

# Requirements Elicitation with a Service Canvas for Packaged Enterprise Systems

Blagovesta Kostova  
LAMS, IC  
EPFL

Lucien Etzlinger  
LAMS, IC  
EPFL

David Derrier  
Nexell GmbH  
Switzerland

Gil Regev  
LAMS, IC  
EPFL

Alain Wegmann  
LAMS, IC  
EPFL

Lausanne, Switzerland blagovesta.pirelli@epfl.ch

Lausanne, Switzerland lucien.etzlinger@epfl.ch

david.derrier@nexell.net

Lausanne, Switzerland gil.regev@epfl.ch

Lausanne, Switzerland alain.wegmann@epfl.ch

**Abstract**—We present a technique for eliciting requirements based on the use of a service canvas and the results of its application in the early phase of a customer relationship management integration project. The project was a collaboration between a research group and two industry partners. We describe (1) our service canvas, (2) how we designed a set of workshops to elicit the requirements, (3) the support tools used for running the workshops, and (4) the resulting canvas, listing the customer relationship management requirements, that was the basis for the project proposal. We explain how, as participant observers, we conducted the project and how we collected and analyzed the data. We describe what worked well and the lessons we learned. We outline some practical problems that remain unsolved.

**Index Terms**—requirements elicitation, service, canvas, workshop, CRM, packaged enterprise system

## I. INTRODUCTION

We present the results of a tripartite project between research and business, in the context of a technology-transfer relationship. The parties of this collaboration were a research group from EPFL, called LAMS, and two industry partners: a customer relationship management (CRM) systems integrator, called Nexell, and their customer, a multinational financial institution that we call AFI. Nexell offers integration consulting services to their clients for CRM systems based on Salesforce.com. The goal of the collaboration was to produce the early requirements for a CRM integration project conducted by Nexell for AFI.

AFI has several thousand employees in more than 40 locations worldwide. The CRM integration project consisted of 14 (fourteen) requirements elicitation workshops, in which around 40 people participated. During the workshops, we employed the service-oriented enterprise architecture method, SEAM, that we developed at LAMS [1].

A CRM integration project is a typical example of the implementation of modern enterprise information systems, in which organizations choose customizable, general-purpose systems (e.g., Salesforce.com, SAP) instead of developing the software from scratch [2]. These organizations seek the services of specialized CRM integrators in order to tailor the CRM system to the organizations' specific needs. CRM integrators must understand what the business requirements are by identifying the expressed – and hidden – expectations that have

triggered the client's decision to initiate a CRM integration project. CRM integrators typically use the following process:

- 1) Analyze the business environment of their clients (as-is analysis)
- 2) Propose a configuration of the CRM system that will fit the organization's needs (to-be proposal)
- 3) Find the intermediary steps of the transition between the current and the future state (gap analysis)
- 4) Setup, configure, and customize the CRM and train key users while providing ongoing support

The problem that we identified and address, in this paper, is based on our observations that, over the years, the customers of CRM integrators are increasingly reluctant to pay for the first three steps of the project. From our experience, this is due to the fact that customers usually know their business well and believe that what they want is what they need. This leads customers to consider CRM requirements elicitation as a pre-sales cost that CRM integrators should cover. Integrators face a challenge in convincing customers to even conduct requirements elicitation. They must either show the value of the elicitation phase or find ways to reduce the time and cost of these steps. Nexell has found that SEAM helps them on both accounts. The involvement of LAMS in this project is centered around the following practical question: “*How do we elicit realistic CRM requirements that fit the client's needs quickly and at low cost?*” In this paper, we provide a detailed account of our collaborative project and our findings from it.

We learned many lessons from our experience. One observation is that even if a client is unwilling, in the beginning, to conduct requirements elicitation, CRM integrators could convince them, but only if (1) the required time is short, (2) the cost is low, and (3) the risk:benefit rationale is convincing. We found that people at every organizational level are willing to share information when the conversation is framed around how they work to deliver value to their customers. We offer practical guidelines on how to organize workshops around the service canvas. We also reason about the combination of techniques (i.e., workshops, interviews, and discussions) that, in our case, yielded enough results. We show how we used a service canvas to aggregate results from multiple workshops, in order to tailor the integration of a CRM.

The structure of the paper is the following. We present related work in Section II. We explain the service canvas and the workshops that we used in the industry project in Section III. In Section IV we describe how we collected the data for the paper. In Section V, we present the CRM project, how we elicited the requirements and the outcome. In Section VI, we present lessons learned from the CRM integration project and reflections regarding the canvas and the workshops. We discuss threats to validity in Section VII. We conclude in Section VIII with open questions and the practical problems that remain.

## II. RELATED WORK ON REQUIREMENTS ELICITATION TECHNIQUES

*State of the Art.* Requirements elicitation is a process of activities, such as understanding the domain, identifying the sources of requirements, analyzing the stakeholders, selecting tools and techniques, and eliciting the requirements [3]. For each activity, there are many requirements elicitation techniques mentioned in the RE literature: for example, introspection, interviews, group work, joint application development, prototyping, protocol analysis, domain analysis, questionnaires, group work, ethnography, apprenticing, task analysis, brainstorming, prototyping, goal-based approaches, scenarios, and viewpoints (cf. [3], [4]). Selecting a technique for each activity is difficult and the mappings are based on literature surveys [3] or on expert advice [5].

Requirements engineers can choose to use a modeling method to guide the requirements elicitation process and to capture the knowledge they obtain from their fieldwork. Some of the best-known examples of such methods in the RE community are the goal-oriented approach  $i^*$ , for early-phase requirements engineering [6], and the value-based method  $e^3$ value [7]. There are studies in the literature that report on case studies (cf. [8],[9]) mostly conducted by researchers specialized in the methods rather than by practitioners.

However, these requirements engineering approaches, and in particular requirements elicitation, are mostly tailored towards classic software development projects. Customizable packaged systems with plug-and-play components (often called commercial-off-the-shelf or packaged enterprise systems) undergo different requirements engineering, implementation, and integration processes [10]. Enterprise systems are information systems that support core business processes: for instance, CRM and enterprise resource planning [11]. There are studies on the differences in requirements evolution for packaged enterprise systems [12], on the specifics in adopting and maintaining such systems [13], and on comparisons between the process of traditional system development and packaged system development [14] among many others.

*State of Practice.* There are 50 techniques in the toolkit for business analysts listed in BABOK [15]. Different techniques are recommended for different activities: for example, the elicitation activity entails preparation for the elicitation with 12 different techniques, conducting the elicitation with 18 different techniques (workshops is one of them), confirmation of the elicitation results with 4 different techniques (workshops

is one of them), and communication of the results with 3 techniques. However, BABOK gives only generic advice on how to use these 50 techniques. Choosing a technique, or a combination of techniques, and how to use it depends on the constraints of each project, the culture of the company, and the experience of the business analyst.

We argue that, based on 50 years of combined industry experience of the co-authors in requirements engineering and business analysis, most early-phase requirements elicitation efforts in industry are ad-hoc and rarely, if ever follow a formalized method. Enterprises often rely on techniques such as interviews, questionnaires, and workshops, that are sometimes centered around a conceptual framework, for example, the customer journey to understand business processes [16], personas [17], mind maps for brainstorming and ideation, and affinity maps for prioritizing and aggregating results. For high-level business requirements, industry players are also familiar with and occasionally use the business model canvas [18].

## III. REQUIREMENTS ELICITATION WORKSHOPS WITH A SERVICE CANVAS

In this section, we describe SEAM, our service method, the canvas, and the tools we use to elicit requirements. We also explain the principles we follow for designing workshops such as those our experience report reflects on.

### A. SEAM and the Service Canvas

The service canvas used during the requirements elicitation workshops has been developed based on the work of our research group. Our service design method, called SEAM, is based on General Systems Thinking and service science [1]. SEAM includes different types of models, viz. behavioral, motivational, and informational. The SEAM behavioral models represent value networks and the service that the value networks provide to their service adopter. The behavioral models are hierarchical, e.g., a value network can be presented as a black-box without any details on how a service is delivered, or as a white-box where these details are visible. The relationship between the white-box and the black-box views is modeled explicitly with another modeling tool called a supplier adopter relationship (SAR) model. The SAR model [19] maps a component that delivers a feature that corresponds to a customer's benefit.

A service canvas is a concise graphical model of a service offering (value proposition) or a service delivery network with the necessary relationships to be able to deliver the service. The most well-known canvas is Osterwalder's business model canvas [18]. The service canvas we describe here is based on the SEAM behavioral model and is used together with the SAR model. It consists of nine elements, specifically, a supplier, the supplier's partners, an adopter, the adopter's influencers, a main competitor, regulators, components provided by the supplier and their partners, features of the service that the supplier gives to their adopter, and benefits that the adopter and their influencers are going to receive by using the service. Figure 1 shows the relationship between the service canvas, the SEAM

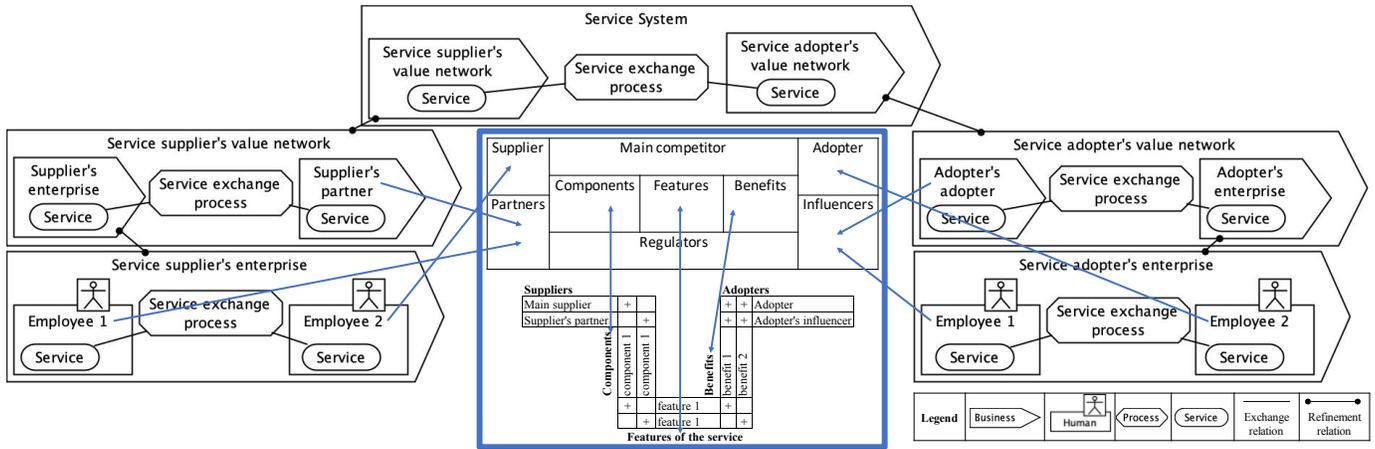


Fig. 1. Relationships between the SEAM behavioral models, the service canvas, and the supplier-adopter relationship model.

behavioral models, and the SAR model. Based on the notion of a value network, some elements in the canvas are implicitly logically connected, but the canvas shows only blocks without relationships. Based on the hierarchical representation from the SEAM behavioral model, the supplier and the partners, as well as the adopter and the influencers represent different value networks. We could depict the different entities at different levels as well as show the regulators and the main competitors in the behavioral models. For the sake of readability, we omitted these details from the models shown.

The SAR model details the service exchange relationship between an adopter and a provider of a service. The service provided by the supplier is modeled by its features that stem from components provided by the supplier's value network (either the supplier or any of their partners), and these features provide a benefit to the service adopter's value network (either the adopter or any of their influencers). The SAR maps to additional annotations in the behavioral model, cf. [19].

Figure 2 depicts how to relate hierarchical canvases. The logic follows the hierarchical decomposition of the SEAM behavioral model. These relationships include (1) a component from the first level becomes the service that is modeled in the second level, (2) the first-level supplier is an adopter in the second level service, (3) the adopter of the business service becomes an influencer, (4) one of the first-level partners becomes the supplier of the second-level service, (5) the other

partners might become influencers but not necessarily, and (6) the features of the first-level canvas relate to the benefits for the second-level adopters.

The main benefits of the canvas are that it (1) simplifies the original service models to a form understandable without prior tutoring, (2) supports collaborative work via an online-based tool, (3) shows the hierarchy of service systems and their relationships easily but still separates the levels visually, and (4) can be used without introducing any theory.

### B. The Design of the Service-Canvas Workshops

We elicited requirements via workshops. The objectives of the workshops are to put people together and to structure their perspectives over the CRM and the way they work around a service canvas. The basic guidelines that we follow when designing the workshops in our case study are as follows:

#### Planning Guideline 1: Understand the organizational chart.

The first place to look to decide who to invite and how many workshops to plan is the organizational chart. If the company is a small or medium enterprise, there might not be many stakeholders and only a few workshops will suffice. If the company resembles AFI, the workshops should capture different geographies, business units, and hierarchical levels.

#### Planning Guideline 2: Split management from operations.

The two levels have different objectives. The alignment between the two levels does not come from bringing people in the same workshops but from the structured findings from the workshop. The management level has strategic objectives and different requirements for the CRM, e.g., monitoring key performance indicators and daily activities. The operational level works directly with the CRM and interacts with the system for their daily activities. These goals might compete or conflict with each other. Hence, a workshop for each of the levels clarifies the expectations of the two groups of CRM stakeholders and ensures further alignment and consistency.

#### Planning Guideline 3. Gather a small representative sample with knowledge and experience in the process.

Our experience shows that there is no need to have more than 8 people in a workshop. At the management level, one

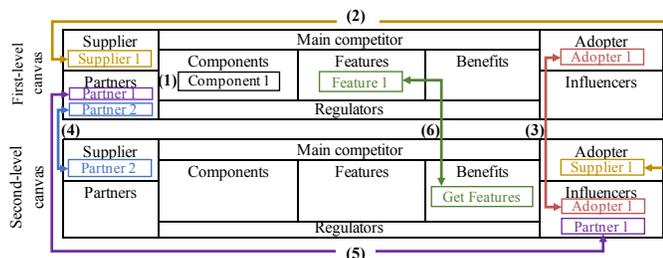


Fig. 2. Relationship between a first-level canvas and a second-level canvas.

or two participants might be from the operational level. Yet, there should be more higher managers than other participants, so they can provide feedback from the point of view of their group. However, at the operational level there is no need for managers from the higher levels but only a direct manager who knows the daily activities and the needs of their teams.

*Execution Guideline 1: Start the conversation with what value customers and their influencers (often, their own customers) expect from the service exchange.*

The main focus of the workshops is the services the company provides to their customer and how a CRM could help with this. The service canvas brings the customer to the forefront: How do they benefit from using the services, why do they choose these services, and who influences them?

*Execution Guideline 2: End the conversation with how to deliver the value that the adopter and their influencers expect.*

The discussion in the workshops should lead to an understanding of what the internal structure of the company's value network should be in order to meet the customer's expectations. Focusing the attention on how to deliver what the customer wants, helps the participants to learn how to work to deliver that value.

### C. From A Canvas to Requirements

The service canvas enables the transition from a canvas to a list of requirements for the IT system. First, the structure of the canvas captures both why a service adopter would use a service and what features that service needs to provide to satisfy the adopter. Based on the features of the service, the service provider(s) can enlist the requirements (both functional and non-functional) that would deliver the desired features. The service components are the primary construct to capture the requirements for the system. The way to prioritize requirements is to take into account: (1) how much benefit the delivery of this component would bring to the service adopter, (2) how easy it is to actually deliver the components, and (3) what dependencies there are between the components. This cost-benefit and dependency analysis can be captured with labels and the requirements list can be sorted based on this prioritization technique. Second, the level of granularity of the components has to be similar. For instance, for a packaged system, the components of the service map to the configurable modules of the system.

### D. Supporting Tools

The use of the canvas is facilitated by a web-based tool. The tool helps workshop facilitators to structure and to document the requirements gathered during workshops. The collaborative online tool also helps multinational organizations to work together because there is no need for all workshop participants to be physically present. Thus, more stakeholders, who have valuable input, and are from different countries, can attend the workshops. Computer-aided service design speeds up both the canvas creation and modification for the users and the consequent review of the gathered requirements with other stakeholders. The first-level canvas is used to create the

skeleton of the second-level canvas based on the refinement shown in Figure 2.

## IV. DATA COLLECTION AND ANALYSIS

The method we used to study the business environment is action research [20]. Action research differs from other research strategies by being an active-participation research method. More concretely, our study is based on participant observation because the researchers have a double role: (1) an active participant and (2) a researcher observer. The first author observed how the workshop participants and Nexell's team interacted during the workshops but she was also a part of Nexell's team. Participant observation is an ethnographic approach for collecting data by participating in the daily life of a social group. Participant observation lies on a continuum between a pure participant and pure observation [21]. The direct involvement and the active role of a researcher in the process preserve the authenticity of the data as the researcher understands better the context in which the artifacts (notes, emails, etc.) came into existence. Field notes are a written representation of the day-to-day observations of the events and people; the notes can be studied at a later stage [22].

We consider the data collection and analysis to be an integral part of our experience because we are applying an academic method in the industry. Here, to provide the context of the experience, we also describe the roles of the authors. The first author participated in the requirements elicitation phase of the CRM integration project for AFI and is a part of the research group. The second and third authors were a part of Nexell's team during the CRM integration project. The second, the fourth and the fifth authors developed the service canvas. The fifth author is the creator of SEAM.

*Data Collection.* The first author collected data (notes, service-oriented canvases, documents, e-mails) by participating in the requirements elicitation phase and by closely collaborating with the second and the third author to clarify, analyze, and follow the entire CRM project development. AFI was aware that she was from academia and that Nexell collaborated with a research group to use a service method in the requirements elicitation phase. Table I details the number of facilitators, workshops, participants, and the duration for each location, where we conducted workshops.

TABLE I  
WORKSHOPS PARTICIPANTS BREAKDOWN

Location	Nexell/LAMS	# of AFI participants	# of workshops	Days
Amsterdam	3 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> authors	10	2	2
Hong Kong	2 1 <sup>st</sup> and 3 <sup>rd</sup> authors	15	6	3
Poland, the UK, the Netherlands (all remote)	2 2 <sup>nd</sup> and 3 <sup>rd</sup> authors	10	6	2
<b>Total</b>	<b>3</b>	<b>40</b>	<b>14</b>	<b>7</b>

At the end of the workshops at each location, the project team communicated the results of the workshops to the local AFI executive manager by presenting a succinct description of the situation and asking for their own goals. These discussions served to elicit the expectations of the managers and to understand the key success factors for them. The second and the third authors aggregated all 14 canvases after the end of the requirements elicitation workshops, together with the AFI project manager. For this paper, we had access to all canvases, notes, e-mails, and our own experiences.

During these meetings, the first author took notes. She wrote down what happened in the room, without analyzing the situation on the spot. During a workshop or an interview, she wrote context-dependent information: the names of everyone present in the room, the place, and what kind of questions and/or answers were exchanged. She observed the group dynamics and how participants came to a consensus. She also took part in informal conversations between the Nexell and AFI representatives.

*Data Analysis.* The collected data were analyzed by first sharing observations between all members of the Nexell team at the end of every workshop. Next, at the end of each day, the Nexell team discussed the results with their general manager. After the requirements elicitation phase, the first author used her notes to analyze the canvases that were created: how detailed were they, how were coherent the canvases between business units? With the help of these data, we analyzed the results of the service canvas and the workshops. Later, all of the authors discussed the requirements elicitation methods and the lessons learned from the experience. The Nexell team also communicated with AFI their impressions and experience from the requirements elicitation phase.

## V. APPLICATION IN A LARGE-SCALE CRM PROJECT

### A. Presentation of the Company

The AFI organization was established approximately a decade ago. Its main activity is financial services, including asset management, corporate finances, individual finances, company incorporation, legal and fiduciary services, and investments. AFI has thousands of employees in more than forty countries. The company's growth strategy was based on external growth with an average of four new acquisitions per year for ten years. The acquisitions were not accompanied by a change of the business processes to integrate the newcomers. This strategy led to dissimilar operations across AFI.

AFI's organizational chart is depicted in Figure 3. The highest is top management. Below the top management, there are regional managers who oversee the company's activities within a region (e.g., Europe, Asia, the USA). Each business unit has one worldwide manager, multiple regional managers, and many business developers (matrix organization). There are four business units: private clients, corporate clients, company incorporation, and investments. Not all countries have all four units. The business developers within the business units are the end-users of the CRM system. Marketing, finance, and IT systems are the three cross-organizational departments.

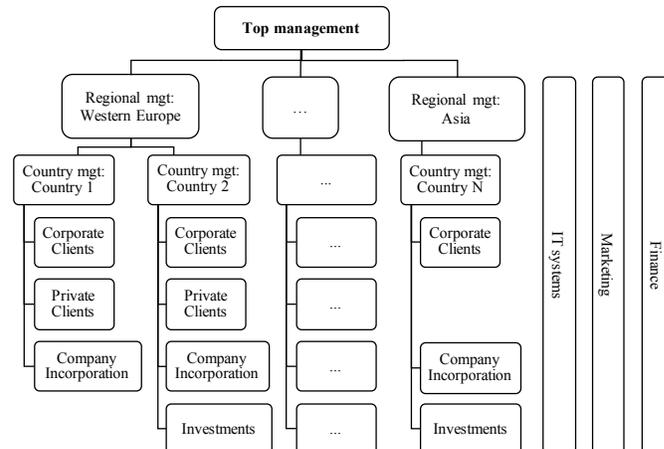


Fig. 3. AFI's organizational chart (the ... symbol stands for other regions where AFI operates).

### B. Presentation of the CRM Project

1) *The Problems:* The problem AFI faced, and decided to solve by adopting a CRM system, was the lack of coherent customer information and the impossibility of tracking revenues, costs, lifetime values, and referrals. For example, an international customer might interact with the business unit *corporate clients* from country 1 and with business unit *corporate clients* from country 2. These units would not be able to share client information. They would have to rely on the client to share it. The same applied to clients who interacted with different business units that were in the same country. A CRM system would enable information sharing of AFI's customers between the business units from the different regions and among the business units. This would reduce costs by avoiding duplicated efforts (e.g., legal services), by providing more precise estimations on customer acquisition/retention costs and customer lifetime values. It would possibly increase sales by cross-selling (selling different services) and up-selling (increasing the purchases of existing customers).

AFI previously attempted, twice, to integrate a CRM, but unsuccessfully. From our observations, AFI had limited knowledge of what went wrong with the previous two projects<sup>1</sup>. AFI explained the failures to be due to the fact that CRM integration projects were regional projects that started, due to company acquisitions and due to a CRM system that was already in place, when they bought the companies.

2) *The Project Settings:* AFI planned two phases for the CRM integration project: (1) a request for proposal (RFP) to select an integrator and (2) the CRM integration. AFI did not dedicate time for eliciting the CRM requirements. The requirements for the CRM were collected via an e-mail to the managers of the business units. AFI provided the spreadsheet as an input to the companies who submitted RFPs. Any elicitation of the requirements had to be quick and effective.

<sup>1</sup> AFI's CRM project manager had joined AFI a few months before the start of the project and had not been involved in the previous CRM integration attempts. In fact, the CRM integration was their first AFI project.

During the RFP phase, AFI asked five potential integrators for their proposals for a CRM integration proposal, cost estimates and a delivery time. Two integrators included in their proposals a requirements elicitation phase. This prompted AFI to dedicate time for eliciting requirements, but they still severely limited the time because their understanding was that the requirements for the CRM were clear. The overall CRM project was then split into three phases: (1) an RFP, (2) a requirements elicitation phase, where the selected integrator identified the main features of the CRM, which should be included, and where it developed a full project proposal, including a road map for implementation, cost estimates, and a delivery time, and (3) the CRM integration. Nexell faced the challenge of understanding the business environment of AFI within a limited time frame (two months) with limited exposure to business stakeholders and CRM users (because people were not available on a short notice) and within a tight budget. Nexell won the requirements phase but had to compete again for the implementation phase, which they also won.

Ultimately AFI agreed to split the CRM integration project into multiple phases because of the favorable risk:benefit analysis. First, the requirements elicitation phase was self-contained and short (two months), compared to the overall project time-span (two years), and the cost of the phase was approximately 15 times less than the most modest cost estimation of the entire integration. AFI could choose another CRM integrator for the final integration phase, as the output of the requirements elicitation phase was generic and another vendor could use it as an input. Hence, AFI mitigated the risk of choosing an unknown integrator for the entire project. Second, Nexell needed to understand AFI and their business process in order to be able to prepare a proposal that was not over- or under-estimated in terms of business and technical issues, time, and costs. Without careful elicitation of the requirements, Nexell faced the possibility of inaccurate ‘to-be’ analysis and a high chance of the CRM specification not fitting the needs of AFI. Thus, the requirements elicitation phase mitigated the risk for Nexell as well.

During the requirements elicitation phase, Nexell used workshops, based on the service canvas, defined the key success factors for the CRM project (according to the different stakeholders), understood the environment, and estimated costs and delivery time. Nexell had to find the CRM features from a representative sample across countries and had to aggregate them into one model. We planned the workshops, based on the organizational chart and participants’ availability. The Amsterdam and the Hong Kong offices were chosen by AFI. Then, Nexell aligned the aggregated business units’ requirements into an overall AFI’s service model. From the aggregated service model, Nexell developed the CRM specification and the project proposal. AFI accepted the project proposal.

### *C. Design of the Workshops for AFI*

We considered two levels from which to choose participants for the workshops: (1) the level in which the AFI’s business developers interacted with AFI’s customer and used the CRM

to support the interaction, and (2) the level in which Nexell provided the CRM system as a service to the AFI’s business developers as CRM users. The workshops were facilitated by the third author.

We conducted fourteen workshops in total: four workshops with business unit managers (management or first-level workshops), eight with business developers (CRM or second-level workshops), and two workshops with the marketing and the finance departments. We created a canvas for each workshop, resulting in fourteen canvases. The number of workshops reflects the organizational chart of AFI and the access we had to AFI’s employees. There needed to be at least two workshops (management and CRM) for each of the four business units, or a minimum of eight workshops. We repeated the CRM workshops with participants from two geographical regions in order to capture the differences and similarities of the operational process between regions. The remaining workshops were with the cross-organizational departments who were going to be direct users of the CRM system, namely, marketing and finance.

At first, we conducted workshops with the management level of a business unit in each country. These workshops showed the expectations of the management towards the business units’ performance and the role of the CRM as a tool to achieve these expectations. As a next step, we did workshops with the operational level of the same business unit. These CRM-level workshops focused on gathering the requirements on the specifics of the work process and the expectations for the CRM capabilities. The CRM-level workshops were driven by the features that Salesforce.com can deliver, e.g., e-mail integration, accounts. The modular structure of Salesforce.com allowed Nexell to derive – from the benefits for the business developers (e.g., “save time”) and the features of the CRM – the specific components of the Salesforce.com platform. We also discussed the information systems in place with representatives from the IT systems unit. We collected feedback from interviews with two regional managers from Amsterdam and Hong Kong. After all workshops, Nexell’s team together with AFI’s project manager analyzed all fourteen canvases and merged them into one single canvas that contains the set of features for the CRM system.

### *D. Workshops at the Management Level*

In the management-level workshops, we invited people from the top management and the regional managers, who could articulate the services that the company provided to their customers. We conducted four management-level workshops: one for each business unit of AFI. For example, at a management-level workshop for the company incorporation (CI) business unit, we would fill a canvas such as Figure 4. The service provided by CI to its clients was to create one or several companies for them (mostly done for international expansion). The discussions at the workshop started with questions about who the customer of CI was. During the workshop, the facilitator asked participants to use the name of a real customer. The facilitator filled the customer’s name,

called Bob here, and their company. Our assumption, based on the work of Barsalou on grounded cognition [23], is that using a real customer’s name helps participants relate to their experience and feel involved as the context is closer to them.

Bob represented an intermediary company, who would offer a package of international company expansion services to their own clients. Bob’s company would use the services of AFI’s CI to incorporate the company but would turn to other vendors, for example, for legal services. The workshops participants had to refer to the business process of Bob’s company to come up with influencers. Often it was the clients of Bob.

The next step was for participants to identify what the benefits for Bob were, for instance, to comply with local laws or to expand internationally. The facilitator asked participants to think of who could influence Bob. The benefits for Bob and their influencers connected to the features of the service that AFI provided. One or more components were “responsible” for delivering each service feature. The components were provided either by the supplier of the service, e.g., Alice, a business developer from CI or by a partner. The partners of the supplier could be either internal to the organization (e.g., Chris, Alice’s team manager), or external (e.g., Nexell). We captured the relationship between the different canvas elements in a SAR in the online tool (Figure 5). The management-level workshops showed the managers’ perceptions of the services that AFI delivered to their clients. In these service canvases, Nexell is a partner of the business developer. The service canvas describes the CRM system in the context in which it will be used.

*E. Workshops at the CRM Level*

Next, we conducted CRM-level workshops with the business developers, the CRM system users, and their immediate team managers. In these workshops, we elicited requirements for the CRM system based on the day-to-day work activities and how the CRM system would accommodate these. We conducted eight CRM-level workshops in total or two workshops for each of the four business units of AFI. For CRM-level workshop we started from the decomposition from the management-level canvas.

Figure 6 depicts an example canvas of CI’s service organization captured during a CRM-level workshop. The online tool would already automatically pre-fill the CRM-level canvas based on the relationships described in Figure 2. In these workshops, Nexell is the service supplier and the CRM system is the service. The service adopter is Alice because the end CRM system user is Alice. We model the CRM system (which was

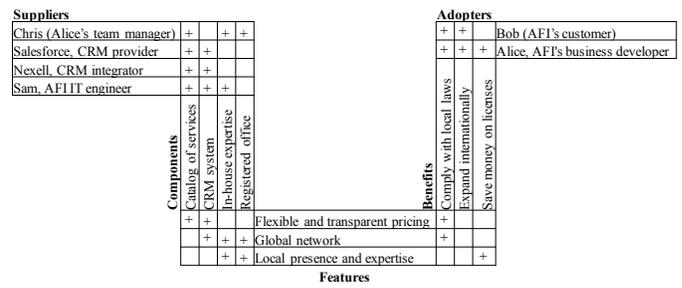


Fig. 5. A Supplier adopter relationship (SAR) model for the management-level workshop of the Company Incorporation business unit.

a component in the first-level canvas) as a service that Nexell provides to Alice. The influencers of Alice can be actors from the business level partners, the adopter of Alice’s service, or other external actors not captured in the management-level workshop. The benefits of using the CRM system for the CI business developers were primarily to have various automation tasks that the CRM’s features could execute and to save time by using a centralized data repository.

The most important features of the CRM system were identified to be customer profiling, leads management, and pipeline management. Nexell’s team was responsible for populating the components of the service offering. These components need to correspond to the features that the end-user of the CRM system needs. The components come directly from the configurable Salesforce’s components. The facilitator filled these components independently after the workshops.

1) *Workshops with the cross-organizational units (marketing, finance, IT systems):* We conducted service-canvas workshops with two additional business units, marketing, and finance, without dividing them into two-level workshops. The two units operated across the organization and supported globally the operations of the four main business units. Both units had to use the CRM system. The marketing unit was the one who generated customer leads and needed to input them in the CRM system. For them, it was important to track the return on their campaigns and events (by tracking generated leads at each campaign and conversion rates of leads into paying customers). The finance unit was mainly concerned with the key performance indicators (i.e., a contract has been paid, not only signed). Their use of the CRM system was mainly for the purposes of auditing and control.

With the IT systems unit, we conducted two free-style

<b>Supplier</b> Alice, AFI’s biz developer	<b>Main competitor</b> SomeFinCorp, a financial company			<b>Adopter</b> Bob, AFI’s customer
<b>Partners</b> • Nexell • Salesforce • Chris, Alice’s manager	<b>Components</b> • Catalog of services • CRM platform • In-house expertise	<b>Features</b> • Global network • Flexible pricing • Local expertise	<b>Benefits</b> • Comply with local laws • Save on licenses • Expand internationally	<b>Influencers</b> Bob’s client
	<b>Regulators</b> Local authorities			

Fig. 4. The company incorporation management-level service canvas.

<b>Supplier</b> Nexell	<b>Main competitor</b> e-mails and document sharing			<b>Adopter</b> Alice, AFI’s biz developer
<b>Partners</b> Salesforce	<b>Components</b> • Salesforce parts (i.e., Accounts, Contacts, Leads)	<b>Features</b> • Customer profiling • Leads management • Pipeline management	<b>Benefits</b> • Info in one place • Save time while building proposals	<b>Influencers</b> • Bob, AFI’s customer • Chris, Alice’s manager
	<b>Regulators</b> Local authorities			

Fig. 6. The company incorporation CRM-level service canvas.

workshops (not counted in the total of fourteen workshops) to review the canvases from the CRM-level workshops and to gather information about the various systems that the CRM system would need to integrate with. We chose this format because this unit was not a direct user of the CRM but was a partner of Nexell in integrating the CRM system in AFI. For this reason, we decided to ask about the current systems in place, which all other participants used. The IT unit was cross-business-unit and each regional office had one.

#### *F. Canvas Aggregation and Project Proposal*

After the workshop phase was completed, Nexell's team had to prepare a project proposal. The end result was that AFI chose Nexell to integrate the CRM system and accepted the project proposal. The project proposal was based on all fourteen canvases but in an aggregated form. The project proposal included a road map for integrating continuously CRM components and a detailed analysis of the AFI environments with justification for why each of the components had been included, a plan for the training of the users, and other miscellaneous details on the Salesforce.com capabilities.

We conducted a two-day working session with the project manager of AFI to merge the canvases. The strategy to aggregate the canvases was to start from the common items at each business unit and to look into the two levels separately. The structure of the service canvas made it possible to work with similar requirements. First, we merged the canvases from the duplicated CRM-level workshops of each unit. We created an expanded canvas with all the service components listed in both CRM-level canvases. Then, we added in the aggregated canvas all features and removed the most similar ones. Next was the benefits for the user, and from those, we kept all except obvious duplicates. In the CRM-level canvases, the components of the service were mostly Salesforce.com components. One of the few exceptions was the custom data adapter that Nexell had to develop to populate the CRM with historical records. The standardized components architecture helped us create a single CRM-level canvas per business unit. We used the same schema for merging the CRM-level canvases from different business units. The resulting aggregated canvas had 30 components, 27 features, and 16 benefits. We loosely followed the aggregation schema for the management-level canvases. From these, we extracted mainly the opportunities and the risks that AFI would be able to address.

Based on the aggregated canvas, we created a project proposal that included a detailed analysis of the strategic vision and a road map for integrating the CRM system. The road map included a monthly delivery plan for each of the 30 components from the aggregated canvas with the dependencies between components. For example, the CRM component 'activity tracking' had to be delivered before 'e-mail sync' so they were scheduled two months apart. For each component, we also included two labels: business value and complexity, which we coded with values *very low*, *low*, *medium*, *high*, *very high*. The business value label indicated the number of times the component was listed in the original canvases (which indicated

the benefits that the component would deliver to the CRM user via the SAR model). The complexity label indicated the technical or organizational complexity for integrating the components as identified from the requirements elicitation phase and the experience of Nexell's team. This points-based system enabled us to plan for a balanced integration of components that would yield benefits from the beginning. For example, the component 'multi-currency' had a very high business value and a very low complexity, thus it was scheduled for month 1. The project proposal was accepted by AFI and Nexell followed with little deviation the road map during the integration phase (which is now over).

#### VI. REFLECTIONS AND LESSONS LEARNED

*Requirements engineering, and requirements elicitation in particular are not a given in industry projects.* Companies assume that they already know what they want from a system. In our case, AFI had collected requirements via an e-mail and three out of the five initial bidders agreed to proceed with the integration based on the list of features collected via the e-mail. Dedicating time and resources to elicit requirements might seem unnecessary and wasteful to enterprises. Requirements-aware practitioners often need to advocate for conducting requirements elicitation, and requirements engineering altogether and for dedicating time and resources to formalize, structure, and manage the requirements elicitation process. It is a non-trivial question, for both academia and industry, how to show the value of RE up-front when the return on the investment might be visible only later on.

*Yet, it is still possible to convince your customers to conduct requirements elicitation.* What you need to propose in return is fast, low-cost, and reasonable specifications from the requirements elicitation phase. This is not a single phase and continues throughout the entire project. However, in an unknown environment with many stakeholders, not conducting a feasibility study and not planning a realistic project delivery in a dedicated phase is risky in most cases. Nexell convinced AFI to split the CRM integration into two parts and to dedicate time for eliciting requirements. The requirements elicitation phase lasted two months compared to two years for the entire project. It cost 15 times less than the entire project's budget. The cost-benefit ratio was favorable because it helped AFI to mitigate the risk of choosing a supplier they did not know for the entire project. With the integration phase over, we have seen that the requirements produced during the requirements elicitation phase and the road map were followed closely.

Throughout the requirements elicitation phase, we sought feedback from the project manager and other top managers on how they felt about the process. Most of AFI's managers were not enthusiastic about this phase at the beginning. They perceived the workshops as a waste of time. They already believed they had all the requirements for the CRM in a spreadsheet created from a company-wide email in which all managers expressed their needs. After going through the workshops, the managers' attitude was much more positive. They saw that there were discrepancies between regions and

business units that they initially collected requirements did not capture. By sifting out the CRM requirements at this early stage, the success of the project was more likely. Top-management recognized that the method was delivering results in terms of aligning people's expectations of the CRM and getting them on board with the change of the operational process that the CRM would require.

*Any workshop might have worked but a focused workshop works better.* We are convinced that other types of workshops might have resulted in a similar outcome. Getting people in a room to talk to each other about their expectations, needs, and pains is a known recipe for creating a shared view. However, an unfocused approach is unlikely to yield quick results for specifying a CRM project under heavy availability constraints. What the service canvas and the two-tiered structure allowed was to speed up the process by engaging a representative sample of people in the requirements elicitation phase and to remove heterogeneous forms of expressing requirements. Speed and cost are critical for such projects, and for that, the results should come as soon as possible. We still had to combine the workshops with other techniques during the requirements elicitation, mostly interviews. Yet, we used the service canvas and the two-tiered workshops as the main elicitation technique but validated and complemented our findings with the other techniques.

*The service paradigm helps people externalize their needs by explaining how they work through the prism of what value they provide to their clients.* The notion of what service to provide to clients shifts the conversation from explicit needs ("I need this") to implicit needs ("This is how I work and the CRM system has to support me"). Employees might not be comfortable or able to express their needs explicitly or in front of managers. With the two-tiered structure of the workshops and the service canvas, the topic of the conversation was how to deliver value to customers. This service-dominant view of the business allowed employees to voice their needs by describing how they worked. A CRM is foremost a service-oriented strategy that a company adopts. As such, it highlights the services that the company has to deliver [24].

The canvas structure and the conversation during the workshops employed the service-dominant logic: we shifted the focus from AFI's business developer's day-to-day activities to the value AFI provided to its customers. This external focus (why the work is being done) helped the participants to create an imaginary "to-be" environment to support these day-to-day activities with the help of a CRM system. Our experience was that most of the workshops participants actively collaborated and contributed openly to fill the canvases.

This, in essence, is the implementation of Zave and Jackson's second recommendation to describe the organization without and with the system [25]. The canvas focused the discussion during the workshops on the environment of the CRM system and made it possible to define requirements for it. The workshops participants had different visibility of the AFI processes and their accounts provided a more complete description of the business process. For example,

at a CRM-level workshop, a business developer shared the process of obtaining clients' records: e-mailing and calling another person. A representative from the IT unit knew where the records originated from (an IT system). Thus, to speed up the process of record retrieval, Nexell understood that the CRM had to connect to this specific IT system.

*Employees' and not only management's buy-in.* Management buy-in is a key success factor for a CRM system [26], [27] and for any enterprise system [28] but is on its own insufficient: employees' buy-in is just as important. Top-tier managers are not essential participants in the workshops but it is key to align their strategic view for the CRM with the rest of the company. The two-tiered workshop structure allowed the two levels, management and operations, to "talk" to each other and voice their expectations for a CRM that would support both groups' activities. In the management workshops, the managers were in the middle-tier of the organizational chart. They managed the teams of business developers and had to directly interact with the CRM system. For the middle-managers, it was important to voice their needs because they were end-users of the CRM.

For the top-managers, who were in charge of regions and the global organization, we employed a different strategy. Instead of inviting them to the workshops, we presented our findings to them and collected their feedback. The regular contact with the top-managers also ensured finding additional constraints and resources, such as the budget and the scope of the CRM integration project, the performance indicators that they wanted to monitor from the CRM system, and additional people who Nexell needed to talk to. The only top-manager who we included in the first management-level workshop was the Chief Information Officer who was the main sponsor of the CRM integration project.

Functional, geographical and hierarchical misalignments are not an AFI-specific problem but are observable in many companies with the same profile [29]. We addressed this problem with the two-level workshops; they helped to elicit requirements from both perspectives and to align the expectations, which ultimately led to a shared vision and buy-in from both managers and employees about the CRM system.

*Packaged enterprise systems entail process re-design but remove the question of technical feasibility.* A CRM integration project is a business process re-design project [26]. As such it is tightly coupled with the information technology that a company adopts [30]. Moreover, an IT system can either support or hinder the adoption of the process re-design [30]. Packaged systems, such as Salesforce.com, help homogenize heterogeneous business processes in multinational companies. These systems propose a standardized way of working, which is an established good practice in the industry. If the company was to implement a CRM, they would have had to build from scratch what Salesforce.com has already had for years.

In the case of AFI, the workshops were designed to engage people in the CRM integration project. The conversations at the workshops were centered around expectations and daily activities. The main goal was to get people on board with the

new way of working that the adoption of a packaged system meant. The workshops did not need to revolve around technical requirements because integrating a mature packaged enterprise system removes the uncertainty about technical feasibility.

*The service canvas structure was key for aggregating all requirements.* The canvas design and use were a prerequisite for creating a single paramount canvas. The canvas captures by design similarly framed requirements. The predefined structure made it possible to create a single canvas that corresponded to all business units. The merge was done after all workshops were conducted and allowed Nexell’s team to prioritize the features of the CRM that needed to be delivered first.

*Requirements elicitation is an iterative process of managing change.* The challenges for a CRM integration project in a multinational company with thousands of employees are not only technical but organizational. As the scope of the project is large, the requirements elicitation process has to start with assessing the feasibility of the project, defining the scope, and estimating the time and the cost. Only then, the integrator can proceed with eliciting fine-grained technical requirements. Nexell continued refining the technical requirements for the CRM system (e.g., define the API that will populate the Salesforce.com instance with historical data).

The challenge lies in the change that a CRM system introduces. This change has to be managed and for this reason, it is important to engage key users and to acquire the high management’s support [31]. By managing the change explicitly and from the beginning of the project, we managed to get management and operation to share their expectations and to commit to the project because they felt they had a stake at it, as they shared with us after the workshops.

*Application in other contexts.* Our method for requirements elicitation could be used for other packaged systems as well as for bespoke software development, e.g., in digital transformation, enterprise resource planning systems. The CRM integration project is an example of how our method could be used in other projects because it spans the entire business process of an enterprise. Our method builds a common understanding between stakeholders on how they work and what an IT system should help them achieve, and therefore, is suitable for requirements elicitation in other contexts.

## VII. THREATS TO VALIDITY

This paper is built on a single case study and the results from the requirements elicitation method might not be reproducible or we might not be able to apply the same technique in another context. We note that validity is an elusive concept in qualitative research, which can be mediated by diligently documenting how data have been collected, analyzed, and interpreted [32]. We are not able to conclusively determine cause-and-effect relationships, based on this case study because we cannot control all the extraneous variables. But, we reflect on the limitations of our work based on [33]. For example, regarding threats to conclusion validity, we might have misinterpreted the positive outcome of the project proposal and attributed some of its success falsely to the

requirements elicitation that we conducted. We modified our approach, along with the project, and employed not only two-tier workshops but also other techniques so as not to be isolated in a single construct. This is a threat to the validity of our construct; the effects we observed might be a result of the interaction of different techniques or of the interference between the use of the technique and the measurement of its success by a researcher (interaction of testing and treatment). Also, our construct, the service canvas and the workshops, are only one possible way of conducting service-oriented requirements elicitation, against which our data should be compared. Regarding the external validity threats, we cannot conclude that such requirement elicitation would produce the same effect if we vary the people, the settings of the project, etc. Our other experiences, however, show that the same approach with some variations could be used in other projects, which would be an avenue for exploration.

We note that our contribution offers observational evidence from a primary study on how practitioners can use a service-oriented approach for requirements elicitation for packaged systems [34]. Single case studies are a necessary building block toward a coherent formalized theory that could be applied broadly. One of the main limitations of single data points, especially in qualitative research, is that they are insufficient for drawing causal relationships. Nonetheless, we deduce that, based on our experience, conducting the workshops (possible cause) led to an accepted CRM integration project proposal and successful integration of the CRM system (effect). The threats to the internal validity are that the workshops were irrelevant and the same would have happened without them, or with a different treatment. We believe this is not the case because we have, as a baseline, the two failed attempts of CRM interactions that were managed differently.

## VIII. CONCLUSION AND FUTURE WORK

In this paper, we have presented a method for requirements elicitation based on workshops that were supported by a service canvas. We have described a collaborative project between our research group and two industry partners. We have described two levels of the workshops, management and operational, and how these workshops helped to align stakeholders’ expectations. We have also discussed how the service canvases were merged into an aggregated one that served to plan a road map for integrating the CRM. Nexell followed the road map closely. We have observed a practical problem that practitioners face: convincing enterprises to even consider conducting requirements elicitation. We believe that the challenge is not specific to the case we have presented here but it is an industry-wide phenomenon that requires the attention of both the academic and the industry communities.

During the CRM integration phase, Nexell needed to collect more requirements for technical implementation. Nexell’s software developers worked with a fine-grained specification of the CRM, which the project definition phase only outlined. For future work, we are interested in learning how to continue eliciting requirements for technical requirements.

## ACKNOWLEDGMENTS

We would like to thank John Sas from Nexell for supporting the collaboration between Nexell and LAMS. We are thankful to the AFI CRM project manager and all AFI employees, who participated in the requirements elicitation process, for sharing their experience. We also thank the RE 2019 mentors, Shaukat Ali and Nan Niu, as well as Jolita Ralyte, Irina Rychkova, Solal Pirelli, James C. Davis, and the anonymous reviewers for providing invaluable feedback during the writing of the paper.

## REFERENCES

- [1] A. Wegmann, "On the systemic enterprise architecture methodology (SEAM)," in *ICEIS 2003, Proceedings of the 5th International Conference on Enterprise Information Systems, Angers, France, April 22-26, 2003*, 2003, pp. 483–490.
- [2] P. Melgarejo, "Worldwide software 2012-2016 forecast summary," Framingham, MA, USA, IDC, 2012.
- [3] D. Zowghi and C. Coulin, "Requirements elicitation: A survey of techniques, approaches, and tools," in *Engineering and managing software requirements*. Springer, 2005, pp. 19–46.
- [4] J. A. Goguen and C. Linde, "Techniques for requirements elicitation," in *[1993] Proceedings of the IEEE International Symposium on Requirements Engineering*. IEEE, 1993, pp. 152–164.
- [5] A. M. Hickey and A. M. Davis, "Elicitation technique selection: how do experts do it?" in *Proceedings. 11th IEEE International Requirements Engineering Conference, 2003*. IEEE, 2003, pp. 169–178.
- [6] E. S. Yu, "Towards modelling and reasoning support for early-phase requirements engineering," in *Proceedings of ISRE'97: 3rd IEEE International Symposium on Requirements Engineering*. IEEE, 1997, pp. 226–235.
- [7] J. Gordijn and J. Akkermans, "Value-based requirements engineering: exploring innovative e-commerce ideas," *Requirements engineering*, vol. 8, no. 2, pp. 114–134, 2003.
- [8] J. Horkoff, J. Lindman, I. Hammouda, and E. Knauss, "Experiences applying e3value modeling in a cross-company study," in *International Conference on Conceptual Modeling*. Springer, 2018, pp. 610–625.
- [9] C. Kort and J. Gordijn, "Modeling strategic partnerships using the e3value ontology: A field study in the banking industry," in *Handbook of ontologies for business interaction*. IGI Global, 2008, pp. 310–325.
- [10] H. C. Lucas Jr, E. J. Walton, and M. J. Ginzberg, "Implementing packaged software," *MIS quarterly*, pp. 537–549, 1988.
- [11] P. B. Seddon, C. Calvert, and S. Yang, "A multi-project model of key factors affecting organizational benefits from enterprise systems," *MIS quarterly*, vol. 34, no. 2, pp. 305–328, 2010.
- [12] S. Schneider, J. Wollersheim, H. Krcmar, and A. Sunyaev, "How do requirements evolve over time? A case study investigating the role of context and experiences in the evolution of enterprise software requirements," *Journal of Information Technology*, vol. 33, no. 2, pp. 151–170, 2018.
- [13] B. Light, "The maintenance implications of the customization of ERP software," *Journal of software maintenance and evolution: research and practice*, vol. 13, no. 6, pp. 415–429, 2001.
- [14] S. Sawyer, "Packaged software: implications of the differences from custom approaches to software development," *European journal of information systems*, vol. 9, no. 1, pp. 47–58, 2000.
- [15] IIBA, *A guide to the business analysis body of knowledge (BABOK Guide)*. International Institute of Business Analysis, 2015.
- [16] K. N. Lemon and P. C. Verhoef, "Understanding customer experience throughout the customer journey," *Journal of marketing*, vol. 80, no. 6, pp. 69–96, 2016.
- [17] A. Cooper, R. Reimann, and D. Cronin, *About face 3: The essentials of interaction design*. John Wiley & Sons, 2007.
- [18] A. Osterwalder and Y. Pigneur, *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons, 2010.
- [19] A. Wegmann, G. Regev, I. Rychkova, P. Julia, and O. Perroud, "Early requirements and business-IT alignment with SEAM for business," in *Proceedings of the 15th IEEE International Conference on Requirements Engineering*, 2007, pp. 111–114.
- [20] D. E. Avison, F. Lau, M. D. Myers, and P. A. Nielsen, "Action research," *Communications of the ACM*, vol. 42, no. 1, pp. 94–97, 1999.
- [21] R. L. Gold, "Roles in sociological field observations," *Social forces*, pp. 217–223, 1958.
- [22] R. M. Emerson, R. I. Fretz, and L. L. Shaw, "Participant observation and fieldnotes," *Handbook of ethnography*, pp. 352–368, 2001.
- [23] L. W. Barsalou, "Grounded cognition," *Annu. Rev. Psychol.*, vol. 59, pp. 617–645, 2008.
- [24] A. F. Payne, K. Storbacka, and P. Frow, "Managing the co-creation of value," *Journal of the academy of marketing science*, vol. 36, no. 1, pp. 83–96, 2008.
- [25] P. Zave and M. Jackson, "Four dark corners of requirements engineering," *ACM Transactions on Software Engineering and Methodology (TOSEM)*, vol. 6, no. 1, pp. 1–30, 1997.
- [26] L. E. Mendoza, A. Marius, M. Pérez, and A. C. Grimán, "Critical success factors for a customer relationship management strategy," *Information and software technology*, vol. 49, no. 8, pp. 913–945, 2007.
- [27] H. Wilson, E. Daniel, and M. McDonald, "Factors for success in customer relationship management (CRM) systems," *Journal of marketing management*, vol. 18, no. 1-2, pp. 193–219, 2002.
- [28] C. V. Brown, I. Vessey *et al.*, "Managing the next wave of enterprise systems: leveraging lessons from ERP," *MIS Quarterly Executive*, vol. 2, no. 1, pp. 65–77, 2003.
- [29] L. Frygell, J. Hedman, and S. Carlsson, "Implementing CRM system in a global organization-national vs. organizational culture," in *Proceedings of the 50th Hawaii International Conference on System Sciences*, 2017.
- [30] M. Attaran, "Exploring the relationship between information technology and business process reengineering," *Information & management*, vol. 41, no. 5, pp. 585–596, 2004.
- [31] J. P. Kotter *et al.*, "Leading change: Why transformation efforts fail," 1995.
- [32] A. J. Onwuegbuzie and N. L. Leech, "Validity and qualitative research: An oxymoron?" *Quality & Quantity*, vol. 41, no. 2, pp. 233–249, 2007.
- [33] T. D. Cook, D. T. Campbell, and W. Shadish, *Experimental and quasi-experimental designs for generalized causal inference*. Houghton Mifflin Boston, MA, 1979.
- [34] C. Le Goues, C. Jaspan, I. Ozkaya, M. Shaw, and K. T. Stolee, "Bridging the gap: From research to practical advice," *IEEE Software*, vol. 35, no. 5, pp. 50–57, 2018.