Can Business Process Management Benefit from Service Journey Modelling Language?

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Abstract—**Business process management aims to align the business processes of an organisation with customers' needs. Doing this is of particular importance for services and requires a good understanding of interactions among the stakeholders involved in service provision and consumption. Several business modelling languages have been proposed, such as Business Process Modelling Notation (BPMN), Business Process Executable Language (BPEL) and Web Services Choreography Description Language (WS-CDL). Although these languages provide good support for process modelling, their consideration of the customer's point of view seems to be insufficient. On the other hand, visualisations of customer journeys for the purpose of conceptualisation of new services have been successfully used in the area of service design. Our hypothesis is that a visual language presenting the customer journey through a service might be useful for aligning business processes of service providers with customers' needs and, in turn, contribute to the delivery of better services. We propose Service Journey Modelling Language (SJML) and report our first experience with it.**

Keywords-software engineering; business process management; services; visual languages

I. INTRODUCTION

Services play an important role in the global economy [1]. This heightens the need to understand business process management (BPM) in the context of services. BPM is used to improve the outcomes and operational agility of business performance by linking people, information flows, system and other assets in order to create and deliver value to customers [2].

Several standard languages have been used for business process management. However, the concept of the customer's perspective is not sufficiently considered enough in most of the languages.

Service providers need appropriate methods and languages to describe the entire service process from the customer's point of view. This employs knowledge from the areas of information visualisation, business process modelling languages, and service design.

The rest of the paper is organised as follows: Section II describes related work. Section III describes visual language for modelling service journey. Section IV concludes the paper and proposes future work.

II. RELATED WORK

Information visualisation increases human cognition [3]. It helps people to more easily understand complex information [4], and changes over time that could otherwise be difficult to comprehend [5].

Moody drew visual information transmission with two processes: encoding and decoding [6]. We aim to develop a visual language for presenting customer journey through services (we call it Service Journey Modelling Language, or SJML) that includes graphical syntax and information about encoder, decoder and channels for effective communication, as presented in Figure 1.
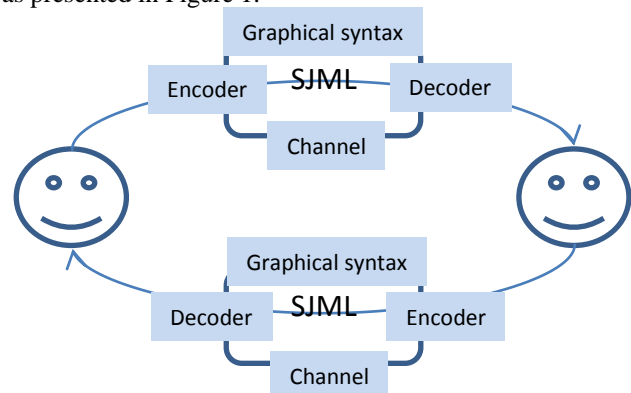

Figure 1. Communication by SJML

Several languages have been used for BPM, such as:

- **Business Process Modelling Notation (BPMN).** BPMN is a graphical notation that shows the steps in a business process and depicts a flow chart that defines business process workflows [7].
- **Business Process Execution Language (BPEL).** BPEL indicates a language that is used to define and execute business processes by using the interfaces via web services in order to export and import business information [8].
- **Web Services Choreography Description Language (WS-CDL).** WS-CDL is a non-executable language based on XML that enables global business processes to be shown [9].
- **ServiceML.** ServiceML includes three packages; Business-SoaML, Light-USDL and Service Journey Map, which consists of touchpoints. Touchpoint means a contact point or interaction

between a customer and a service provider during service delivery. The colours of the touchpoints stand for the type of behaviours (normal, ad-hoc and unexpected) and customer emotional stage (unhappy, neutral and happy).

Customer Journey Map (CJM) is a tool used in service design to visualise users' experience. A map is constructed with touchpoints. The details of service interactions and the associated emotions can be described in a highly accessible manner by using a CJM [10]. People use the map to see the service delivery process from the user's perspective. The CJM overview shows problem areas and opportunities for innovation, and the touchpoints assist in further analysis [10]. By using CJM, people can easily and quickly compare a service with its competitors [10].

Service blueprint is a technique that was introduced by Shostack and has been used in business and marketing [11]. It shows the series of service actions and the time flows related to the roles of stakeholders during service delivery by dividing them into front tasks and back tasks. Service blueprints enable managers to understand the entire process properly and provide useful information for new service development and its evaluation.

Above described languages and tools support modelling business processes. However there is a lack of methods for precise specification of concepts where the customer has a role as a co-producer [12]. While partly addressing this, CJM and service blueprints are mainly focusing on the conceptualisation and evaluation phases [13, 14]

III. VISUAL LANGUAGE FOR MODELLING SERVICE JOURNEY

The main goal of this research is to introduce a generic visual language which enhances the service design development/improvement process. We propose a visual language, called Service Journey Modelling Language (SJML) that supports aligning business processes of service providers with customers' needs. The language will be developed and evaluated in an iterative manner. Information visualisation theory [15] and communication theory [6] will form a theoretical basis for language design and evaluation. Information visualisation involves users, tasks and visualisation forms [15]. We aim to investigate which visualisation forms might improve communication between stakeholders when performing different tasks within service design and development.

As the first phase of our research, we wanted to investigate the needs of practitioners when designing new or improving existing services. How do different stakeholders such as designers, service developers and managers communicate with each other? Which information about customers and their interaction with services is essential when aligning business process with customers' needs? We developed the first version of the language and evaluated it in a half-day workshop with twenty-six employees of a university library.

A. Scope

Services can be divided into the following four areas according to the nature of the service act and the recipient of the service: services directed at peoples' bodies, services directed at physical possessions, services directed at peoples' minds and services directed at intangible assets [16]. Figure 2 gives examples of these services. We intend to use SJML within all four service areas.
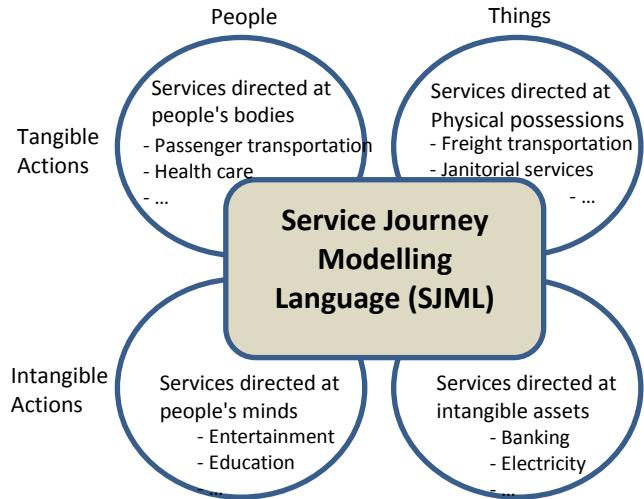
Figure 2.   Service areas covered by SJML

Table I compares SJML with other similar languages. The second column gives the application domain of the language. BPMN, BPEL, WS-CDL and ServiceML are used in business process management, whereas SJML is used in service design and development. The second column indicates whether the language considers service providers' and/or customers' point of view. The third column indicates communication coverage. Front-communication means that the languages cover only communication between employees inside organisations. Front-end communication means that the language covers also communication between service providers and customers. ServiceML describes service experience from both customer's and service provider's view and cover communication between service providers and customers. However, ServiceML cannot display third party stakeholder. SJML aims to be customer-oriented, cover front-end communication and enables to illustrate existing and newly designed services.

TABLE I.   COMPARISON OF THE LANGUAGES

Language	Domain	Perspective	Communication coverage
BPMN, BPEL, WS-CDL	Business	Service provider–oriented	Front communication
ServiceML	Business	Service provider /customer-oriented	Front-end communication
SJML	Service design	Customer-oriented	Front-end communication

Service design includes the following phases: ideation, conceptualisation, design, prototyping, development, implementation, evaluation, maintenance and improvement. Whereas CJM and Service blueprints support ideation and conceptualisation phase, SJML is expected to be used in the whole service design process from conceptualisation to improvement aiming to enhance service quality.

SJML aims to improve:

- communication to strengthen customer orientation and facilitate collaboration between all involved stakeholders through a common vocabulary and extensive use of visualisation;
- support for design and development, where language serves as a tool for managing the development and implementation of innovative service concepts; and
- support for the analysis of existing and new services to ensure consistency and overall customer experience across touchpoints and throughout the service life cycle.

B. Specification of SJML

Meetings, seminars, e-mail and telephone conversations, were used to specify requirements and to collect relevant data. From this requirement and data, functional requirement are specified like below.

- Source of requirement: internal, external meetings, seminars, e-mail and telephone conversation.
- Functional requirement:

Touchpoint. SJML consists of a sequence of touchpoints. Each touchpoint include symbols which show channels and devices that are used for the touchpoint.

Actor. The colour of the boundary indicates the actor initiating the touchpoint.

Status. The boundary style indicates the status of the touchpoint (solid boundary: completed, dashed boundary: missing and crossed touchpoint: failed).

The first version of SJML (SJML v1.0.) consists of terminology, symbols and model journey. Customer journey relevant terminology such as service and stakeholders was studied and summarized for better understanding. Symbols and visual elements were developed together with syntax and context. Visual symbols represent actions, devices and mediums that are used during service delivery process. We used SJML v1.0. for model service analysis of four different services (Going to the movies, Tax reporting, Retail purchase and Air travel). Both expected and actual journeys were mapped.

C. Evaluation and Results

A service design seminar was held at the science library at the University of Oslo in June 2013. The seminar consisted of a lecture about service design and two practical sessions. SJML was introduced and tested during one of these sessions. The session included a short introduction of

SJML, eight tasks and discussion. Twenty-six librarians participated, and the entire session took about 30 minutes.

Participants were divided into four working groups and asked to make customer journey maps of the service process of borrowing paper and electronic books at the library using SJML. One blank icon plus seventeen book loan service relevant icons which were selected among 32 SJML icons were given to each group as a set (Figure 3). In this workshop, the actor and status concepts were not adapted.

Figure 3.   SJML icons given at the workshop

First task was to present customer journey for a customer borrowing a paper/electronic book (Figure 4.). The process includes extension of the loan and finishes with when the book is returned. Second task was to present customer journey for a customer ordering a paper/electronic book which the library does not have. The process includes extension of the loan and finishes when the book is returned. Participants were asked to make customer journey maps for the both existing (Figure 4.) and desired book loan service.

Figure 4.   Customer journey maps for a customer borrowing a paper book (up) /electronic book (down) in existing book loan service at the library

The participants had no problems in understanding of SJML and using its symbols. Participants were able to describe and explain the service journey using the given SJML icons. However some of the participants were confused about using the symbols that look similar such as the icon of PC and the icon of web service via PC.

Participants also wanted to draw loops that happen repeatedly. However they did not know how to present this. It was also found that more icons were needed to illustrate library service specific touchpoints. These challenges will be addressed in the next version of SJML.

IV. CONCLUSION AND FUTURE WORK

Services usually have a complex structure with several stakeholders, and their interests are intertwined. Aligning the business processes of an organisation with customers' needs is important for business process management, especially in service field. A good understanding of interactions among the stakeholders involved in service provision and consumption is need for this. Several modelling languages were introduced for business process management and several methods were suggested to support service design process. However, there is a lack of support for describing, communicating and analysing service concepts for stakeholders in a detailed way in order to develop and implement new services and improve existing services.

SJMLv1.0. was developed and tested by adapting information visualisation and visual communication theories together with requirements. We expect that SJML and associated methods can improve business process modelling by alleviating communication problems among different stakeholders.

We are going to develop and evaluate several versions of SJML in an iterative manner. They will be evaluated in collaboration with our industrial partners on real-life services they are providing. A literature review, interviews, prototyping, usability testing, post-mortem analysis and a living lab would be used in further research.

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