

Discovering Organizational Elements for IT Service Brokering from a Literature Review

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Abstract: New technological trends and models are allowing organizations to easily access to specialized external IT services. As a consequence, IT areas are developing fewer and fewer IT services and relying more on external providers to achieve their customers' objectives. In this new context, the IT function should move from its traditional role of service builder and operator to a new role of service integrator and broker. However, IT areas are not aware of the organizational elements that need to be implemented to adopt this new role. In order to compensate this lack, this work presents a review of the existing literature intended to identify IT capabilities, roles, skills and strategies that can help IT organizations to act as a service broker. Our findings aim at establishing the basis for a complete approach.

1 INTRODUCTION

New technological trends and models, such a cloud computing, crowdsourcing, offshoring, among others, and the increasing emergence of new IT suppliers and services in the last few years has produced a growing offer of services in the IT market. In this context, organizations can find easy and rapid responses to their needs by contracting and accessing to external services without making requests, seeking approvals or consulting the IT department (Zimmermann and Rentrop, 2014). According to (Stratecast, 2016), 83% of employees in business areas of U.S. companies use IT services and applications that are not authorized by the IT department to carry out their daily work. If this is the case this could mean that the business areas would be meeting a part of their needs and taking advantage of the benefits offered by external services without the intervention of the IT department. However, this scenario could bring also security threats, since users would be overlooking the information security policies and requirements of their organizations (Zimmermann and Rentrop, 2014). Considering the potential benefits and risks associated to such scenario it could be said that the IT department should, on the one hand, facilitate the use of external IT services in order to allow business areas to reap the benefits they offer, and, on the other hand, govern the procurement and access to such services in order to reduce potential risks.

To succeed in, IT functions need to assume a new management role allowing them to intermediate between the external suppliers and the business customer in order to ease and control the supply of IT services. This role has been defined in the the following research works (Rackspace, 2014a), (Erbes et al., 2012), (Rackspace, 2014b) as IT service broker. According to these works, in this role *IT exercises the role of intermediary between external suppliers and internal customers in the provision of technology services, with the aim of focusing its own efforts on the delivery of solutions that leverage the business strategy. The IT department acts as a strategic partner for the business and as the sole responsible for the provision of IT services to the business.* But the reality is that in most of cases IT departments do not know how to take on this new role because there is a lack of conceptual tools and knowledge about the organizational elements that need to be changed in the IT function in order to offer a unique and flexible catalog of services that meets business needs from the aggregation and integration of the services contracted to external suppliers.

Considering the need above mentioned, this research work presents a review of the literature to identify and analyze the contributions in the IT service brokering area. The main objective of this review is to provide a general and up-to-date overview of existing work in order to identify and describe capabilities, roles, skills and strategies that that can help IT orga-

Table 1: Categories, criteria and research questions.

Category	Criterion	Research Question
Context	Domain	What is the domain of the research work?
	Objective	What is the objective of the research work?
Role of IT personnel and function	IT Function	What is the role of the IT function in the Service Broker role?
		What are the capabilities required by the IT function in this role?
	IT Personnel	What are the roles required by IT experts in the Service Broker role?
What are the skills required by IT experts in the Service Broker role?		
Business strategy	Alignment	What is the IT strategy in the Service Broker role?

nizations to act as a service broker. Our findings aim at establishing the basis for a complete approach or management model.

To succeed in, firstly, we present in Section 2 a review of the state of the art by following a systematic method that help us to understand the main organizational elements to be included the IT department when working as a Service Broker. Finally, Section 3 concludes the paper.

2 STATE OF THE ART

The following steps were used to conduct the review process: (i) Planning: This stage focuses on planning the search to identify the most relevant contributions. Thus we define in this step the research objective and an evaluation framework including research categories/criteria and questions in order to conduct the search as well as validate and select the most pertinent works. (ii) Realization: It consists in making an exhaustive search for works defining the search criteria, and assessing the found approaches in order to select those that answer the research questions. (iii) Analysis: This stage is related to the extraction of the relevant information of each selected approach and to synthesized it in order to answer the research questions of the framework.

2.1 Planning

The objective of this research work is to identify and analyze the characteristics of the IT Service Broker role to help IT departments in adopting the role. To perform this analysis, we propose a framework that is structured in term of: categories, criteria and research questions. The categories are divided into: (i) Context: to examine the domain and purpose of each research work; (ii) IT function and personnel: aspects related to the new role and capabilities of the IT area as well as the skills of its experts; (iii) Alignment of IT with the business: type of relationship to the business strategy under this new role. The elements previously described are shown in Table 1.

2.2 Realization

With the purpose of finding potential research works answering the research questions previously announced, the Scopus database was used by introducing the following criteria: (i) Search area: Computer Science, Business, Management and Accounting and Engineering. (ii) Document type: book, book chapter, article, conference paper and journal paper. (iii) Search field type: Abstract, title and keywords. (iv) Language: English.

Thus, the query introduced in the database is: *TITLE-ABS-KEY (("brokering" OR "broker" OR "mediator" OR "inter-agency" OR "interagency" OR "inter agency" OR "builder" OR "integrator" OR "integration" OR "composition" OR "composer" OR "decomposition" OR "decomposer" OR "break down" OR "breakdown" OR "unbundled" OR "unbundling" OR "brokerage") AND ("IT service" OR "ITC service" OR "cloud service" OR "saas" OR "paas" OR "iaas" OR "cloud computing" OR "cloud management" OR "outsourcing" OR "Information technology" OR "enterprise mashup") AND ("IT department" OR "CIO" OR "IT function" OR "IT area" OR "IT unit" OR "IT functional unit" OR "IT business unit" OR "IT functional area" OR "enterprise IT" OR "emerging trends" OR "academic research"))*

With these criteria, the Scopus search engine returned 98 candidate articles. To reduce the number of articles included in the analysis, firstly, a review of the articles titles was carried out. This filter reduced the number to 35. Secondly, a reading of articles abstracts was undertaken to filter those works that do not present evidence of answering any of the analysis questions. This filter limited the number of articles to 12. Thirdly, a complete reading of the articles was performed to select the final works set made up of 7 articles which were identified and included in the analysis. Therefore, in order to identify more relevant works, it was decided to carry out a Google search to find articles, books or white papers concerning the research objective. As a result, 5 white papers from technology companies that talk about the role were obtained.

In order to include to our analysis the contributions made by the existing standards, best practices and reference frameworks in the area of IT service management, we include the following works to our review: IT4IT (Information Technology for Information Technology) (TheOpenGroup, 2017), ITIL (Information Technology Infrastructure Library) (AXELOS, 2017), FitSM (Fitsm, 2017) and COBIT (Control Objectives for Information Systems and related Technology) (ISACA, 2012).

2.3 Analysis

A synthesis of the selected works, with reference to the research questions is presented below (see Table 2).

2.3.1 What is the Domain of the Research Work?

Two domains are identified, academy and industry. In the academy domain, seven works were found: six works in the Computer Science area and one work in the Business, Management and Accounting area. The categorization of these areas was taken from Scopus. Concerning the industry domain, documents identified do not make reference to a specific industrial sector. Last, the document (Erbes et al., 2012) was found through Scopus, however, it also presents elements of the industry because it was issued by the laboratory of the Hewlett Packard (HP) company. For this reason it was categorized in both the academy and in the industry.

2.3.2 What is the Objective of the Research Work?

When analyzing the 16 works, two common objectives are identified. The first objective is to provide contributions to help the IT department to adopt the IT Service Broker role. Consequently, these documents propose recommendations (Rackspace, 2014a), methodologies (Erbes et al., 2012) (HewlettPackard, 2013), best practices for the IT personnel (Rackspace, 2014b), reasons to switch to Service Broker role (Stratecast, 2016), challenges facing the IT function to adopt cloud computing (Willcocks et al., 2012), standard reference architecture (TheOpenGroup, 2017), best practices for IT service management (AXELOS, 2017) (Fitsm, 2017) and role and business frameworks for the governance and management of IT (ISACA, 2012). The second objective is to argue the need for IT departments of change from the traditional role of constructor and operator of IT services to the role of broker of IT services (Gefen

et al., 2011), (Ragowsky et al., 2014), (Rohmeyer and Ben-Zvi, 2012), (Wadhwa et al., 2013).

2.3.3 What is the Role of the IT Function in the Service Broker Role?

The identified roles are described below:

(i) IT service broker. The IT department exercises the role of intermediary between external suppliers and customers (Erbes et al., 2012) (Willcocks et al., 2012) (Hoyer and Stanoevska-Slabeva, 2009), (Rackspace, 2014a) (Rackspace, 2014b) (HewlettPackard, 2013) (Stratecast, 2016), (Devoteam, 2014) (TheOpenGroup, 2017). This role is responsible for all aspects related to technology in the organization. Thus, customers should only contact the IT department to obtain technological services (this helps reduce shadow IT). In addition, the IT department will be responsible for managing IT providers and services. This is the main role of the IT department in the IT Service Broker role, the following roles, from (ii) to (iii) were identified as sub-roles.

(ii) IT service integrator. In addition to the role of IT service broker, it is inferred from the articles (Erbes et al., 2012), (Gefen et al., 2011), (Ragowsky et al., 2014), (Hoyer and Stanoevska-Slabeva, 2009), (Rackspace, 2014a) and (HewlettPackard, 2013) a sub-role that need to be assumed by the IT department: the service integrator. According to (Wadhwa et al., 2013) to support a business process, could be necessary to combine services from different suppliers. As a result, the IT area should be able to integrate the different services to offer an unique consumer experience.

(iii) IT service administrator. It is understood as the role in charge of managing the entire life cycle of the service contracting process, from the acquisition to the termination of the service contract, so that these services are aligned with the business strategy (Erbes et al., 2012) (Hoyer and Stanoevska-Slabeva, 2009) (Rackspace, 2014a) (Rackspace, 2014b).

(iv) Aggregator, Governor and Customizer. According to (Wadhwa et al., 2013), these three roles are specific for Cloud Service Brokers (CSB): (i) Aggregator: is an intermediate company that contract multiple services in the cloud from different suppliers and offers them to different customers through a unified catalog. The intermediary manages service level agreements (SLA) for the customer. (ii) Governor: for specialized intermediaries in the cloud it is a specific role that guarantee data protection and security. The intermediary ensures that the cloud provider manages the data according to regulations and security policies previously established. (iii) Customizer: this role consists in developing specific functionality

to previously existing cloud services to meet a specific need of the customer.

2.3.4 What are the Capabilities Required by the IT Function in the Service Broker Role?

To respond to this question, we understand a Business Capability as the particular ability that a company possesses to achieve a specific purpose or result (Blair and Marshall, 2016). For the IT function, the following capabilities were inferred from the revision. (see Table 2).

(i) Supplier management. This capability involves searching, contracting, integrating, supervising and managing a wide variety of external suppliers (Erbes et al., 2012) (Rackspace, 2014a) (Rackspace, 2014b) (AXELOS, 2017) (Fitsm, 2017) (ISACA, 2012). Besides this capability includes to obtain good value for money from suppliers and ensuring that all contracts and agreements with them meet the needs of the business (AXELOS, 2017).

(ii) Services catalog management. The process responsible for providing and maintaining the service catalogue and for ensuring that it is available to those who are authorized to access it (Erbes et al., 2012) (Rackspace, 2014a) (Rackspace, 2014b) (TheOpenGroup, 2017) (AXELOS, 2017) (TheOpenGroup, 2017).

(iii) Requirements management. It consists in identifying customer needs, analyzing them before the acquisition of the service, prioritizing them according to the business strategy and, in conjunction with the catalog management capability finding a service that meet such needs (Erbes et al., 2012) (Rackspace, 2014a) (ISACA, 2012) (TheOpenGroup, 2017).

(iv) Service level management (SLM). It consists in the identification, specification, design, publication, compliance and monitoring of service level agreements (SLAs) (Gefen et al., 2011) (Wadhwa et al., 2013) (Rackspace, 2014a) (Rackspace, 2014b) (AXELOS, 2017) (Fitsm, 2017) (ISACA, 2012). In addition to negotiating clear SLAs with suppliers, through this capability the IT department ensures that they are appropriate to the needs of customers and continuously reports the service levels achieved.

(v) Offer management. It is in charge of publishing the catalog entries and defining with precision and detail the services, including dependencies and prices. It is also responsible for grouping specific offers for a specific group of customers. The purpose is to facilitate a service consumption experience that allows customers to easily access services through self-service (TheOpenGroup, 2017).

(vi) Requests fulfillment management. A request contains the selection of offers made by the customer from the service catalog. This capability is responsible for managing those requests. It capability is specifically responsible for: tracking the status of the request, directing the request to the provider to be attended, as well as recording consumption patterns of the services. Managing customer requests is for the purpose of maintaining customer satisfaction (TheOpenGroup, 2017).

(vii) Knowledge management. This capability includes to collect, analyze, store and share knowledge and information in order to help customer to meet their needs. The objective is to reduce the number of requests for information and increase self-service.(TheOpenGroup, 2017).

(viii) Customer relationship management. It focuses on the relationship with customers, which includes to identify potential customers, assign a responsible to manage the relationship of each customer, establish communication mechanisms with customers and manage complaints from customers (Fitsm, 2017) (AXELOS, 2017). It recommends the relationship on mutual trust, using understandable terms, common language and willingness to take responsibility (ISACA, 2012).

(ix) Services portfolio management. The process responsible for managing the service portfolio. Service portfolio management ensures that the service provider has the right mix of services to meet required business outcomes at an appropriate level of investment. Service portfolio management considers services in terms of the business value that they provide (Erbes et al., 2012) (Rackspace, 2014a) (Rackspace, 2014b) (TheOpenGroup, 2017) (AXELOS, 2017) (TheOpenGroup, 2017).

2.3.5 What are the Essential Roles Required by IT Experts in the Service Broker Role?

The following IT expert roles were identified as important in the IT Service Broker role.

(i) Supplier and partner manager: It is essential to have IT experts who address simultaneously the management of multiple suppliers because of the accelerated growth in the number of suppliers in current organization. Regarding their activities experts should master the supplier management capability above mentioned . This role is in charge of ensuring that contracts with suppliers support the needs of the business and all suppliers comply with their contractual commitments (Erbes et al., 2012) (Gefen et al., 2011) (Willcocks et al., 2012) (Rackspace, 2014a) (Rackspace, 2014b) (HewlettPackard, 2013) (Stratecast, 2016).

Table 2: Answers of related works to research questions for Roles, Capabilities and Expert IT Roles.

IT Function	
Roles	
IT service broker	(Erbes et al., 2012), (Willcocks et al., 2012), (Hoyer and Stanoevska-Slabeva, 2009), (Rackspace, 2014a), (Rackspace, 2014b), (HewlettPackard, 2013), (Stratecast, 2016), (Devoteam, 2014), (TheOpenGroup, 2017)
IT service integrator	(Erbes et al., 2012), (Gefen et al., 2011), (Ragowsky et al., 2014), (Wadhwa et al., 2013), (Hoyer and Stanoevska-Slabeva, 2009), (Rackspace, 2014a), (HewlettPackard, 2013)
IT service administrator	(Erbes et al., 2012), (Hoyer and Stanoevska-Slabeva, 2009) (Rackspace, 2014a), (Rackspace, 2014b)
Aggregator, Governor, Customizer	(Wadhwa et al., 2013)
Capabilities	
Supplier management	(Erbes et al., 2012),(Gefen et al., 2011), (Willcocks et al., 2012), (Rackspace, 2014a), (Rackspace, 2014b), (HewlettPackard, 2013), (Stratecast, 2016), (AXELOS, 2017), (Fitsm, 2017), (ISACA, 2012)
Services catalog management	(Erbes et al., 2012),(Rackspace, 2014a), (Rackspace, 2014b), (Stratecast, 2016), (TheOpenGroup, 2017), (AXELOS, 2017)
Requirements management	(Erbes et al., 2012), (Rackspace, 2014a), (TheOpenGroup, 2017), (ISACA, 2012)
Service level management (SLM)	(Gefen et al., 2011), (Wadhwa et al., 2013), (Rackspace, 2014a), (Rackspace, 2014b), (AXELOS, 2017), (Fitsm, 2017), (ISACA, 2012)
Offer management	(TheOpenGroup, 2017)
Requests fulfillment management	(TheOpenGroup, 2017), (AXELOS, 2017)
Knowledge management	(TheOpenGroup, 2017), (AXELOS, 2017)
Customer relationship management	(AXELOS, 2017), (Fitsm, 2017), (ISACA, 2012)
Services portfolio management	(Erbes et al., 2012),(Rackspace, 2014a), (Rackspace, 2014b), (Stratecast, 2016), (TheOpenGroup, 2017), (AXELOS, 2017)
IT Personnel	
Expert IT roles	
Supplier and partner manager	(Erbes et al., 2012), (Gefen et al., 2011), (Willcocks et al., 2012), (Rackspace, 2014a), (Rackspace, 2014b), (HewlettPackard, 2013), (Stratecast, 2016), (AXELOS, 2017)
Service manager	(Erbes et al., 2012), (Rackspace, 2014a), (Rackspace, 2014b), (Stratecast, 2016), (AXELOS, 2017), (ISACA, 2012)
IT services integration specialist	(Ragowsky et al., 2014), (Hoyer and Stanoevska-Slabeva, 2009), (Rackspace, 2014a), (Rackspace, 2014b)
Enterprise architect	(Rackspace, 2014b), (HewlettPackard, 2013)
Financial manager	(Ragowsky et al., 2014), (HewlettPackard, 2013), (Stratecast, 2016)
Strategic advisor	(Gefen et al., 2011), (Ragowsky et al., 2014), (Rohmeyer and Ben-Zvi, 2012), (HewlettPackard, 2013)
Business relationship manager	(AXELOS, 2017)
Business analyst	(Erbes et al., 2012), (Rackspace, 2014a), (TheOpenGroup, 2017)
Service level manager	(AXELOS, 2017), (Fitsm, 2017)
Catalog manager	(AXELOS, 2017), (Fitsm, 2017)
Knowledge manager	(AXELOS, 2017)

(ii) Service manager: The person in charge of managing the life cycle of services managing the development, implementation, evaluation and continuous management of new and existing services for the customer. In addition, this person make decisions about which service should be developed internally or purchased from an external provider (Erbes et al., 2012) (Rackspace, 2014a) (Rackspace, 2014b) (Stratecast, 2016) (ISACA, 2012) (AXELOS, 2017).

(iii) IT services integration specialist: this consists in supporting support a process of business through the unification of services from different suppliers and offer the customer a unique service (Rackspace, 2014a) (Rackspace, 2014b) (Ragowsky et al., 2014) (Hoyer and Stanoevska-Slabeva, 2009). If services are contracted from different providers, but integration is required to solve a business need. IT experts should have software development skills from multiple platforms (Hoyer and Stanoevska-Slabeva, 2009) (Rackspace, 2014b).

(iv) Enterprise architect: the IT department should have an enterprise architect to assume a more strategic role and have a holistic view of the company's needs (Rackspace, 2014b) (HewlettPackard, 2013). It is also inferred that this role has deep knowledge in business, negotiation skills, leadership and domain to propose IT solutions.

(v) Financial manager: the IT Service Broker role when hiring several suppliers to supply IT services to the customers. It becomes indispensable to have IT experts who know of contracts, licenses, financial projection of costs and clauses (Gefen et al., 2011) (Ragowsky et al., 2014) (Rohmeyer and Ben-Zvi, 2012) (HewlettPackard, 2013).

(vi) Strategic Advisor: IT experts should be trusted business partners. The strategic objectives of the company can be leveraged through the generation of IT solutions. Therefore, expert consultants or auditors are required to advise the business from technology (Gefen et al., 2011) (Ragowsky et al., 2014) (Rohmeyer and Ben-Zvi, 2012) (HewlettPackard, 2013).

(vii) Business relationship manager (BRM): the person in charge of maintaining a positive relationship with customers (AXELOS, 2017). BRM process identifies the needs of existing and potential customers and ensures that appropriate services are developed to meet those needs.

(viii) Business analyst: It is inferred the need to have a role that is responsible for the requirements management, so it can identify first-hand the needs of customers (Erbes et al., 2012) (Rackspace, 2014a) (TheOpenGroup, 2017).

(ix) Service level manager: the person responsi-

ble for negotiating and defining service level agreements (SLA) and ensuring that they are met (AXELOS, 2017) (Fitsm, 2017).

(x) Catalog manager: the person responsible for defining and maintaining the catalog of services, as well as ensuring that all the information contained in the catalog is accurate and up-to-date (AXELOS, 2017). It also is named as a process manager, it is the person in charge of ensuring that the service catalog is aligned with the business strategy (Fitsm, 2017).

(xi) Knowledge manager: the person responsible for ensuring that the IT organization is able to collect, analyze, store and share knowledge and information (AXELOS, 2017).

2.3.6 What are the Skills Required by IT Experts in the Service Broker Role?

(Erbes et al., 2012) argue that in the IT service broker role traditional skills such as network configuration, server administration or network support are replaced by new skills, which are grouped by subject and described as follows.

Supplier management: IT experts need skills to deal with all the concerns related to suppliers such as: searching, evaluating, integrating and orchestrating multiple suppliers, and having the ability to maintain good relations with suppliers and business partners (Erbes et al., 2012) (Gefen et al., 2011) (Willcocks et al., 2012) (Rackspace, 2014a) (Stratecast, 2016) (AXELOS, 2017). In addition, they should manage and supervise SLAs and contracts, as well as know how to negotiate, obtain mutually beneficial contracts and have knowledge in market analysis.

Financial management: IT experts need skills to manage costs, manipulate contracts, manage licenses and monitor compliance with SLAs. There is an increasing dependency of the IT function with the legal department to contracting services with external providers, however this department does not know about service level agreements or how to measure the effectiveness of the service. This is why CIOs prefer to have IT experts who also dominate the financial, legal and contractual aspects of supplier management (Gefen et al., 2011) (Willcocks et al., 2012) (Ragowsky et al., 2014) (HewlettPackard, 2013) (Stratecast, 2016).

Strategic and customer management: IT experts need skills in strategic and critical thinking, analytical skills, capability for decision making, communication at the commercial and technical level, solving problems, creativity, strategic analysis (Erbes et al., 2012) (Ragowsky et al., 2014) (Rohmeyer and Ben-Zvi, 2012) (Willcocks et al., 2012) (Rackspace, 2014b). Soft skills: soft skills such as communication are es-

sential because of the continuous relationship with customers and suppliers. According to (Erbes et al., 2012) these skills are essential for the IT department to become a strategic partner for the business. Service integration: IT experts need to have a broad view of the company's needs and business objectives when designing and integrating solutions (Ragowsky et al., 2014) (Rackspace, 2014a) (Hoyer and Stanoevska-Slabeva, 2009). Therefore, they should have the ability to evaluate the consequences of integration decisions and have knowledge of different platforms for integration.

Service management: IT experts should have the ability to generate clear SLAs with customers, ability to generate metrics of service performance and continuous monitoring to take preventive measures (Hoyer and Stanoevska-Slabeva, 2009) (Rackspace, 2014b) (Stratecast, 2016) (AXELOS, 2017). In addition, the expert should have skills to manage multiple and different services.

2.3.7 What is the IT Strategy in the Service Broker Role?

The following three IT strategies were inferred:

(i) Be a strategic partner for the business. The IT department could be a strategic partner for the business using technology to leverage strategic initiatives. IT department experts could focus on strategic issues with the Service Broker role, as issues with incidents or problems will be handled by service providers. The strategic objectives are met when the business recognizes and allows technology to be involved in the strategies of the company (Rohmeyer and Ben-Zvi, 2012) (Gefen et al., 2011) (Willcocks et al., 2012).

(ii) IT governance. The catalog of services should always be aligned with the business strategy. The services that will make up the service catalog based on the definition of the business strategy (Erbes et al., 2012) (Rackspace, 2014b) (HewlettPackard, 2013). It establishes a holistic view of the catalog of IT services based on strategic priorities such as: business value, risk, costs, benefits and resources (TheOpenGroup, 2017) (TheOpenGroup, 2017). In addition, the IT department is solely responsible for all IT services (Erbes et al., 2012) (Rackspace, 2014b) (HewlettPackard, 2013).

(iii) Identify what service is built and what service is contracted. One of the challenges facing the IT department is deciding which IT services to hire and which ones to develop internally (Erbes et al., 2012) (Ragowsky et al., 2014). Among the services that are hired, one of the decisions that should also be defined is which services are managed in the public cloud and which in the private cloud.

2.4 Discussion

From the literature review, we identified a set of common organizational element for the IT Service Broker role which are described in this section. These elements should be taken into account by the IT department when migrating towards this new role.

According to the results of the analysis, the IT department should work with nine essential capabilities, each of which is associated to an IT expert role with respective skills.

Although relationships between the elements were not found in the reviewed works, one of them could be interpreted as follows: the customer raises needs or requirements, that are prioritized by the requirements management capability according to the strategic business plan. Thus, portfolio management defines a service portfolio to meet business requirements that is also aligned with the strategic business plan. To define the services portfolio, it is necessary to contact external suppliers that offer specialized services, the suppliers management capability is in charge of such task. In addition, from the portfolio, a catalog is published by the offer capability in a portal that is accessed by the customer. The customers in the portal can consult all the services that are ready to consume, in this way they can also consult all the detailed information of the service. When a customer is interested in a service published on the portal, this makes a request, which it is managed by the requests fulfillment, through a contract with the provider. This contract contains service-level agreements that are managed by the service level management capability agreements. Transversely to all the aforementioned IT services management, it is the knowledge management capability that takes knowledge generated by suppliers and the IT department to make it available to customers.

3 CONCLUSIONS AND FUTURE WORK

This article presents a literature review that identifies and analyzes the research works in the IT Service Brokering domain. From this analysis, this paper gathers the main organizational elements, such as capabilities, roles, and skills, that can help IT organizations to work as a broker. Regarding roles of IT experts, we identified a reduction in technical and traditional roles, such as infrastructure, servers and networks administrators, and an increase in new organizational roles in the following areas in management, consultancy, and strategy. Regarding skills, Concern-

ing capabilities, they follow the same way that skills in the sense that IT departments are moving from focusing on technical capabilities to organizational capabilities. For example, today IT departments require procurement capabilities, similar to the ones of purchasing department, allowing them to supply the organization with technological goods and services.

Concerning future work, on the one hand, one of the main findings of this research is the lack of academic research works and best practices in the IT Service Brokering domain, although of the importance that this phenomenon. This lack of works has had repercussion in the ability of companies to migrate to this role. For example, (Rackspace, 2014b) shows that most IT executives see the IT Service Broker role as a priority but only 25 percent have made a progress in its adoption. In addition, (Rackspace, 2014b) considers that this transition has been slow, in part, due to the lack of best practices and frameworks. Furthermore, according to (Wadhwa et al., 2014), there is a clear gap in academic research in the area of CSBs, even though Gartner projects a 100 billion dollar growth in revenue for CSB in the next year. Therefore, we consider that there is a need for academics to get involved in studies regarding transformation and change in the organization, as in (Avila and Garces, 2017), to support the transition to this role. On the other hand, when we analyze the results corresponding to the characteristics in the IT function, we consider that they can be complemented and improved in several ways in future investigations. Regarding the adoption of the role, one of the main conclusions is that the reviewed works are too focused on presenting the urgency of a change in the IT function. However, these works fail in proposing a set of good practices or formal frameworks to carry out such change. In addition, in the literature review carried out no case studies or analysis of specific organizations were found. We consider that it is important to research about real application cases in order to abstract lessons learned of the transition to service broker.

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