Towards Multi-Sourcing Maturity: A Service Integration Capability Model

Completed Research Paper

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Abstract

When outsourcing IT services, many enterprises today resort to multi-sourcing. It allows them to reduce costs and assemble a best-of-breed service portfolio. However, this usually also increases complexity. Despite the economic importance of multi-sourcing, though, there is no systematic understanding of the capabilities required to successfully integrate interdependent services and to manage multi-sourcing.

This paper develops a capability model for service integration in a grounded coding approach based on literature and expert interviews. The model identifies six key capabilities and 18 sub-capabilities. We evaluate its applicability and validity via an empirical survey and two in-depth case studies. In addition, provide various insights into the implementation of service integration functions.

Our contribution should provide orientation for companies how to direct their transformation efforts. It outlines an agenda for future research and builds a solid foundation for maturity models to improve multi-sourcing readiness – ultimately leading to more effective multi-sourcing solutions.

Keywords: Service Integration, Multi-sourcing, IT Service Management, IT outsourcing, IT capabilities

Introduction

Since the early 1990s, IT outsourcing has become an integral part of IT strategies. Today, companies increasingly adopt multi-sourcing to maximize benefits (Bapna et al. 2010; Wiener and Saunders 2014). Blending solutions from various providers allows to realize best-of-breed service selections. These promise improved service levels, cost efficiency, and access to specialized technology, while reducing several risks associated with outsourcing – for example "vendor lock-in" (Cohen and Young 2006). Eventually, however, many companies realize that multi-sourcing is no silver bullet. The complexity of interdependent multi-sourcing services may well outweigh its benefits if companies fail to adequately manage and integrate these services (Jin et al. 2014; Plugge and Janssen 2014).

The end-to-end management and coordination of these services is called *service integration*. It is concerned with integrating various internal and external providers and their interdependent services (Bapna et al. 2010; Davy 2014). Retaining sufficient management capabilities is a key requirement for effective service integration (Anderson and Parker 2013). However, many companies are still lacking the required capabilities and are failing to perform service integration successfully (Benkel et al. 2015). Our literature review shows that existing research does not provide sufficient guidance on service integration capabilities. Little knowledge exists about the required capabilities and how to develop them (Goldberg et al. 2015; Kleinveld and Janssen 2015; Urbach and Würz 2012).

Our objective is to close this gap and to expand the current knowledge of service integration. We build on and significantly extend an existing framework (Goldberg et al. 2015). The original conceptual framework outlines six capabilities for service integration. It is, however, too generic to be operationalized and to be evaluated in a real world context. Our proposed service integration capability model addresses both deficiencies. With 18 sub-capabilities, our model provides operational guidance for effective and mature service integration functions and allows to empirically explore its applicability in industry practice.

Applying a *model development procedure*, we systematically construct our model in a grounded coding approach – analyzing both literature and a large number of expert interviews. After a pre-evaluation in a quantitative, questionnaire-based study, we evaluate the model's validity, completeness, and applicability in two case studies. Here, we also identify initial measures to judge and improve capability maturity.

The paper is structured as follows: After introducing important terms, we outline our research method in detail. The following section presents the developed service integration capability model. In the subsequent sections, we evaluate the model. First, we outline the results of our quantitative pre-study. Then, we discuss our two case studies including a cross case analysis. After discussing our findings, we propose areas for future service integration research. Finally, we conclude the paper by summarizing our main contributions, discussing limitations and deriving managerial implications.

Our findings contribute to existing multi-sourcing and service integration research by developing and evaluating a service integration capability model. We develop a ranking of capabilities according to their importance and acquire insights into approaches for implementing service integration.

Better understanding what the required capabilities are and how to mature them should enable more successful service integration solutions and, thus, contribute to outsourcing success.

Research Foundations and Related Work

To approach our research questions, a thorough understanding of three concepts is required that we introduce in the following: *Service Integration, Multi-sourcing*, and *Service Integration Capabilities*.

Service Integration and Multi-Sourcing

Service Integration can be defined as *the seamless management and coordination of internal and external providers and their interdependent services into a coherent, collaborative system of end-to-end services* (Benkel et al. 2015; Davy 2014; Goldberg et al. 2016b). The level of interdependence – from no to high interdependence (Bapna et al. 2010; Plugge and Janssen 2014) – is driving the need for service integration. Integration of internal services only has been coined *service orchestration* (Baryannis et al. 2010; Janssen and Gortmaker 2010; Tan and Sia 2006). Although the definition also includes configurations with only one external provider, academic literature mostly refers to service integration in the context of multiple external providers (Bapna et al. 2010; Davy 2014; Goldberg et al. 2014a; Rajamaki and Vuorinen 2013). Hence, in a narrow sense, service integration focuses on integrating internal IT with multiple external, highly interdependent providers. It is thus closely related to multi-sourcing.

Multi-sourcing can be defined as *combining IT services from internal and multiple external providers (Levina and Su 2008, Bapna et al. 2013)*. Companies mainly apply multi-sourcing to increase cost efficiency, service quality and flexibility (Levina and Su 2008). While early definitions from supply chain management also included *single-sourcing* constellations with only one external provider (e.g. Cohen and Young 2006), more recent literature on service outsourcing associates multi-sourcing with services from *at least two external providers* (Bapna et al. 2013; Davy 2014; Levina and Su 2008; Plugge and Janssen 2014; Wiener and Saunders 2014).

Figure 1 illustrates the relationship of service integration and multi-sourcing. Our paper and capability model focus on the intersection of service integration and multi-sourcing with high interdependence.

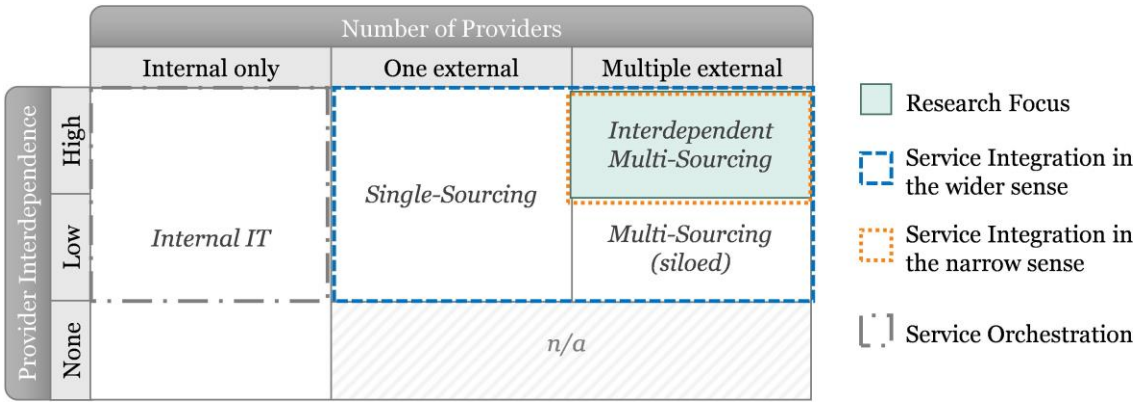

Figure 1. Relationship of service integration and multi-sourcing

While substantial research on single- and multi-sourcing in general has been published (e.g. Lacity et al. 2009, Goldberg et al. 2016a), research on multi-sourcing with highly interdependent services requiring service integration is still sparse and existing concepts cannot simply be transferred (Bapna et al. 2010; Wiener and Saunders 2014). The interdependencies increase multi-sourcing complexity with additional challenges such as *measuring end-to-end services*, *aligning contracts across providers*, *managing relationships and collaboration*, and *defining standardization and modularization* (Goldberg and Satzger 2015).

Regarding multi-sourcing, much research work focuses on the sourcing strategy and decision (e.g. Bapna et al. 2013; Herz et al. 2011a; Levina and Su 2008; Łoboda 2013; Su and Levina 2011; Su et al. 2015), provider selection (e.g. Feng 2012; Fridgen and Mueller 2011; Herz et al. 2012a), the management of multi-sourcing (e.g. Beck et al. 2011) and multi-sourcing (e.g. Herz et al. 2011b; Herz et al. 2012b; Plugge and Janssen 2014).

Schermann et al. (2006) and Bapna et al. (2010) introduce general service integration requirements and research areas. Recent academic work mainly focuses on service integration governance and organization design. For instance, Plugge and Janssen (2014) outline governance requirements for service integration; Rajamaki and Vuorinen (2013) present an exemplary governance model for interdependent multi-sourcing services. Goldberg and Satzger (2015) outline various organizational models for service integration. Both Wiener and Saunders (2014) and Plugge and Bouwman (2015) investigate collaboration in a multi-sourcing environment identifying various service integration requirements. Researching knowledge integration, Anderson and Parker (2013) and Jin et al. (2014) cover a related aspect of service integration.

Service Integration Capabilities

Three main schools of thought exist that define *IT capability* in different ways (Baiyere and Salmela 2014): The *resource-based view* (RBV) understands capabilities as a company's ability to acquire and manage specific resources to gain competitive advantage (Barney 1991). Origination from the RBV, *dynamic capability theory* (DCT) adds the ability to orchestrate and re-configure organizational resources (Teece et al. 1997). Last, the *core competence* concept refers to a firm's distinct abilities differentiating it from other organizations (Prahalad et al. 1990).

Our model acknowledges that companies mature their capabilities, thus implying a dynamic view. Hence, we define service integration capabilities in accordance with the DCT as *an IT organization's ability to perform IT management and to re-design its resources as well as processes to achieve successful service integration* (Baiyere and Salmela 2014; Mithas et al. 2011; Ramirez et al. 2010).

Although capabilities are a major stream in IS research (Baiyere and Salmela 2014), there is a lack of academic research on service integration capabilities. Several IT capability frameworks consider the management of external providers. For example, Feeny and Willcocks (1998) define nine core IS capabilities to successfully govern and manage IT. Bharadwaj et al. (1999) outline strategic capabilities to gain competitive advantages from IT. Although these and other contributions (e.g. Cragg et al. 2011; Herz et al.

2012a; Kleinveld and Janssen 2015; Wiedemann et al. 2015) consider external providers, they focus on (multiple) dyadic relationships. They do not specifically reflect the requirements of multi-sourcing with highly interdependent services. An exception is the work of Goldberg et al. (2015): It develops a high-level framework of six capabilities to enable effective service integration, explicitly targeting interdependent multi-sourcing. The framework remains generic, though. It lacks sufficient detail to be operationalized and to be evaluated in real world scenarios. As it fits best with a service integration setting, we decided to use it as base framework for our model development procedure.

Research Method

Our research method follows a structured *model development procedure* consisting of five phases. Based on the procedure of Becker et al. (2009), which has been frequently applied in comparable studies (e.g. Becker et al. 2010; Cosic et al. 2012), we apply a simplified approach as suggested by Hecht (2014).

Based on existing academic literature, we defined our *research problem,* reviewed *existing models* and determined our *research strategy*. The main phases four and five focused on developing and testing our model. During the *iterative model development phase*, we developed our capability model in a grounded coding approach based on literature work and expert interviews. In the *model evaluation phase*, we then evaluated our model empirically in a quantitative study and two case studies (see Figure 2).

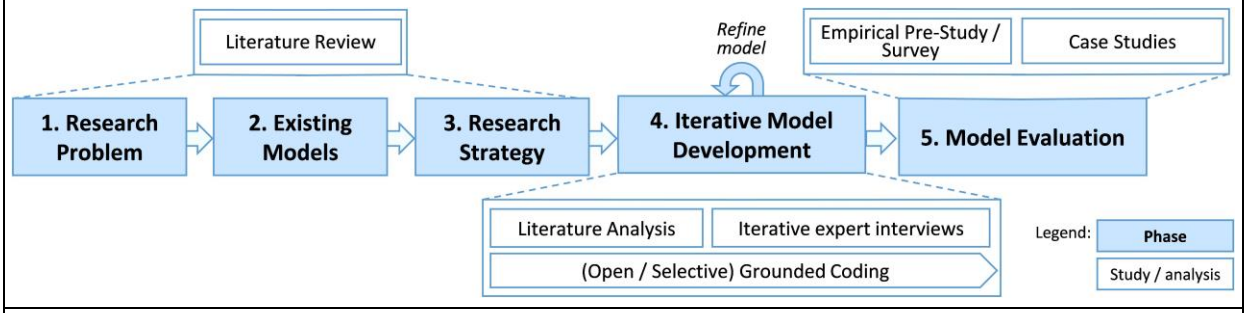

Figure 2. Structured model development procedure

In this paper, phases one to three are the basis for our foundation, our research approach and research issue. The remainder of this paper focusses on the outcomes of phases four and, in particular, five.

Phase 1-3: Research problem, Existing Models and Research Strategy

Based on Webster and Watson (2002), we analyzed extant literature. Our analysis utilized a keyword-based[1] full-text and a subsequent forward/backward search. From an initial search result of 167 articles, we selected papers relevant to our research via an abstract and, if required, full-text review. We applied positive selection criteria: We focused on peer-reviewed journal and conference papers dealing with success factors, capabilities, or issues regarding interdependent multi-sourcing. This way, we selected 26 papers to frame our research issue and strategy. As the *model development procedure* suggests (Becker et al. 2009), we selected an existing framework outlined by Goldberg et al. (2015) as basis for our research.

Phase 4: Iterative Model Development

As we built on an existing framework, the second research phase aimed at both evaluating (particularly in terms of completeness and applicability) and extending the existing framework. Therefore, we applied an iterative grounded coding approach (Corbin and Strauss 1990; Glaser and Strauss 1967) combining open coding (to evaluate the existing model) and subsequently selective coding (to enrich the model).

[1] Based on Google Scholar and IEEE Xplore, the search consisted of variations and combinations of the following keywords: capabilities, multi-sourcing, service integration, and interdependence.

We collected data from papers identified in our literature review and from qualitative expert interviews. In total, we performed 42 expert interviews based on Gläser and Laudel (2010). Participants of our qualitative study included client-side experts (e.g. CIOs), service provider representatives and consultants.[2] The semi-structured interviews utilized interview guides with mostly open questions to capture a broad range of detail. They lasted 45-90 minutes, were recorded and transcribed.

According to grounded theory, interviews alternated with transcript coding and interpretations. Findings then determined the scope of future interviews. The interviews focused mainly on the experts' experience with service integration and multi-sourcing. While initial interviews were broad and open (open coding), later interviews focused on specific capability areas (selective coding). We initiated additional interviews until our analysis reached a theoretical saturation. For the coding process, we used the software 'f4'[3] and extracted codes into master tables. With every coding, we validated and combined/clustered codes. With each new item, we re-evaluated already coded material.

Phase 5: Model Evaluation

We applied two evaluations methods. To pre-evaluate the model and to develop an understanding of capability importance, we performed a quantitative study with service integration experts. Our main evaluation used two case studies to further validate the model and explore its applicability in practice. As the main evaluation did not indicate any need for adaptions, we accepted the model.

The quantitative pre-evaluation study was based on a questionnaire performed with experts from client companies, service providers and consultancies. Participants rated the importance of each sub-capability of our model based on a 10-point Likert scale with verbalized endpoints (1='not important', 10='highly important'). To determine a ranking, we calculated the average importance for each sub-capability treating the Likert scales as equidistant and quasi-metric (Bortz 1999). In additional open questions, we asked for missing items, and for required changes in terms of wording or granularity.

We then evaluated our model in two consecutive case studies. Case studies are often used to develop an understanding of emerging and complex research issues (Dubé et al. 2003; Yin 2003). Although their generalizability is limited, case studies allow for studying causalities in real-life situations (Eisenhardt and Graebner 2007; Miles and Huberman 1994). Besides validating the model's completeness and validity, we aimed at evaluating its practical applicability, and at revealing measures for maturing the capabilities.

In both cases, we performed an initial focus-group session with client-side representatives (both times with the CIO and direct reports). The participants discussed their situation using a topical interview guide structured along our capability model. They also self-assessed each sub-capability's maturity based on a 5-point Likert scale with verbalized endpoints (1='very low capability', 5='very high capability'). For our second case, we re-ran the focus group session with the same participants. This allowed us to assess the organization's maturity at two different points in time. Being longitudinal, our second case study enabled more detailed observations by linking measures to the second maturity levels (Kehr and Kowatsch 2015).

To develop further insights into the implementations, we performed additional interviews and reviewed documents. The interviews were semi-structured and lasted from 30 to 180 minutes. Main topics were implementation measures and solutions, issues and challenges with service integration, and lessons learned. Interviewees included client-side employees, consultants advising the client companies, and service provider representatives.[4] During these interviews, we also collected feedback regarding our capability model. The documents included meeting minutes (project and board meetings), organizational and operational documentations, as well as project plans and documentations.

To analyze the collected data, we applied a two-step approach: First, we selected and summarized the data. Second, we generated data displays (e.g. tables and charts) to structure it (Miles and Huberman 1994). By triangulating different data sources, we increased the consistency and validity of our results.

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[2] An overview of interview participants is attached in appendix A.1.

[3] *www.audiotranskription.de/english.*

[4] A short overview of interview participants from the case studies is attached in appendix A.2.

The Service Integration Capability Model

The developed service integration capability model consists of six main capabilities and 18 sub-capabilities. It is derived from both literature and expert interviews extending a base framework with six capabilities outlined by Goldberg et al. (2015). Our findings support the base framework as we did not identify any other main capabilities. Therefore, our work focuses on enhancing the model with fine-granular sub-capabilities.

The six main capabilities reflect a specific ability of a service integration function in a multi-sourcing context. Each capability is further decomposed into three sub-capabilities, yielding a total of 18 sub-capabilities. The underlying assumption of our model – that emerged during our study – is that the (sub-) capabilities relate to service integration efficiency and effectiveness. A higher maturity in a sub-capability should reflect a higher maturity of the related main capability and the overall service integration solution.

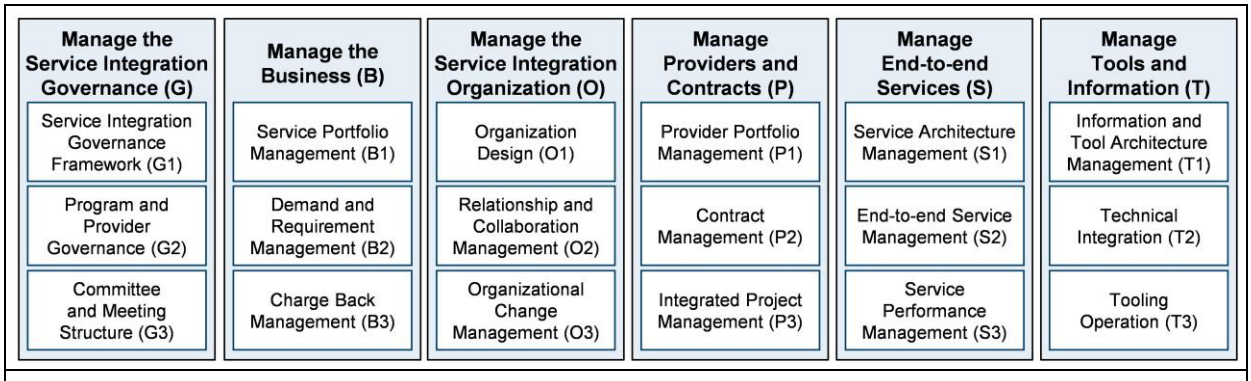

Figure 3. The Service Integration Capability Model

Figure 3 gives an overview of the developed capability model. For instance, organizations should be able to manage the *service integration governance*; that is, they need to continuously re-define and establish the rules and the blueprint for integration. This capability can be further broken down: organizations should be able to define and adapt principles and policies to enable governance of the delivery to its business units as well as a corresponding framework for the governance of providers; in addition, they need the ability to establish and adapt committees and meeting structures that ensure interlock across all business customers and providers. A short description of each (sub-)capability is provided in Table 1.

Pre-evaluating Service Integration Capabilities and Their Importance

With the findings of our questionnaire, we pre-evaluated our capability model. The sample of our quantitative study is composed of 15 completed questionnaires[5]. Based on an initially targeted population of 59 experts, we realized a return rate of 25%.

Overall, our questionnaire study supports our model. No additional capabilities were added by the participants. In addition to validating our model, we use the questionnaire data to develop a first understanding of each sub-capability's importance. Table 2 lists the average importance for each sub-capability ('Imp') varying from 6.6 to 9.4 (on a scale from 1 to 10). Overall, the more strategic capabilities (e.g. governance) are ranked higher than more operational capabilities (e.g. *tools and information*). We observe the same tendency for sub-capabilities (e.g. *Tool Architecture Management* and *Tool Operation*).

[5] An overview of questionnaire participants is attached in appendix A.3.

Manage Service Integration Governance (G): Define, establish and adapt a governance to establish rules and a blueprint for service integration.
Service Integration Governance Framework (G1): Manage a governance framework with principles and policies enabling the management of service delivery across business units.
Program and Provider Governance (G2): Manage a program and provider governance based on agreed principles and policies that are aligned across all providers.
Committee and meeting structure (G3): Manage a committee and meeting structure across business units and providers including reporting with governance KPIs.
Manage Providers and Contracts (P): Manage the service provider portfolio, relationships and contracts.
Provider Portfolio Management (P1): Continuously improve the provider portfolio based on standardized selection and transition processes.
Contract Management (P2): Negotiate, manage and develop provider contracts that are aligned across providers in a standardized process.
Project Management (P3): Manage cross-provider projects based on standardized processes.
Manage the Business (B): Manage and satisfy the business demand based on a portfolio of services aligned to business requirements.
Service Portfolio Management (B1): Actively manage and optimize the service portfolio and an end-to-end integrated, overlap-free service catalog.
Demand and Requirement Management (B2): Consistently manage business demand and requirements based on standardized processes.
Charge Back Management (B3): Manage and charge-back service costs with clear budgets.
Manage the Service Integration Organization (O): Design and manage the distributed multi-sourcing organization in alignment with business requirements.
Organization Design (O1): Design and manage an organizational model that integrates business units and providers and with a skill management aligned to business requirements.
Relationship and Collaboration Management (O2): Manage relationships with/between business units and providers in a consistent approach that fosters collaboration.
Organizational Change Management (O3): Systematically implement, manage and align organizational and cultural changes.
Manage End-to-end Services (S): Perform end-to-end service management.
Service Architecture Management (S1): Define and manage a service architecture that enables definition of end-to-end service levels.
End-to-end Service Management (S2): Manage service management processes across providers including cross-supplier procedures.
Service Performance Management (S3): Manage service performance end-to-end.
Manage Tools and Information (T): Manage and maintain the service integration tools and information.
Information and Tool Architecture Management (T1): Define an integrated service management tool and information architecture across providers.
Technical Integration (T2): Manage technical integration with automated process interfaces.
Tool Operation (T3): Manage and operate service management tools across providers.

Table 1. Capability and Sub-Capability Descriptions

ID	Imp	ID	Imp	ID	Imp	ID	Imp	ID	Imp	ID	Imp
G	9.4	B	8.0	O	7.8	P	8.1	S	7.7	T	7.2
G1	9.4	B1	8.2	O1	8.0	P1	8.1	S1	8.2	T1	7.5
G2	9.4	B2	8.5	O2	7.9	P2	8.2	S2	7.7	T2	7.6
G3	9.4	B3	7.2	O3	7.5	P3	8.1	S3	7.3	T3	6.6

Table 2. Service Integration Capability and Sub-Capability Importance

Manage the service integration governance was ranked as the most important capability. During our interviews, governance was also considered a central topic. Interviewees indicated it as a "prerequisite for successful service integration" (*IT Service Management Consultant, Global Outsourcing Provider*) or "enabler [...] for service providers to integrate" (*Project Manager, Global Pharmaceutical Company*). Also, recent literature emphasizes the importance of appropriate governance (Goldberg et al. 2015; Plugge and Janssen 2014).

With an average importance of 8.1 and 8.0, *manage providers and contracts* as well as *manage the business* are ranked next. The importance of both capabilities is supported by recent literature (Herz et al. 2012a; Kieninger and Satzger 2011, Kieninger et al. 2011, Ilmo and Nahar 2010) and one interviewee argued that managing providers "is one of the key competences" (*Project Manager, Global Pharmaceutical Company*). Another interviewee expressed that understanding the business is essential to "select [...] the services that support the strategy of the enterprise" (*IT Sourcing Manager, Service Integrator for Global Industrial Company*).

Evaluating the Service Integration Capability Model's Applicability

We selected the two relevant cases 'Alpha' and 'Beta' for our evaluation. Both companies implemented a service integration solution. After briefly introducing each case, we will discuss perceived issues, the companies' service integration maturity, and measures taken. For each case and sub-capability, Table 3 provides the assessed maturities. For Beta, the table also provides the re-assessment at project end.

ID	Alpha	$Beta_1$	$Beta_2$	ID	Alpha	$Beta_1$	$Beta_2$	ID	Alpha	$Beta_1$	$Beta_2$
G1	3	1	3	O1	3	1	3	S1	2	1	2
G2	3	2	2	O2	3	2	3	S2	4	2	4
G3	3	2	3	O3	2	2	3	S3	2	1	2
B1	2	1	3	P1	1	2	3	T1	3	1	2
B2	1	2	3	P2	1	2	2	T2	2	2	3
B3	2	2	2	P3	2	2	2	T3	3	2	3

Alpha = Maturity of Alpha; $Beta_1$ = Maturity of Beta at project start; $Beta_2$ = Maturity of Beta at project end

Table 3. Sub-Capability Maturity at Alpha and Beta

Case Study 1: Service Integration at Alpha

Alpha is a leading international insurance company mainly offering insurances for private clients, small to medium-sized businesses and pension schemes. Alpha is a multi-national business group consisting of a central group headquarter and legally independent business entities. Its IT organization has a centralized governance structure. Alpha implemented a multi-sourcing model with six main and highly interdependent providers. Outsourced services include end-user services, telecommunication and network services, various application services, and infrastructure operation (storage and servers). Planning to outsource additional services, Alpha initiated a project to optimize their multi-provider management and service integration capabilities. Service integration is performed by Alpha's in-house retained organization.

Overall, Alpha was satisfied with the results of their multi-sourcing approach. IT managers and IT personnel, however, reported issues with service integration. We encountered three main issues: First, the interlock and pro-active alignment with the business units was insufficient. One manager argued they "recognize business needs too late and constantly chase frantically after solutions" (*Manager IT Services, Alpha*). Secondly, Alpha had issues with defining consistent service levels across services and provider contracts. Accordingly, one interviewee mentioned their "difficulties to measure service levels end-to-end" (*Manager IT Services, Alpha*). Another interviewee highlighted difficulties "in aligning contract details across all providers" (*Manager Provider Management, Alpha*). The third main issue regards the provider relationships. There was a lack of partnership and pro-active behavior, particularly between providers. An IT manager mentioned recent service continuity issues when they exchanged one of their providers where they "ran into severe issues resulting in service interruptions" (*IT Service Continuity Manager, Alpha*).

We performed the focus group session and additional interviews in June and July 2013. In February 2014, we performed two follow-up interviews and reviewed project documents to gain insights into the implementation. In the focus group, Alpha's IT management assessed their current service integration maturity as medium (3 on a scale from 1 to 5). The average score of their sub-capabilities amounted to 2.3 (see 'Alpha' in Table 3). The strongest capability area was *governance* (G1-G3) while *provider* (P1-3) and *business* (B1-B3) were ranked lowest. Weakest sub-capabilities were *demand and request management* (B2), strategic provider portfolio management (P1) and *contract management* (P2). For instance, demand management did not exist for most services. The provider portfolio was not managed strategically and provider selection was not unified. A common function to perform contract management was missing.

To mature service integration, Alpha implemented several improvements. First, they established a systematic demand management based on a newly introduced ITIL-based process. To enable integration with the provider-oriented processes, the demand management tool is interfaced with their request tools. The business requirements identified by the new process are the basis for defining end-to-end service levels. Second, Alpha introduced a structured contract management for the outsourced services. It covers common billing models for different types of services and is based on automated billing processes. To better align provider contracts, a standard contract framework was defined including standard descriptions and definitions of service levels. Third, Alpha developed a standardized provider selection procedure to ensure faster selection and better alignment with business requirements. In a provider portfolio approach, providers are increasingly selected based on their fit with the strategic requirements instead of mainly focusing on costs. The selection procedure incorporates a predefined RFI/RFP approach including templates and standard terms and conditions. Fourth, Alpha reviewed their cross-provider IT service management processes and cross-supplier procedures. They identified required adaptions to processes and tools to enable service integration. Ultimately, Alpha re-defined their *Service Asset and Configurations Management* process based on a new service management tool including automated interfaces with the provider systems. Also, they increased automation of their *Change Management*, *Release & Deployment Management*, *Identity & Access Management*, and *Service Level Management* processes.

We did not have the chance to re-assess Alpha's maturity. In our follow-up interviews, however, Alpha's management outlined the improvements due to the measures taken. Although the implementation was still ongoing, improvements were already visible. They particularly highlighted the more pro-active determination of business requirements. They also indicated better integration with providers in terms of service level measurement, and implementation of requests and changes. Their contract management was still under development and results inconclusive.

Case Study 2: Service Integration at Beta

Beta is a leading global chemical manufacturing firm mainly focusing on the development, production, and marketing of chemical products. Similar to Alpha, Beta is a multi-national business group with a central headquarter and legally independent business entities. Before the implementation project, Beta had a highly decentralized IT structure consisting of six largely independent IT organizations. Due to several issues, Beta decided to transform their IT organization.

Beta experienced various issues. Most prominently, they had problems to define and measure service levels end-to-end across providers. Service levels of different providers were inconsistent and did not support the overall committed service levels. For example, one manager mentioned that frequently the sum of smaller outages of different providers resulted in not met "overall service level targets [...], even

though all service providers met their SLAs" (*IT Supplier Manager*, *Beta*). Beta had difficulties negotiating unified contract specifications – partly because IT service portfolio decisions were increasingly made by the lines of business. Beta's IT struggled to integrate services that did not comply with the overall IT strategy and landscape. In this regard, the CIO said that "they [N.B.: three lines of business] just recently bought three new cloud applications without involving us" (*CIO, Beta*). We also encountered a disconnection between business requirements and services delivered. Part of the problem was a lack of transparency regarding specific business requirements. In addition, accountabilities and responsibilities were often unclear leading to issues when problems were not owned and solved with delays.

We held our initial workshop with Beta at the beginning of their implementation project (January 2014) and accompanied them over an observation period of 1.5 years. At the end of the project, we re-assessed Beta's service integration maturity (June 2015). During the observation period, we performed additional interviews and reviewed documents at various points in time. In our initial assessment, Beta's IT management self-assessed their current service integration maturity as low (2 on a scale from 1 to 5). The average assessment of sub-capabilities was 1.7. The weakest capability was *end-to-end service management* (S, 1.3) while the strongest was *provider and contract management* (P, 2.0). The other four capabilities were rated 1.7 (Table 3, Beta1).

Beta initiated a transformation project to re-organize their IT organization. They established a single global multi-sourcing strategy with eleven main providers. They consolidated outsourced infrastructure operations to three providers (e.g. server, storage, network, and desktop); SAP platform and various application services including public cloud services were outsourced to eight providers. The transformation project focused on three main areas: *organization*, *governance*, and *service management*.

Organization: Beta integrated their six IT organizations. Following a federal governance model, its IT organization now consists of a main centralized IT delivered from shared service centers, and decentralized IT departments for production sites. To embed service integration into the organization, Beta set up a centralized in-house *Global IT Service Management & Integration* department. It pools all accountabilities and responsibilities with regard to managing and integrating internal and external service providers. Within this unit, Beta created dedicated *boundary spanning* roles. These roles are described in literature, as well (e.g. Levina and Vaast 2005). In case of Beta, they are assigned to actively build relationships with both business units and (between) providers. One manager reasoned that before introducing these roles they "were mainly watching service levels of providers instead of ensuring [...] that they [N.B.: the providers] work together" (*IT Supplier Manager, Beta*). Beta carefully selected the employees filling the boundary spanning roles, mainly focusing on interpersonal skills and business understanding.

Governance: Beta introduced a common global management system. Their governance model defines general principles for the organization and the interfaces with providers. Clear accountabilities, as well as a refined board and meeting structure were defined. "The most significant change is [the introduction of] dedicated integration boards. They are led by the GSMI [N.B.: *Global IT Service Management & Integration* department] and facilitate the discussion between [..] providers and [...] lines of business" (*Director IT Service Management and Integration, Beta*). The established integration boards foster cross-provider alignment and decision processes on various organizational levels. On the highest governance level, representatives of IT, the business units, and the strategic providers meet on a quarterly basis. For defined relationships, more frequent boards are facilitated between interrelated providers by the relevant boundary spanning roles.

Service management: Beta re-defined eight ITIL processes to incorporate service integration. *Service Level Management*, *Supplier Management*, and *Service Catalogue Management* received particular attention. Most process activities relating to service integration are assigned to the *Global IT Service Management & Integration* department. To increase automation and to ensure provider integration, Beta introduced a new service management tool suite for all adapted processes. It is integrated with the provider-side tools to increase transparency and to enable end-to-end service management. To better define, measure and manage end-to-end service levels, Beta developed a structured approach. Beta also introduced a service portfolio and a provider portfolio management process with strategic guidelines and a systematic selection processes. These processes ensure that providers and services fit with both business requirements and with each other. Last, Beta defined and published an integrated service catalog towards the business, incorporating services of all providers and hiding the complexity of their delivery.

Beta's transformation fundamentally changed their IT organization. The revolutionary change caused several implementation issues. The project was delayed due to resistance of staff and lack of provider commitment. Beta had to invest into organizational change management and ongoing communication. Also, lengthy negotiations with providers were required to achieve buy-in. Ultimately, the project was successful, but exceeded the planned project duration by six months.

At project end, we re-assessed Beta's service integration maturity. Based on our model, we performed the session with the same people as the initial assessment. After the implementation project, the perceived maturity was substantially higher. With an average rating of 2.7, the average assessment of the model's sub-capabilities increased by one. Most significant improvements are perceived in the *organization* and *end-to-end service management* capabilities. Their average rating increased by 1.3 (see Table 2, Beta2).

Cross-Case Comparison

Comparing Alpha and Beta, some general differences exist. They operate in different industries and have a different number of providers. Their outsourced services, however, are comparable (see Table 4).

	Industry	Main Providers	Outsourced Services	Average Maturity
Alpha	Insurance	6	Client and end-user, applications, and infrastructure	2.3
Beta	Chemicals	11	Desktop, SAP platform, applications, and infrastructure	1.7 / 2.7*

* Maturity of Beta at project start / project end

Table 4. General differences between Alpha and Beta

Both companies had difficulties with end-to-end service management including defining consistent service levels. Also, issues with eliciting business requirements were common. At Alpha, this led to dis-alignment and a IT passive behavior, whereas Beta's lines of business increasingly made IT decisions and directly contracted service providers. They did not share other issues: For instance, Alpha experienced difficulties in switching between providers, whereas Beta had problems with clear accountabilities and service portfolio decisions. All in all, Alpha's and Beta's issues were similar but not identical.

The initial service integration maturity differed substantially. While Alpha already had a medium maturity, Beta's maturity was low. In consequence, Alpha opted for selective improvements, whereas Beta completely re-defined their setup. The different approaches resulted in different setups. Both companies kept service integration responsibilities in-house. Alpha assigned them to existing service and provider management functions. Beta, on the other hand, pooled all service integration responsibilities in a newly created, dedicated department. Beta's revolutionary approach involved more risk and effort than Alpha's evolutionary change. In doing so, Beta realized strong maturity improvements.

Alpha		Beta	
Measure	Related Capabilities	Measure	Related Capabilities
Establish demand management	B2, S2, T1	Define common governance model	G1, G2, G3
Introduce systematic contract management	P2, B3	Re-setup organization with dedicated service integration unit	O1, O2, G1
Define standardized provider selection procedure	P1, B2	Re-define service management processes for service integration	S2, T1
Optimize cross-provider service management	S2, T1	Define and publish integrated service catalog	B1
		Introduce service and provider portfolio management	B1, P1

Table 5. Key measures and their relation to sub-capabilities

If we map the key measures to related service integration capabilities (see Table 5), we see that both Beta and Alpha addressed their weakest sub-capabilities. For instance, Alpha covered all capabilities with a maturity rating of 1 and Beta all but one. At our second assessment at Beta, the maturity of the addressed capabilities increased particularly. For example, G1, B1, O1, and S2 increased by two points each.

Discussion and Development of a Research Agenda

In the following, we will discuss our main findings before outlining an agenda for future research.

Discussion of Results

Although our quantitative study aimed at pre-evaluating our model with a small sample, we can derive some initial implications. No additional (sub-)capabilities emerged from the study and the importance of all sub-capabilities is medium-high (6.6 to 9.4). This implies completeness and validity of our model as no capabilities should be omitted or added. On the other hand, our findings imply that (sub-)capabilities are of varying significance for service integration success. More strategy-oriented capabilities seem to be more important: With an average rating of 9.4, *Governance* is rated highest. Its importance is also frequently indicated by recent literature (e.g. Plugge and Janssen 2014; Wiener and Saunders 2014). With 7.2 and 7.7, the more operational capabilities *tools and information* and *end-to-end service management*, in contrast, are perceived as less important. The *business*- and *provider*-related capabilities are rated equally important (8.0 and 8.1). This is consistent with recent research highlighting the importance of business interfaces, while in practice clients often focus on provider-side interfaces (Goldberg et al. 2014b).

An assumption emerging from these observations is that all sub-capabilities should be matured for successful service-integration. Yet, as a tendency, the more strategic capabilities should receive particular attention (e.g. governance). A question for further studies is whether the more important sub-capabilities should be matured first or to a higher ultimate maturity level. Overall, the ranking of the sub-capabilities provides a starting point for future studies and for prioritizing investment in individual capabilities.

Both our case studies support the model's applicability, completeness and validity. No additional (sub-) capabilities emerged and we were able to assess the maturity of both companies. It was also possible to map all measures to specific capabilities and to track their improvements. Also, Beta's maturity increased substantially for the addressed sub-capabilities. This supports both the linkage between measures and capabilities, and the model's suitability as maturity model. Lastly, feedback from interviewees supports the model and its applicability, describing it as "comprehensive and [...] a helpful tool in future projects" (*Manager Provider Management, Alpha*).

Both case studies provide insights into service integration challenges, potential measures and solutions, and how to apply the capability model. Yet, three more specific findings can be highlighted.

First, end-to-end integration is a key factor for service integration which is in line with recent literature. Plugge and Janssen (2014) discussed the importance of end-to-end integration. The authors argue that a 'fit dependency' based on mutual adjustment between providers is required. Our findings highlight that end-to-end integration starts with clearly defined business requirements. It should encompass consistent service levels, and enable technical and organizational integration across providers.

Second, different approaches in terms of governance model and implementation can be applied. Academic research defined different governance and organizational models for establishing service integration (Goldberg and Satzger 2015; Plugge et al. 2013; Wiener and Saunders 2014). Our findings show that these can be further distinguished. Service integration responsibilities can be assigned to existing functions, corresponding to a decentralized or federal governance mode. Or, responsibilities can be pooled in a centralized function. With regards to implementation, both a revolutionary and evolutionary approach can be applied. While the former allows for more significant improvements, it also yields higher effort and increased risk.

Last, current standards and approaches are not easily applicable. For example, ITIL currently does not cover service integration. Adaptions to existing models are required to incorporate the new requirements.

Development of an Agenda for Future Research

Our model and each (sub-)capability have potential for future research. Studies can investigate how to establish and mature individual capabilities. To direct further research, we suggest four IS research areas.

Research Area 1: Advance understanding of capability interdependencies and importance

We have been treating (sub-)capabilities as largely independent and equally weighed them. For example, we calculated the average maturity to compare the cases. Our findings indicate, however, that capabilities may be important in different ways. To enable more specific models, further research should advance the understanding of sub-capability importance and inter-capability relationships. In studies with large samples, researchers could apply factor analyses and structural equation modeling. They can determine the statistical power of items to reveal how sub-capabilities contribute to main capabilities and overall maturity. This would allow to develop more specific models, for example by weighing capabilities.

The statistical power would also help to identify effective combinations of maturity levels. That is, should capability levels be balanced or should specific capabilities be matured first? Recent literature argues that both under- and overfit lead to less performance (Luo and Donaldsen 2013). Plugge and Bouwman (2013) show that organizational structures in fit with their contingencies improve sourcing performance. Configurational studies can help to investigate interaction effects. They proclaim interdependent variables that form coherent configurations (e.g. Fink 2010). Researchers could identify effective configurations composed of various maturity levels.

Research Area 2: Transfer findings to other service integration models

To test and support our model, research should validate it in other service integration constellations. For example, Goldberg and Satzger (2015) outline the *Guardian Vendor* and the *Independent Service Integrator* model where external entities are responsible for service integration. We solely validate the applicability for in-house service integration.

Research Area 3: Develop a more detailed model to capture maturity

Currently, our capability model only allows subjective assessments. We ensured comparability as the same researchers facilitated the sessions. Additional studies are required to build a more objective model. We propose to develop a pre-defined number of maturity levels per capability with verbalized descriptions for each level allowing for more objective assessments. For example, research could develop descriptions in iterations of several qualitative studies and evaluations based on so called Delphi studies.

Research Area 4: Develop implementation approaches

Longitudinal studies should evaluate measures for addressing issues and link them to the capabilities. For example, studies could evaluate whether specific measures significantly improve issues and the maturity. These measures can be incorporated in approaches or serve as basis for implementation frameworks. In addition, our model should help to develop design approaches for retained organizations. They should reflect the identified capabilities and provide a roadmap to mature the organization.

Conclusion

Our research paper extends the current knowledge of service integration. It adds to existing academic literature on multi-sourcing and service integration. Our empirically evaluated capability model provides a basis for understanding service integration capabilities and their interrelation. That way, we also contribute to strategic management literature. We provide novel findings and propose a research agenda.

Our main contribution is the service integration capability model. It consists of a comprehensive set of capabilities designed for service integration requirements in a multi-sourcing context. We developed and evaluated our model based on a multi-phase study, incorporating the latest insights from academic literature and extensive expert knowledge. That way, our model exceeds preceding frameworks in terms of detail and specificity. It can be applied by researchers and practitioners with more easy and consistency.

Our paper has three additional key contributions. First, we provide a ranking of sub-capabilities according to their importance. Our findings show that all identified capabilities are important for service integration success. Their relative importance, however, differs. Second, our case studies give new insights into

service integration implementations. With an evolutionary and a revolutionary approach, we unveil two different approaches to maturing service integration capabilities. Last, we derive an agenda for future service integration from our findings.

Our findings contribute to both theory and practice. They suggest that service integration functions should be tailored to the company's specific situation and sourcing strategy. In the following, we will briefly discuss research limitations and derive managerial implications.

Research Limitations

A number of limitations need to be considered. With 15 returned questionnaires, the sample size of our pre-evaluation can be regarded as rather small to fully generalize our findings. The quantitative study aimed at pre-evaluating our model before applying the case study approach. Small samples are appropriate to develop and test research aspects in the first phases of research (Hakim 1987) and to leverage small samples to gain initial expert feedback (Beecham et al. 2005); several comparable studies with small pre-evaluation studies exist (Brown and Russell 2007; Dyba 2000; Emam and Madhavji 1996). Also, two case studies do not suffice to fully generalize findings. The goal of the case studies, however, was to evaluate the applicability of our model for which two (longitudinal) studies seem reasonable. In addition, we triangulate various sources (literature analysis, an extensive qualitative study based on 42 expert interviews, a quantitative expert study, and two case studies) to ensure overall research consistency. Nevertheless, additional research is required to further develop and support our findings.

Second, research identifies additional models with external service integration functions (Goldberg and Satzger 2015) while our case studies focus on in-house service integration. The development phase and our quantitative study, on the other hand, were more general and included interviews with external service integrators. Therefore, our model should also be valid for other service integration models which should be confirmed by further studies.

Managerial Implications

Our findings confirm that many companies have difficulties in adapting their retained organizations for service integration requirements. Three immediate consequences arise for IT managers.

First, we outline 18 sub-capabilities influencing service integration success. Our model gives insight into these capabilities and their importance. They should *guide the transformation focus of enterprises*. Our findings show that there is no one-size-fits-all approach. Even though challenges are similar, companies should develop capabilities depending on their specific requirements choosing the most viable organizational models and implementation approaches. IT managers can use our model to (self-)assess capabilities. Although the model does not outline detailed maturity levels, managers can review each sub-capability for shortcomings, identify key areas for action and derive an implementation approach. For example, service integration governance emerged as the most important capability. Companies should establish the blueprint for service integration and then develop it according to their needs. The presented model will, thus, help IT managers to design and mature their organization. In the same way, providers performing service integration for their client as Guardian Vendor or Independent Service Integrator (Goldberg and Satzger 2015) can design and develop their capabilities based on our model.

Secondly, our model emphasizes that *both providers and business units need to be tightly integrated*. In our cases, the business-side interfaces were more problematic. Several interviewees mentioned that companies often neglect them. Hence, companies should not solely focus on provider management. They should sufficiently invest in capabilities relating to their own business units. This should help to realize end-to-end service integration which should start with clearly defined business requirements.

Lastly, we encountered a *gap in existing practitioner frameworks*. For example, ITIL does not yet reflect integration requirements. Further work is required to develop appropriate frameworks.

Systematically developing the outlined capabilities and consciously designing retained organizations should contribute to more successful multi-sourcing solutions and improve IT provision competitiveness.

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Appendix

A.1 Interview Participants Qualitative Study

#	Job Role	Company
1	Senior Strategy Manager	Banking Company
2	CIO	Energy Producing Company
3	IT Management Consultant	Global IT Management Consultancy
4	IT Management Consultant	Global IT Management Consultancy
5	IT Management Consultant	Global IT Management Consultancy
6	IT Management Consultant	Global IT Management Consultancy
7	Managing Consultant	Global IT Management Consultancy
8	Managing Consultant	Global IT Management Consultancy
9	Executive Enterprise Architect	Global IT Management Consultancy
10	IT Service Management Consultant	Global Management Consultancy
11	IT Management Consultant	Global Management Consultancy
12	Service Engineer	Global Outsourcing Provider
13	Lead Client Sourcing Architect	Global Outsourcing Provider
14	IT Service Management Consultant	Global Outsourcing Provider
15	Project Executive	Global Outsourcing Provider
16	IT Service Management Consultant	Global Outsourcing Provider
17	Project Executive	Global Outsourcing Provider
18	Project Executive	Global Outsourcing Provider
19	Project Executive	Global Outsourcing Provider
20	Delivery Project Executive	Global Outsourcing Provider
21	Delivery Project Executive	Global Outsourcing Provider
22	Delivery Project Executive	Global Outsourcing Provider
23	Transition Manager	Global Outsourcing Provider
24	Project Manager	Global Pharmaceutical Company
25	CIO	International Insurance Company
26	Sourcing Manager	International Insurance Company
27	Member of the Board	Comunication Services Company
28	IT Strategy Consultant	IT Consultancy
29	IT Architect	IT Service Provider
30	CEO	IT Service Provider
31	CTO	IT Service Provider
32	Managing Consultant	IT Service Provider
33	IT Architect	IT Service Provider
34	Senior Consultant	Software Developer
35	Research Associate	Research Institute
36	IT Strategy Consultant	Self-employed
37	IT Sourcing Manager	Service Integration Provider
38	Sourcing Architect	Service Integration Provider
39	Sourcing Architect	Service Integration Provider
40	Software Architect	Software Service Provider
41	CEO	Customer Services
42	Solution Architect	Comunication Services Company

Table 6. Interview Participants Qualitative Study

A.2 Interview Participants Case Studies

Job Role	Case	Company	Interviews
CIO	Alpha	Alpha	Once
Program Manager	Alpha	Alpha	Multiple
Manager Provider Management	Alpha	Alpha	Multiple
Manager Infrastructure	Alpha	Alpha	Once
Manager IT Services	Alpha	Alpha	Once
IT Service Continuity Manager	Alpha	Alpha	Once
Three IT Management Consultants	Alpha	Consultancy	Multiple
VP Global CIO	Beta	Beta	Multiple
Director Global IT Strategy	Beta	Beta	Multiple
Director Global IT Business Relationship	Beta	Beta	Multiple
Director IT Service Mgmt. and Integration	Beta	Beta	Multiple
Director Global IT Applications	Beta	Beta	Once
Director Global IT Infrastructure	Beta	Beta	Once
Two Service Managers	Beta	Beta	Once
IT Supplier Manager	Beta	Beta	Multiple
Two IT Service Desk Managers	Beta	Beta	Once
Three IT Management Consultants	Beta	Consultancy	Multiple
Project Executive	Beta	Provider A	Once
Service Manager	Beta	Provider A	Multiple
Customer Account Manager	Beta	Provider B	Once
Service Manager	Beta	Provider B	Once

Table 7. Interview Participants Case Studies

A.3 Questionnaire Participants

Company	Jobrole
Multi-Sourcing Customer	CIO
Multi-Sourcing Customer	Sourcing Manager
Multi-Sourcing Customer	Service Integration Project Manager
IT Consultancy	Management Consultant
IT Consultancy	Management Consultant
IT Consultancy	IT Management Consultant
IT Consultancy	IT Management Consultant
IT Consultancy	IT Management Consultant
IT Consultancy	IT Service Management Consultant
Service Provider	Project Executive
Service Provider	Project Executive
Service Provider	Sourcing Architect
Service Provider	Sourcing Architect
Independent Service Integrator	IT Sourcing Manager
Independent Service Integrator	Sourcing Architect

Table 8. Participants Quantitative Study