital other invisible service scenes are also modelled (e.g. health insurance calculation, invoice for the health insurance of the patient). About the service production process of the ambulatory treatment or hospital service more detail information are visible. Below the line of implementation the human resource management is placed. On this basis the customer-independent activities can be supported (e.g. usage of a hospital information system, technical equipment, and data base of diagnosis codes and prices). These three activities under the line of order penetration support the customer-dependent activities like transcriptions, electronic patient records, and customer management. For example, the transcription activity within the hospital simplifies the medical data input. The electronic patient records are supporting the preparation of the patient forms, medical treatment, medical data input, and medical consultation. Customer management is possible due to the electronic patient records and important for the health insurance calculation and writing an invoice for the health insurance of the patient.

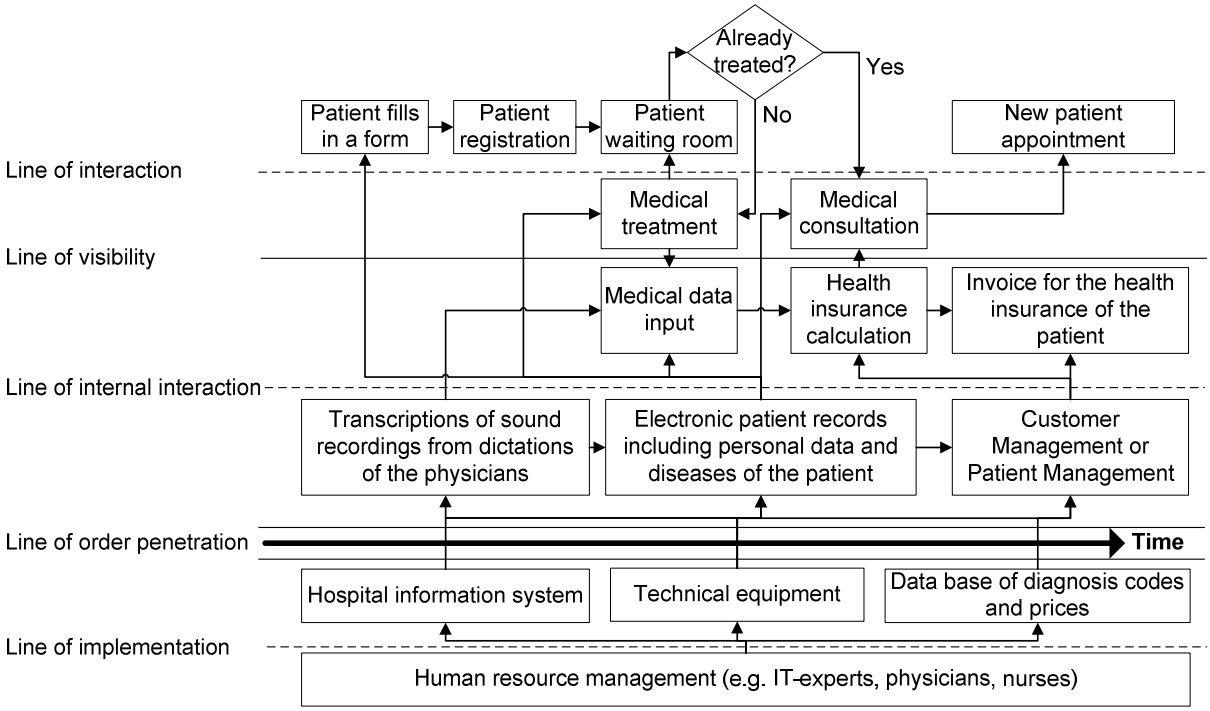

Figure 12. Blueprinting of a Health Service (Technique based on Shostack, 1984, 1987; Kingman -Brundage, 1989; Fließ; Kleinaltenkamp, 2000).

5. Discussion of the Research Results

5.1. The Constructed Mixed Methodology

Modelling technique. Other modelling techniques can be transferred as a basis for a mixed methodology to develop innovative service modelling methods. For example, another level-based or view-based modelling technique can be selected to transfer the concept of this modelling technique to the mixed methodology. These techniques are also usable to handle or in some cases to reduce the complexity of the enterprise reality or objects being modelled like a business cooperation or business process. Another suitable modelling technique is represented by the Unified Modelling Language (UML) (OMG, 2016) with its different views on users, structures, behaviours, implementations, and settings.

Research method. Other research methods and results can be used for combination within the mixed methodology for service modelling method development. For instance, a literature review can be combined with grounded theory procedures for deeper theoretical and practical insights for the development of service modelling methods. Suitable research methods can be selected on the foundation of the method spectrum of information systems research (Wilde; Hess, 2007) like expert interviews, a delphi study, or quantitative study. The results of these research methods must be applied for constructing a morphological box fitting as a methodical basis for the effective development of innovative service modelling methods.

Morphological box. As indicated, other morphological boxes can be constructed as a part of the mixed methodology to design innovative service modelling methods on a

well-grounded foundation. The constructed morphological box – so called the SPM Element Framework – can contain other and/or further dimensions but also other and/or further attributes describing the included dimensions. It can be decided for another framework instead of the BPM context framework (vom Brocke, 2015) as an additional orientation during the morphological box construction.

5.2. The Developed Service Experience Modelling Method

The first level: service classification. The time-based service classification based on the three dimension service time consumption, service technology use, and service encounter is also developed on a conceptual level and not on an empirical level – but most service classifications are developed on a conceptual level first and afterwards optimized on an empirical level (Kolek et al., 2015). It is valuable to classify services rather than to classify service-product-bundles. Services can be differentiated into two time-based service groups: Time-saving services and time-consuming services. Its three dimensions aid to design new services and to position existing services.

The second level: service conception. In the service science literature there is no technique developed and available to model situational service scenes directly. Service scripts within the literature remembered on described process workflows but without modelling elements for designing situational service scenes like symbols. To handle or in some cases to reduce the service complexity described as service abstraction the modelling of situational service scenes as a storyboard – filled with involved roles or actors, objects, facilities, and so on – should be more understandable than as a process workflow diagram without any illustrations only based on text and flows of processes and information. Therefore, storyboard modelling seems to be the best fitting method at this state of the art.

The third level: service process modelling. In this research paper the SPM Element Framework is constructed as a decision basis for selecting a suitable modelling technique for effective service modelling. The most of the modelling techniques like BPMN 2.0 (OMG, 2016) illustrated in the SPM Element Framework are established to model business processes. For the special case of modelling service processes service blueprinting appeared as one of the most fitting techniques. Some of the reasons are stated by its development for service process modelling, the structured modelling of service processes with the aid of the five lines for example to separate the activities of the customers and employees of service providers, and times that can be planed, coordinated, and controlled.

5.3. The Applied Service Experience Modelling Method

The first level: service classification. The time-based service classification enables not only the service management (Corsten, 2001) to clarify planned or existing services for service quality (Parasuraman et al., 1985) enhancement. It is also possible to position other services as the application examples indicate if they are fitting with the three dimensions service time consumption, service technology use, and service encounter. The goal of service positioning is to get a regulatory overview. The assignment of services is due to argumentation why they fit into the three dimensions. In service practice, the most services will fit into the dimensions stated as time-based

service groups directly but some could represent special application cases. Clarified immaterial services can be also linked with material products to locate service-product-bundles within the time-based service classification e.g. selling products like medical home equipment together with time-consuming health services. This demonstrates the flexibility of service and service-product-bundle clarification.

The second level: service conception. The modelling of situational service scripts with storyboards appears to be clearly understandable and practical for service conception. Headings and description texts are easy to define. Comic elements are difficult to select and to interpret e.g. the patient waiting room could be understand as a meeting room for model interpreters. In real-life service practice pictures of the service settings should be used for a deeper understanding of the situational service scenes and overall service potential. It is assumed, that especially the modelling not only of service scenes with storyboards makes fun. This hypothesis is linked with the *hedonic motivation* (Venkatesh et al., 2012) of model developers. *Hedonic motivation* can be considered as an essential reason for using modelling results like a service scene storyboard (Venkatesh et al., 2012). Another reason for using modelling results can be shaped by *habits* (Venkatesh et al., 2012) of customers and employees of service providers if they are modelled within the situational service scripts. If the modelling makes fun and well-known behaviors are recognized the generated *price value* (Venkatesh et al., 2012) is expected to be high. This should also have a positive impact on the use of effective modelled service business models. Hence, modelling conventions or modelling rules – not only for modelling situational service scripts – must be further developed.

The third level: service process modelling. The application of service blueprinting indicates that improvements of this modelling technique are required. Hence, a suggestion for re-designing service blueprinting is provided. The suggestion is based on the questions how to model service technology use effective and for that application purpose which lines should be adapted. Adapted and new introduced lines are suggested to reflect a differentiated view of technology use during the service production process. The adapted and new introduced lines of service blueprinting are marked as bold (see figure 13). A new *line of technology use* is implemented within service blueprinting. It separates therefore the (external) technology use of customers. Above this line customer activities excluding technology use and below this line customer activities including technology use are modelled. Under the *line of technology use* the line of interaction is kept but moved to the second position, because on this position it is useful to separate the activities of customers from those of the employees to differentiate the technology use of customers and service providers. The line of internal interaction is transferred into the adapted and new introduced *line of internal technology use*. It separates the (internal) technology use of service providers. Above this line service provider activities excluding technology use and below this line service provider activities including technology use are shown. The production-theoretic view is retained regarding the line of order penetration and it is still on its position (Fließ; Kleinaltenkamp, 2000). It differentiates now between customer-dependent and customer-independent technology use activities of the service provider. Above the line the customer-dependent technology use activities and below the customer-independent technology use activities are placed. The line of implementation still separates the customer-independent support activities from the customer-independent management activities of the service provider. Management activities like human resource management are today in the most cases linked with internal technology use. Therefore, the line of implementation is also unchanged on

its position (Kingman-Brundage, 1989). The horizontal line of visibility is adapted and new introduced as a vertical line. It splits based on the process modellers decision visible onstage activities from invisible backstage activities of both the customers and employees of the service provider. This leads to the advantage while service process modelling that not only service provider activities can be invisible modelled. Now customer activities can be invisible (e.g. patient fills in a form) or visible (e.g. patient registration) for service providers. Here, the service provider activities can be invisible (e.g. health insurance calculation) or visible (e.g. medical consultation) for customers, too. For the differentiation of process types an annotation is connected with each activity. Process model developers can decide between (C) core activities, (S) support activities, and (M) management activities. This process type annotation improves the concept of the line of internal interaction because customers can perform core activities and now also support activities.

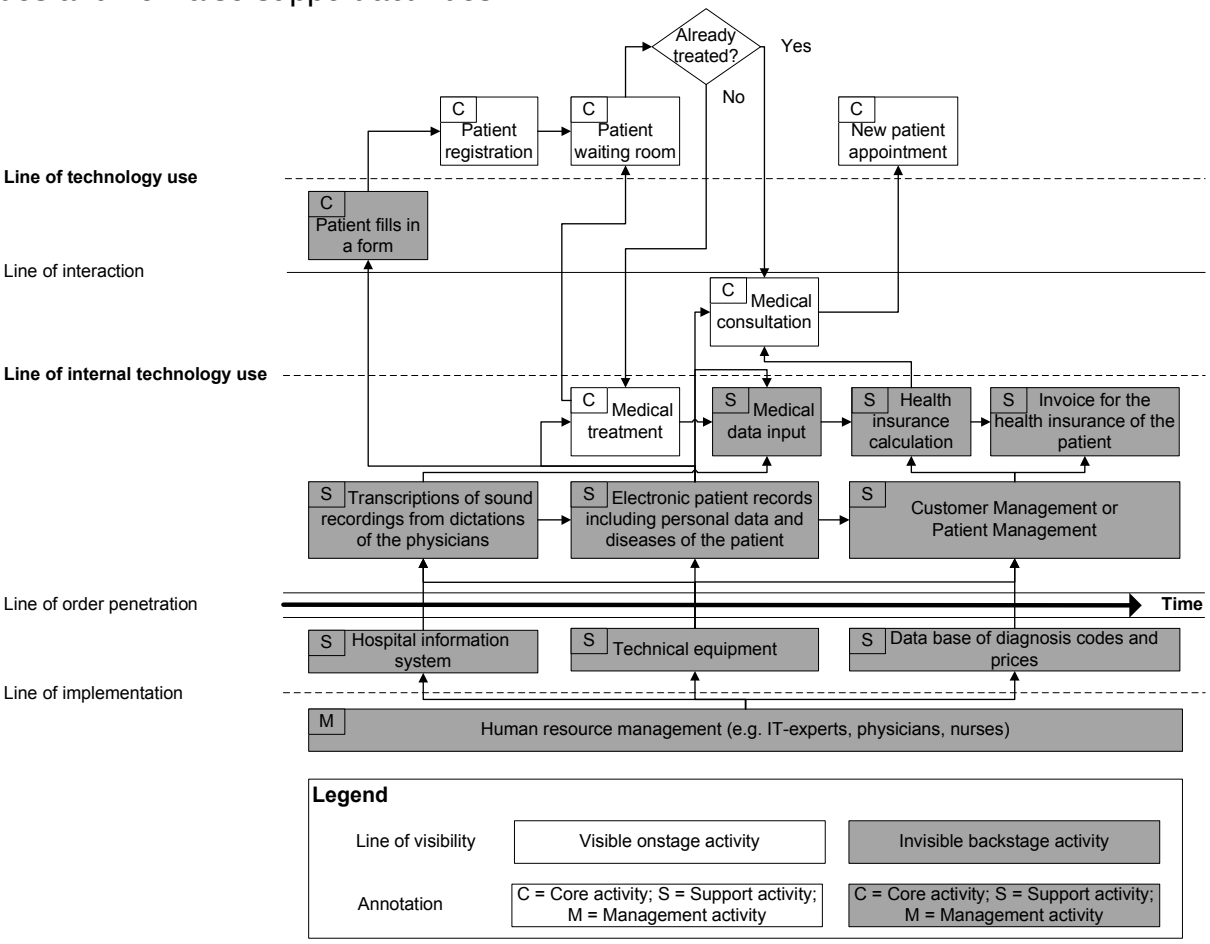

Figure 13. Service Technology Use Blueprinting of a Health Service (Technique further Developed based on Shostack, 1984, 1987; Kingman-Brundage, 1989; Fließ; Kleinaltenkamp, 2000; Kolek et al., 2015).

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