Tackling Knowledge Gaps in Digital Service Delivery

Insights from a Case Study and Literature Review

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Abstract. Today, in more and more enterprises digital services are offered to employees. An inherent characteristic of digital service is the self-service concept. Based on findings from a case study and academic literature, it is argued for the importance of employee knowledge when designing digital services. It is revealed that existing service blueprinting approach are not capable of adequately reflecting knowledge gaps. To fill this research gap, the paper proposes an agenda for future research.

Keywords: Digital service, e-service, service blueprinting, knowledge, skills

1 Introduction

Rapid advances in information technology (IT) have paved the way for internal service organizations (e.g., departments like IT, human resources and procurement) to offer e-services (digital services) to their internal customers (employees of other departments) [1, 2]. Such a digital service can be defined as a process of providing any service through technology-mediated delivery channels, including the internet, intranet and mobile devices [3].

Technology-mediation as the defining characteristic of digital services generates the inherent characteristic of digital service as self-service contributing to the digital service experience [4]. Self-service channels enable internal customers to perform the majority of tasks of a service process by themselves and independent of direct involvement of the internal service organization's employees [5]. Transferring task-performance to internal customers, the internal service organization is able to reduce its workload per service production and delivery and thereby increase its efficiency/productivity [6, 7]. However, not all internal customers are equally capable of performing the transferred process tasks due to their high complexity and/or a lack of knowledge and skills [8]. Hence, service designers need to be aware of knowledge gaps: knowledge and skills required to perform devolved process tasks, but which are not possessed by the involved actors [9, 10]. While knowledge gaps can cause unnecessary costs in internal self-service contexts, when offering external self-service they can lead to a loss of income.

So far, a wide range of approaches for designing and analyzing digital services has been introduced by academic literature [11]. However, as discussed in a later section of this paper, these approaches fall short in highlighting potential knowledge gaps (required knowledge and skills not possessed by involved actors) causing process failures and employee intervention. Drawing upon case study evidence and literature findings, it is argued that this information is fundamental when designing digital services and deciding to whether transferring task-performance to internal customers. The present position paper argues for a research agenda that aims to stimulate future research on this topic to fill this research gap.

2 Importance of Employee Knowledge in Digital Self-Service

An exploratory case study approach is applied to analyze the design of a digital service offer that is provided by the IT department of a medium-sized German IT-service provider to its internal customers (software developers, system engineers and IT consultants). The digital service offer was designed in the form of a self-service portal, which enables the internal customers to deploy Infrastruce-as-a-Services (e.g., virtual machines) on their own. The main rationale of this portal was to reduce the IT department's workload per service provisioning and increase the speed of service delivery. However, regarding the former anticipated benefit, the digital service offer failed to succeed. Virtual machines deployed by the internal customers were often excessively customized (regarding CPU, storage and memory) and misused for undesired purposes and use cases. In consequence, decision makers of the IT department had to intervene and perform recovery tasks, such as the reconfiguration of oversized virtual machines and migration of misused virtual machines into separate cloud environments, differing from traditional service delivery tasks. These interventions were necessary to prevent a rapid decrease of limited IT resources and violations of agreed software license terms.

Source	Evidence
IT Consultant	"[…] it looks good from a technological point of view, but for end users it is too much to handle […] I would say that users should not have control over the amount of memory [of the virtual machine] and so on […]".
CIO	"[…] they request testing environments, which they should provide through the self-service portal, and after two weeks we recognize 'Oh gosh! They develop [software] on them [virtual machines]' […] [b]ecause they do not know […] they provide the virtual machines [replacement for colloquial term] on their own […] and are able to make these faults".

Table 1. Evidence from the case study.

It is argued by the interviewed decision makers that, among other contextual factors, the lack of the internal customers' knowledge regarding service customization and software license restrictions lead to the occurred problems (see Table 1). The IT department

plans to redesign the digital service offer and to consider task requirements and characteristics of the internal customers, in terms of establishing control mechanisms for the service process and providing adequate training and support for employees of other departments.

Source	Evidence
[8]	"Organizations will need to articulate exactly what knowledge, skills and capabilities customers require; how they will acquire them, i.e. from where or who; and what the associated learning curve will involve".
[10]	"Finally, low-value, high-volume standard transactions that require the least customer effort and knowledge are the ones most suitable for self-services".
[9]	"Taken together, the above reasoning highlights the notion that the value customers can cocreate in a particular service channel (i.e., the value-in-context) differs markedly, when considering the differences between customers' resources (i.e., ability, motivation, knowledge) and unique service circumstances (e.g., complexity of the service task)".

Table 2. Evidence from academic literature.

Academic literature also highlights the importance of customer knowledge and skills for the success of digital service offers (see Table 2). In [10] it is identified that the service process characteristics (characteristics of the co-production tasks and customer characteristics) moderate the service provider's cost reduction when offering web-based self-service channels. It is proposed that "web portals are effective for simple, unambiguous tasks but not so for comprehensive and ambiguous tasks" [10]. Based on Media Richness Theory and Channel Expansion Theory, in [9] it is argued that customers create most value from self-service offers when they are used for simple and recurrent tasks. The authors of [9] further claim that customers are also able to derive value from complex tasks, in case they are confident in their own knowledge and skills. Overall, service organizations need to be aware of what knowledge and skills their customers require and whether they already acquired it [8].

3 Lack of Knowledge Consideration in Service Blueprinting

In [11] a number of approaches for service process specification and analysis has been identified and examined. In the present paper, those approaches that allow for the specification and analysis of the customer's operant resources are discussed in more detail to analyze whether they support the identification of potential knowledge gaps. Table 3 depicts the resulting list of relevant approaches.

Approach	Consideration of customer knowledge
Adapted Service Blueprint [13]	-
Customer Experience Modeling [14]	-
Flexible Service Systems [15]	Competence propositions and matches

Resource Mapping Framework [16]	Required resources for boundary shifts
Structured Analysis and Design Technique [17]	Actor roles; job descriptions
Public Value Process Mapping [18]	Affecting actions and strategies
i* [19]	-

Table 3. Examined approaches and level of customer knowledge consideration.

Though the approaches described in [13, 14, 19] do allow for the specification and assignment of individual actor roles, it is not possible to describe these roles in terms of their possessed knowledge and skills. Also, the complexity of the tasks comprised by a modeled service process cannot be described when making use of these tools.

The approach in [15] introduces the concept of competence propositions presented by service providers and evaluated by service customers in a given market. In this context, a competence is defined as knowledge and skills that either can be applied by the service provider and/or is required by the customer. The matching of two competence propositions results in the happening of a service episode. Although the concepts of competence propositions and matches are promising, they do not hold for individual service processes, but only for service systems and their interactions.

In [16] a Resource Mapping Framework is introduced, which aims to support service designers in identifying changes in resource requirements for the service provider and customer when shifting the service boundary towards either self-service or super-service. However, the framework is very abstract and general in the sense that it does not provide concrete methods or tools to describe such required knowledge and skills as well as changes in these.

The Structured Analysis and Design Technique allows for the assignment of actor roles to specific process tasks. Actor roles that are assigned to process tasks can be incorporated into job descriptions, depicted through separate models. Such job description models portray the service personnel's different roles and their interrelationships. As such, the focus of these models is not on the knowledge and skills possessed by the employees of the service organization, but on tasks performed by individual roles jointly or separately.

Adopting Public Value Process Mapping [18], decision makers are able to derive key actions relevant for the realization of public value. For each of these key actions, associated actions can be derived that positively or negatively influence the key action's contribution to the intended outcome. Such associated actions can involve the establishment of specific knowledge and skills for the involved actors. Nevertheless, resulting models rather reflect means-end chains instead of service processes. Also, the approach does not support the specification of the current actors' characteristics.

4 Discussion and Future Research Agenda

In this section an agenda for future research is presented, which guides scholar in addressing the identified shortcomings.

Identification and clustering of knowledge and skills relevant for digital service delivery. Future research should aim to identify specific knowledge and skills that are of importance for the production and delivery of digital services. It should be investigated whether this knowledge and skills could be clustered along different service categories, types of process tasks and involved employee roles. Further, research is required to determine how employees can acquire such required knowledge and skills and service providers can ensure the adequate performance of service process tasks. Scholars are encouraged to identify themes of knowledge and skills relevant to digital service delivery.

Design of meta-models allowing for the representation of co-production task and employee characteristics. Scholars should elaborate on how to represent the knowledge and skills required by service process tasks and/or possessed by involved process actors in service blueprints. Therefore, meta-models should be designed describing the necessary constructs for knowledge and skill representation and their interrelations. The meta-models of the approaches in [16, 18] could serve as a basis for the design of appropriate meta-models. For instance, they could be combined with the meta-model of the well-accepted Service Blueprinting approach.

Development and evaluation of service blueprinting approaches supporting the identification of knowledge gaps. Based on designed meta-models, new service blueprinting approaches should be developed and evaluated. Such approaches should enable decision makers to design digital service offers, identify potential knowledge gaps of involved employees and derive training and support programs to ensure task-performance and effectiveness. Evaluations in the form of case studies or illustrative scenarios should be performed to demonstrate the theoretical and managerial contributions of the approaches.

In this paper, the importance of employee (internal customer) knowledge for the success and design of digital service offers is presented. Evidence were collected from a case study and self-service literature. It is further presented that current service blueprinting approaches do not adequately allow for the identification of knowledge gaps. To tackle these shortfalls, we present a research agenda.

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