

Clarifying Service Classification Concepts: An In-Depth Literature Review

Erik Kolek, Dennis Behrens, Univ.-Prof. Dr. Ralf Knackstedt

University of Hildesheim

Very different views, meanings, concepts, and definitions of services are illustrating the importance of service classifications and the need for service classifications. To conduct a comparison and to detect current research gaps seems to be impossible, because of the extreme variety of service classifications. An in-depth literature review is an effective method of choice to clarify service classifications. New three- and multi-dimensional service classifications must be developed. The focus is on representing hybrid service bundles. Service classification researchers must reflect the service technology use, service encounter, and service time consumption. Service modelling languages can be developed or enhanced on this basis.

1. Introduction

There are numerous different types of service classifications with highly diverse dimensions, scopes, and representations developed in the service science literature. This high variety leads to the objective to clarify the existing service classification concepts. The stimulus for this research paper has its origin in the many different views, meanings and definitions of services stated by various scientific authors. Therefore, an overview about the term service is stated to illustrate why it is important to know the diverse possibilities for service classification. The heterogeneous definitions of services are reflecting the various service classifications with highly different dimensions and amounts of dimensions. This multifaceted overview of meanings of services and classifications emphasizes the importance of the three associated **research questions**:

- **RQ1: Which service classifications concepts exist in the literature?**
- **RQ2: Which concepts are demonstrating research gaps?**
- **RQ3: Which service classifications must be developed in further research?**

It is known, that there can be found many various forms of service classifications in the literature, but they are extreme different in their views, dimensions and representations that as a result none of these will exactly fit into the needs e. g. for digitalization or hybridization of services. Each service classification will only describe some attributes to structure such a classification framework. The missing concepts represent the research gaps for the development of a new service classification framework e. g. for digital services or hybrid service bundles distinguished by the different allocation degree of both material products and immaterial services. Services clarified by their attributes like their skills for digitalisation or hybridization have an impact on significant conceptual insights for further service science research.

Hence, the service definitions and service classifications are described first (see section 2). After that step the conducted in-depth literature review is explained based on guidelines (see section 3). In the fourth step the developed three-dimensional literature conceptualization framework is established (see section 4). Fifth, the literature review results are presented (see section 5). Then, the concepts of service classifications are discussed (see section 6). Finally, an outlook is stated (see section 7).

2. Literature Review Background

2.1. Service Definitions

The term service encounter refers to any kind of interaction between customers and service providers according to Surprenant and Solomon (1987). Every customer is unique and therefore a personalized service must be offered. Interaction is a critical determinant for the degree of customer satisfaction. In a person-to-person situation, the service provider can strategically react on the customer's needs.

Also Bitner et. al. (2000) recommends the definition that every single service encounter is an opportunity for a company to sell itself in terms of customer satisfaction, customer loyalty, word of mouth, sales and profitability. These service encounters exist in actual service settings, over the phone, through e-mail or the internet. The central objective is to increase the customer loyalty by satisfying its personal desire and needs. They point out that traditional service industries are hotels or banks.

For instance, digital services are independent, tradable performances which are provided by the digital service skills of the vendor (potential dimension) and by the integration of the external factor with the aid of digital data exchange (process dimension) targeting an effective impact on the external factors (result dimension) (Bruhn, 2002).

Hence, customer integration means customer participation with a central meaning for the service production and it focuses on the cooperation process between vendors and customers. In this view the customer has the position of a co-producer of the service. He works together with the vendor during the service production process, which emphasizes this central meaning of the customer participation. The customer moves himself for the service delivery in the observable service area, so called service encounter, which is characterized by the rooms of the vendor (Fließ, 2006).

Customer integration can be seen as an active participation of the customer on a contractual specified service preparation with contribution of external factors or take-over of subservices with the result that the service activities of the vendor are influenced or partial replaced (Büttgen, 2007).

Inside the product development process the customers have different functions and are an important part of the service. A customer as a service recipient can be seen as a resource when generating and creating new ideas. Additionally, a customer can become a co-producer in relation to the concept and design of the service. By testing a specific product or service the customer takes over the role as a regular producer. As a buyer the service recipient takes part when creating ideas in the market introduction of a product or service (Lattemann et. al., 2008).

The development of web 2.0 leads to customers who are taking over the role or function as a producer of products, services, and information. Forms of information produced are web blogs, wiki systems, online communities, or virtual realities. User created content in any arrangement dominates the internet, where users are able to publish content (Büttgen, 2009). That is why services are seen as performances for their preparation or delivery and why the participation or integration of the customer in the service production process is absolute necessary. The integration of the customer takes place in three different and simultaneously possible approaches. First, the customer as a person produces active services. Second, the customer provides one or more objects, animals, plants or his body with the result that changes can be realised on these external factors. Third, the customer provides information to specify the service. The service process result is then intangible (Fließ, 2009).

The meaning of service integration focuses on the integration of the external factors and immateriality. Recognising that fact, sales objects of service vendors are service skills of humans or object systems, especially of machines, which are produced on the basis of internal factors direct on the humans or objects of humans, both are seen as external factors, with the objective to cause changes or keep conditions. Concentrating on the service process in which the integration of the external factors occurs during the service preparation has an effective impact. Services are independent and tradable performances with three dissimilar orientations. First, in the potential orientation performances are linked with the provision or use of service skills. Second, in the process orientation internal and external factors are combined during the service preparation process. Internal factors are for example business rooms, employees and trainings. External factors are not in the range of influence of the service provider. Third, in the result orientation this factor combination of the service provider has the objective to achieve an effective impact on the external factors like on humans or objects of humans (Haller, 2010).

The quantity of these interacting resources, which are delivered by the customer and the service provider, are building a service system. Services are offered functionalities, which are produced by the interaction of resources. This functionality leads to a change of the condition of minimal one resource of the service system. At a minimum one of the changed resources must belong to a customer for whom the change represents a value (Böttcher, 2011). Since web 2.0 customer integration has developed from its basics to a digital form of customer integration. This process has been taken from customer integration 1.0 to customer integration 2.0 (Fließ et. al., 2011).

Customer integration means that consumers are integrated into business processes by using provided resources and receiving a more active role by completing tasks on their own. In the passive role a customer who does not take part of the actual process can be called inert, whereas a customer without motivation or time receives the status idle. Active roles of customers can be split into two groups with direct and indirect relationships between customer and service providers (Heidemann et. al., 2012).

Georgi and Mink (2013) state that since the development of the web 2.0 the service encounter have changed in terms of a stronger connection between the service customers and service providers. The services of a provider for a customer have been enhanced due to new service technology as a key element of service digitalization. Customers become co-producers in the service production process and influence the service output quality directly.

2.2. Service Classifications

One established service classification consisting of active and passive roles for customers is described by Mersha (1990). These customer roles are defined in a contact model. The active role of a customer is defined as a direct contact between the customer and the service provider. The passive role is defined as the contact between the customer and service system. A hybrid role as a form of passive and active role is possible as a service output as well.

Meier and Piller (2001) categorize the digitalization of services into four groups: differentiation services, service modularization, add-on-e-services, and core e-service customization. The differentiation services with low support or even no possibility for digitalization count toward secondary services. Examples are repair services or delivery services. Service modularization counts toward primary services. For instance, a hospital that offers additional services such as further treatment or better rooms can be described as a type of modularization. The add-on-e-service as another secondary service can be digitalized. That means complete service transactions and service provisions are possible digitally. Even providing personalized services for customers will provide a higher chance for customer loyalty. The core e-service customization is positioned within the group of primary services like consulting services and information services.

Chase (2010) classifies service systems by a range of required customer contacts during the production of service products. He differences services into three groups: the pure services, mixed services and quasi-manufacturing.

Salegna and Fazel (2013) developed a service classification to illustrate the degree of service customization. This degree is described by a fragmentation into a high and low level of customization. The high level of customization represents an emphasis on service customization, meaning individualization, personalization and customization of services. In contrast, the low degree of customization characterizes a lack of customization of provided services or offered products. In the dimensions of services and products another fragmentation into attributes represents the labelled degree in terms of tangibility and intangibility.

3. Literature Review Guidelines

3.1. Literature Data Collection

The resulting benefit of the literature data collection is characterized as a state of the art in the field of service classifications. Hence, a research path for revision and as a basis for arrangement of the various findings is drawn. Innovative findings, influences, senses, and literature review carefulness are addressed (Webster; Watson, 2002). The challenge was to decide to include relevant articles. To avoid gaining only keyword literature, the life circle of the searched keywords and discovered changes over time in these key terms are also studied. Constantly, the literature is observed with a topic based lens represented by the research questions, which addresses the phenomenon of diversity in the service sciences specified by the various service definitions and service classifications (Levy; Ellis, 2006).

First, the literature review scope is defined. The focus is to learn from the service research outcomes and the goal is to detect the central issues. Therefore, the literature review organisation is conceptual. The perspective is to grasp a neutral representation without personal opinions. The scholar is called service science. The coverage of the in-depth literature review is stated as representative (vom Brocke et. al., 2009).

Second, the research topic is also conceptualized. Mind mapping is used to link the discovered central search terms and handbooks for teaching students to outline our working or topic definition. The search strategy is in-depth, because of the sample of journals and conferences which are relevant (vom Brocke et. al., 2009).

Third, the start of the literature search characterizes the top ranked journals and conferences in the field of service science (Based on VHB). It is searched in the databases of these journals and conferences, both with the developed set of keywords like service typology or service classification. A backward and forward literature search is realised. In the backward search older literature is detected, which are cited in the research articles. Further references are discovered during the forward search of articles, which cited the articles. The sum of literature is limited by analysing the article contents in the following order: titles, abstracts and text with regard to the visualized service classifications (vom Brocke et. al., 2009).

Fourth, a literature analysis and synthesis is accomplished. Therefore, the concept matrix of Webster and Watson (2002) is used to foster the discussion. It segments the on-topic concepts in different units of analysis and arranged and synthesised the ex-ante research results completed by other service scientists.

Fifth, as a result of the in-depth literature review a research agenda is obtained. The basis of this agenda is the concept matrix and itself can be seen as a basis for further literature reviews. The empty fields in the concept matrix mark or highlight the concepts or research fields, which are significant important for further research. These empty fields are demonstrating the research gaps. In this research paper, the major findings of the in-depth literature review are presented (vom Brocke et. al., 2009).

3.2. Literature Data Analysis

The literature data analysis is based on the concept matrix of Webster and Watson (2002) and demonstrates how the relevant literature is analysed (vom Brocke et. al., 2009). It is critical to know that one or more relevant concepts can structure one or more relevant articles. This is familiar to Webster and Watson (2002) to handle the application of the literature. The target is to identify, why the offered information in the literature is important. To find patterns, relations and findings to underline associations is essential. Therefore, different forms of conceptualization based on the literature data sets to gain new knowledge are applied. The result of this literature data analysis process is a contribution to the body of knowledge (BoK). A concept-centric approach is conducted following the question: how are the research results linked with the research questions? The research results demonstrate a better comprehensible BoK (Levy; Ellis, 2006).

There is no intention to argue critical, but to review the literature from a neutral position by the research results. The completed researches of service scientists are respected and decisions to include the literature into the existing research stream are

made very carefully. Compromises are realised to focus on the knowledge, which is accumulated during the in-depth literature review. The target is to define the agenda for the further research and to state recommendations how to close existing research gaps. In the concept matrix is highlighted what is known and what is essential to know. Therefore, this completed research paper focuses on different service classifications. It is argued from a concept, empirical and practical point of view. These points of views are discussed and evaluated frequently to ensure the quality of the conducted in-depth literature review (Webster; Watson, 2002).

4. Literature Conceptualization Framework

4.1. Conceptualization of Service Classifications

The developed three-dimensional literature conceptualization framework for the literature organization covering heterogeneous service classifications with highly diverse dimensions has a pre-filter function for the literature review conducted. To explain that function, it must be stated that all collected literature is tested, organized, and accepted through this framework, before it is decided to place it as selected relevant literature into the concept matrix to demonstrate current research gaps. Hence, the literature review is grounded on different concepts of service classifications: representations, dimensionality, and scopes. The development of this literature conceptualization framework (see figure 1) is orientated on Klör et al. (2014).

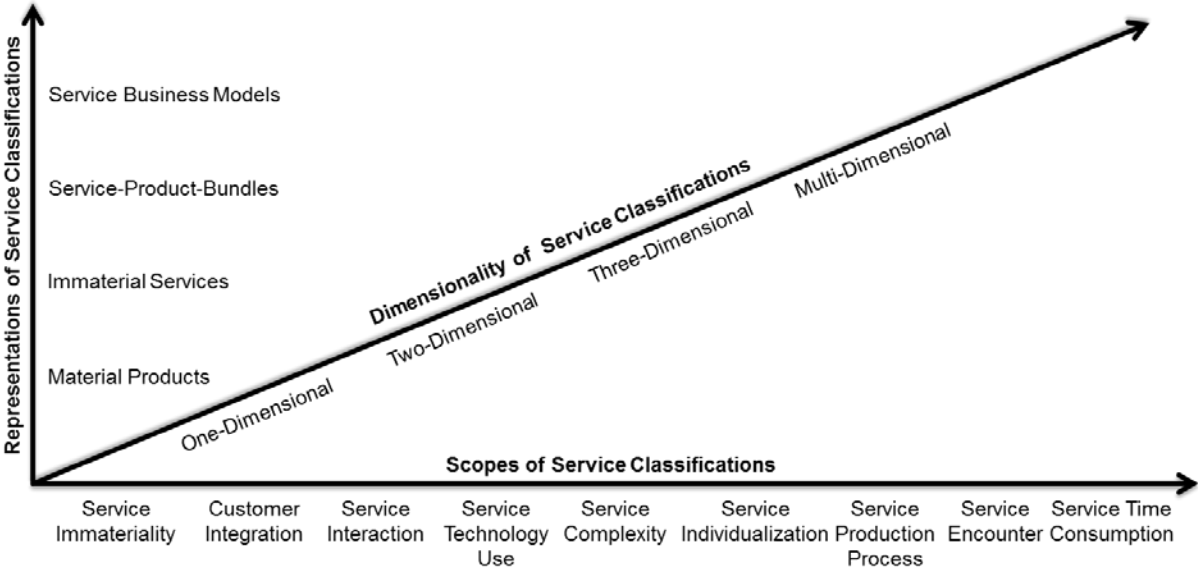


Figure 1. Literature Conceptualization Framework (Based on Klör et. al., 2014).

4.2. Scopes of Service Classifications

First of all, there are a number of heterogeneous service classifications with highly diverse dimensions. Every dimension has its own name and description. That is the reason, why it is so difficult to put all these dimensions together in one concept matrix. Therefore, scopes of service classifications are defined on the basis of the various dimensions of service classifications:

- **Service Immaterially** can be described by the service classification dimensions like: tangibility (Shostack, 1977), intangibility (Bell, 1986), and result dimension: degree of immateriality: material/immaterial (Engelhardt, 1995).
- **Customer Integration** is defined by the service classification dimensions like: customization of the service and necessity of customization (Lovelock, 1983), degree of service customization (Bell, 1986; Haywood-Farmer, 1988), customer disposition to participate (Larsson; Bowen, 1989), and process dimension: degree of integration: integrative/autonomous (Engelhardt, 1995).
- **Service Interaction** is shaped by the service classification dimensions like: degree of fluctuation and interaction between customer and service provider (Lovelock, 1983), degree of interaction: interactive/independent (Engelhardt, 1995), low/high performance ambiguity and goal incongruence/goal congruence (Bowen; Jones, 1986), degree of labour intensity and degree of contact and interaction (Haywood-Farmer, 1988), contact intensity: low/high (Barth et. al., 2000), passive and active contact (Mersha, 1990), and personal (Mills; Margulies, 1980).
- **Service Technology Use** can be formed by the service classification dimensions like: type of connection (Lovelock, 1983), simple/complex technology and mechanistic/organic interface (Haynes, 1990), technology as enabler for employees and customers (Bitner et al., 2000), interface (online/internet) and purpose (customer service) (Meuter et al., 2000), and digitalization of service provision (Meier; Piller, 2001). Service technology use is not only based on the use of information systems, but also on the use of machines during the service production process.
- **Service Complexity** can be constructed by the service classification dimensions like: maintenance, task (Mills; Margulies, 1980), service task (Davis, 1999), service recipient (Lovelock, 1983), service recipients people/things (Hsieh; Chu, 1992), nature of service provision (Lovelock, 1983), high/low complexity (Shostack, 1987), service delivery (Davis, 1999), degree of variation (Schmenner, 2004), and level of input uncertainty (Larsson; Bowen, 1989).
- **Service Individualization** can be assembled by the service classification dimensions like: diversity of variants (Barth et. al., 2000), diversity of demand (Larsson; Bowen, 1989), degree to which the offer is limited and nature of service (Lovelock, 1983), degree of individualization: standardized/customized (Engelhardt, 1995), importance of the individual service from a customer perspective (Meier; Piller, 2001), and low/high divergence (Shostack, 1987).
- **Service Production Process** is described by dimensions of service classifications like: production factors mobile and stationary (Sampson; Snape, 1985), rigid and flexible processes of goods, information, and humans (Wemmerlöv, 1990), and service process structure and service package structure (Kellogg; Nie, 1995).
- **Service Encounter** can be labelled by service classification dimensions like: number of delivery places (Lovelock, 1983), the drivers of service encounter satisfaction meaning customization/flexibility, effective service recovery, and spontaneous delight (Bitner et al., 2000), and use of persons and IT (Leimeister, 2012).
- **Service Time Consumption** is termed by service classification dimensions like: types of utility creation: time utility/space utility (Hsieh; Chu, 1992), time, which is spend at the service encounter differentiated in short (minutes), middle (hours),

and long (days) (Wakefield; Blodgett, 1999), and relative throughput time for a service transaction (Schmenner, 2004).

4.3. Representations of Service Classifications

The third dimension of the developed literature conceptualization framework is specified by the different representations of service classifications:

- **Material Products** are represented in service classifications. Especially early forms of service definitions and classifications tried to separate material products from immaterial services. That is the reason for including material products as an important unit for service classification conceptualization. Bell (1986) represents goods with high materiality and a low degree of adaption. Real physical goods are contained in the service classification of Choi et al. (1997).
- **Immaterial Services** are illustrated in service classifications. As expected nearly all service classifications are demonstrating examples of immaterial services. Bell (1986) represents services with low materiality and a high degree of adaption. Also Schulze (2000) is illustrating immaterial services like supportive-interactive services (software development), problem-orientated-interactive services (insurance), and personal-interactive services (training).
- **Service-Product-Bundles** or hybrid service bundles can be also part of the representation of a service classification. Here, an individual mixture of material products and immaterial services is visualized. To give an example, Leimeister and Glauner (2008) placed hybrid products between material products and immaterial services on the dimensions interaction and immateriality.
- **Service Business Models** are placed in service classifications. One example from Silvestro et al. (1992) is the dimension number of customers processed by a typical unit per day. They are clarifying professional services, the service shop, and mass services. Another example is stated by Mersha (1990) with passive and active customer contact clarifying different kinds of services like data processing services. Besides Schmenner (1986) is differentiating the service factory, service shop, mass service, and professional service by the customer contact. Davis (1999) is also representing service factories, service stores, service shops, and service complexes on two task-orientated dimensions.

4.4. Dimensionality of Service Classifications

Inside the service classifications it is discovered that different service scientists are focusing on different quantities of dimensions. These developed classifications are illustrated by one, two, three, or more dimensions, but mostly by two dimensions:

- **One-Dimensional** means that the service classification consists of one dimension. For instance, Shostack (1977) illustrates different kinds of services on one dimension from tangible dominant (salt) until intangible dominant (teaching). A second example is represented by Chase (1978) with high contact of pure services and low contact of manufacturing.

- **Two-Dimensional** describes a service classification matrix existing of two dimensions. One example is the service classification of Larsson and Bowen (1989) for differentiating the service design by the dimensions of demand diversity and customer participation. The service classification matrix of Doster und Roegner (2000) contains the two dimensions integration and individualization and separates service business models into four quadrants.
- **Three-Dimensional** refers to a service classification that is more detailed because of the three dimensions. Often a service classification matrix is the foundation and extended with a third dimension. For instance, Weiber and Adler (1995) are establishing the three dimensions search attributes, experience attributes, and trust attributes for classification of immaterial services and material products.
- **Multi-Dimensional** explains a complex service classification with more than three dimensions. This complexity occurs during the service classification because of the high amount of service dimensions, which are represented by several different degrees. For instance, Benkenstein and Güthoff (1996) are illustrating the five dimensions individuality, multi personality, length of production episode, and number of partial performances, and heterogeneous of partial performances.

5. Literature Review Results

The literature review results are stated as a service classification research agenda based on the concept matrix from Webster and Watson (2002), which indicates the research gaps in the fields where no cross is made. This concept matrix is grounded on the developed literature conceptualization framework based on Klör et al. (2014) for the organization of the literature detected and presented in table 1.

Table 1. Service Classification Research Agenda.

Used for Classification	Concepts of Service Classifications																
	Scopes									Representation				Dimensionality			
Units of Analysis	Service Immateriality	Customer Integration	Service Interaction	Service Technology Use	Service Complexity	Service Individualization	Service Production Process	Service Encounter	Service Time Consumption	Material Products	Immaterial Services	Service-Product-Bundles	Service Business Models	One-Dimensional	Two-Dimensional	Three-Dimensional	Multi-Dimensional
Judd (1964)	X		X							X	X					X	
Rathmell (1966)	X						X	X	X	X	X	X	X	X			
Shostack (1977)	X									X	X		X	X			
Hill (1977)			X			X					X				X		

Browning; Single- mann (1978)					X						X			X			
Chase (1978)		X	X				X	X	X		X		X	X			
Thomas (1978)			X			X	X				X				X		
Mills; Margulies (1980)		X	X		X				X		X					X	
Grove; Fisk (1983)			X		X						X			X	X		
Lovelock (1983)	X	X	X		X	X	X	X			X				X		
Sampson; Snape (1985)		X					X				X				X		
Silpakit; Fisk (1985)		X	X				X				X			X	X		
Bell (1986)	X	X								X	X	X			X		
Bowen; Jones (1986)			X										X		X		
Schmen- ner (1986)		X	X		X						X		X		X		
Shostack (1987)					X	X	X				X				X		
Haywood- Farmer (1988)		X	X				X				X					X	
Larsson; Bowen (1989)		X			X	X	X				X		X			X	
Chase; Aquilano (1989)		X	X				X				X					X	
Bowen (1990)		X	X			X					X			X			
Bitner (1990)		X						X			X			X			
Haynes (1990)			X	X			X		X		X				X		
Mersha (1990)			X								X				X		
Wemmer- löv (1990)			X				X				X				X		
Bitner		X	X					X			X			X			

(1992)																	
Hsieh; Chu (1992)		X						X	X		X		X		X		
Silvestro et al. (1992)		X	X			X	X	X	X		X		X		X		
Engelhardt et al. (1993)	X	X	X			X	X			X	X				X		
Kellogg; Nie (1995)					X		X				X		X		X		
Mößlang (1995)			X	X	X						X				X		
Patterson; Cicic (1995)	X	X	X			X					X	X			X		
Weiber; Adler (1995)	X					X					X	X				X	
Benkenstein; Güthoff (1996)			X		X	X	X				X						X
Wakefield; Blodgett (1996)								X	X		X			X			
Woratschek (1996)	X	X				X					X					X	
Bufka (1997)	X	X									X	X			X		
Choi et al. (1997)				X							X					X	
Corsten (1997)	X	X	X	X							X				X		
Davis (1999)		X			X		X				X		X		X		
Wakefield; Blodgett (1999)							X	X	X		X				X		
Bitner et al. (2000)		X	X	X				X			X				X		
Corsten (2000)		X	X								X				X		
Doster; Roegner (2000)		X				X							X		X		
Meuter et al. (2000)				X							X				X		
Schulze			X			X	X				X				X		

(2000)																		
Bruhn; Meffert (2001)		X	X	X	X	X	X				X		X		X			
Meier; Piller (2001)		X		X		X	X				X		X		X			
Spath; Demuß (2003)		X	X							X	X	X		X				
Schmen- ner (2004)		X	X		X	X			X		X		X		X			
Breithaupt (2005)	X	X	X	X	X	X	X		X		X			X	X			
Meier et al. (2005)	X									X	X	X		X				
Meffert; Bruhn (2006)	X	X	X	X	X	X	X				X			X	X	X		
Büttgen (2007)		X	X								X				X			
Kollmann (2007)				X	X					X	X						X	
Leimeis- ter; Glau- ner (2008)	X	X	X			X	X			X	X	X			X			
Chase (2010)			X								X		X	X				
Clement; Schreiber (2010)	X			X	X					X	X			X	X			
Backhaus et al. (2010)	X	X			X	X				X	X	X	X	X				
Becker et al. (2011)					X	X					X			X	X			
Ihlenburg (2012)		X	X	X							X			X				
Leimeis- ter (2012)			X	X							X		X		X			
Salegna; Fazel (2013)	X	X	X								X				X			
Total	18	35	37	14	20	21	24	10	10	14	59	7	17	19	39	10	1	

6. Discussion of the Literature Review Results

6.1. Limitations of the Literature Review Results

The boundaries of the in-depth literature review conducted and its application is outlined by other or further dimensions of the literature conceptualization framework, use of a keyword string, and missing double-blind review process.

First, there can be other or further dimensions of the literature conceptualization framework. For instance, there might be more representations or scopes of service classifications like service use behaviour of customers. On the other hand, the concepts are well-grounded based on the dimensions and illustrations of the service classifications. Hence, the developed framework is a methodical background for realising and structuring an in-depth literature review of service classifications by other researchers.

Second, the use of a keyword string in the literature review is neglected like Klör et. al. (2014) did. However, a set of keywords with different keywords and synonyms of keywords in a keyword search is applied. The search result is not only keyword literature, because the life circle of the keywords specified in keyword changes is also observed. Over the decades published articles from different authors established diverse keywords with the same and changed meanings. The forward and backward search aided not to miss relevant service classification literature.

Finally, no double-blind review process during the literature integration in the concept matrix is conducted. First, it is not explicit recommended (vom Brocke et. al., 2009). Otherwise, it is not explicit necessary, because the dimensions and illustrations of service classifications are observed. These are transferred into the concepts of service classifications with the aid of the literature conceptualization framework.

6.2. Implications of the Literature Review Results

Starting in the 1960s service classifications are one- and three-dimensional, material products and immaterial services are represented by concentrating on the scope service immateriality.

Later, in the 1970s one and two dimensions, immaterial services and service business models, and the scopes service interaction, service individualization, and service production process are in the discussion of service science researchers.

From 1980 the research of service classifications became famous in service science. Here, the researchers focused on two-dimensional service classifications for the positioning of immaterial services while applying the scopes customer integration, service interaction, service complexity, and service production process.

This growth of conducted service classification research increased to its top in the 1990s. Service scientists are concentrating on two dimensional service classifications, highlighting immaterial services and service business models, using the scopes service immateriality, customer integration, service interaction, service individualization, service production process, and the service encounter.

Since the year 2000 service classification research seems to be decreasing. Nonetheless, two dimensional service classifications are established to demonstrate material products, immaterial services, and service business models covering the scopes customer integration, service interaction, service technology use, service individualization, and service production process.

Service classification research since 2010 focused on one and two dimensions, the representation of immaterial services and service business models, the scopes service immateriality, customer integration, service interaction, service technology use, and service complexity.

Based on this conceptual foundation in the realized in-depth literature review the analysis of the concept matrix visualizes the needed further research as a meaningful service classification research agenda (see table 1) of open research gaps. The in-depth literature review conducted validates understandable the time based development of the open and closed research gaps. Further research must close the current research gaps. Service classification development is realized on a conceptual level first and then with the aid of an empirical foundation. Service classification researchers must reflect the scopes service technology use, service encounter, and service time consumption and represent service-product-bundles or hybrid service bundles with a three- or better multi-dimensional visualization.

7. Outlook

New service scripts (Schank;Abelson, 1977) or service business models especially for service implementation in the market can be planned on the foundation of the literature conceptualization framework. Chances, risks, strengths and weaknesses are visible, if the scopes of service classifications are reflected in the business plan or service script. Just think on a new restaurant service script, where exclusive food is served (service individualisation), where you can order your meal with a tablet computer installed at the table (service technology use), where the customer sees the open kitchen (service immateriality), where he can interact over the tablet computer for example to ask other guests how their food tastes (service interaction), where they can pay online with the tablet computer (customer integration), and where they get food suggestions on the tablet computer (service complexity).

Service modelling languages can be developed or enhanced concerning the contributions of this in-depth literature review. The established literature conceptualization framework aids to develop a modelling language for service engineering. This service modelling language can exist of three levels: service classification level, service conception level, and service blueprinting level. The first service classification level is grounded on a service classification framework, which orders the representations by dimensionality and scopes. The second service conception level is then described by e. g. service scripts or service business models based on the concepts applied during the service classification development: scopes, dimensionality, and representations. The third service blueprinting level details information about the service process by using service modelling languages like blueprinting for service process modelling. This service modelling language with its three levels can be applied for the digitalization of services, modelling the service episodes, customer contact points and service process activities of both the customer and service provider. The per-

ceived service quality as a result of the customer comparison between expected and perceived service can also be enhanced, because the determinants of service quality like access, communication, competence, courtesy, credibility, reliability, responsiveness, security, tangibles, and customer understanding and knowing can be positive influenced (Parasuraman et al., 1985) by the service modelling language specified.

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Authors

Erik Kolek, Dipl.-Betriebswirt (FH), M. A., M. Sc.
University of Hildesheim
Department of Information Systems and Enterprise Modelling
Universitätsplatz 1, 31141 Hildesheim, Germany
Email: erik.kolek@uni-hildesheim.de

Dennis Behrens, Dipl.-Wirt.-Inf.
University of Hildesheim
Department of Information Systems and Enterprise Modelling
Universitätsplatz 1, 31141 Hildesheim, Germany
Email: dennis.behrens@uni-hildesheim.de

Ralf Knackstedt, Univ.-Prof. Dr.
University of Hildesheim
Department of Information Systems and Enterprise Modelling
Universitätsplatz 1, 31141 Hildesheim, Germany
Email: ralf.knackstedt@uni-hildesheim.de