

Validating the Domains of an
Inter-Organizational Business-IT Alignment
Assessment Instrument: A Case Study

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August 2008

¹Supported by the Netherlands Organization for Scientific Research (NWO) under contract number 638.003.407 (Value-Based Business-IT Alignment).

Abstract

CIOs can judge the effectiveness of their business-IT alignment activities by assessing maturity of processes in domains relevant to alignment. Currently, assessment instruments that support this are being developed. This paper reports on a case study aimed at validating four process domains we deemed necessary for inclusion in an assessment instrument that focuses on business-IT alignment at the level of inter-organizational collaboration. Our case study research draws on empirical evidence from an inter-organizational collaboration among different government departments within the state of Tamaulipas in Mexico. The case study revealed that the domains included in the alignment assessment instrument are the most important ones to address when achieving business-IT alignment in inter-organizational collaborations.

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Chapter 1

Introduction

Concerns such as identifying ways to control costs, improve quality, increase effectiveness, and manage risk have become increasingly important for CIOs as organizations face more and more pressure to gain and maintain their competitive edge. Assessment instruments have been developed to assist organizations in these efforts. These instruments serve as tools to identify, prioritize, and implement improvements in different areas within organizations. A maturity model (MM) is one kind of these assessment instruments. MMs have been developed to assess specific areas against a norm. Based on maturity assessments, organizations, then, know the extent to which activities in such areas are predictable.

Business-IT alignment (B-ITa) is recognized as a solution to the concerns mentioned above. CIO magazine's State of the CIO 2008 research reveals that alignment is still a top priority for CIOs [3]. In this paper, we address B-ITa at an operational level and define it as the process of matching services offered by IT with the requirements of the business [4, 5]. B-ITa can be achieved at various levels of maturity. Therefore, maturity models seem a suitable vehicle for organizations to use in order to gain a deeper understanding of how they progress toward better alignment. Although literature (e.g., [6, 7, 8]) proposes MMs to assess B-ITa, to the best of our knowledge there is no MM that specifically addresses the aspects needed for achieving alignment between business and IT in inter-organizational collaborations – which is another important topic for CIOs [9]. Inter-organizational collaborations arise when organizations redesign themselves to cooperate with other enterprises due to increasing competitive pressure in their markets. Our research is set out to develop a maturity model (the so-called ICoNOs MM – **IT-enabled Collaborative Networked Organizations Maturity Model**) to assess B-ITa in inter-organizational collaborations. If achieving B-ITa is complex in single enterprises, with the advent of inter-organizational collaborations, it becomes more complex because in such settings, B-ITa is driven by economic processes instead of by centralized decision-making processes.

This paper builds on earlier publications [4, 10], in which we reported on our

motivation for developing the ICoNOs MM and on how we began to validate the model. In this paper, we leverage our earlier results and describe how we used a case study to validate the B-ITa domains included in the ICoNOs MM. These domains are: **partnering structure**, **IS architecture**, **process architecture** and **coordination**. A domain is a group of processes that help to have improvements in a particular area of inter-organizational collaboration. We deem the four B-ITa domains above to be the necessary domains to address when achieving B-ITa in inter-organizational settings. The present validation study represents a continuation of previous validation efforts that help us to confirm the domains that should ultimately be included in our MM.

In the remainder of this chapter we first elaborate on two concepts: B-ITa and inter-organizational collaborations. This serves as background for the rest of the paper, which is organized as follows: first, we briefly present (i) the MM development process we are following and, (ii) some validation aspects of MMs. Then, in Chapter 3, we describe the B-ITa domains that we are validating. Furthermore, we present the validation approach we followed. Finally, we discuss the results, summarize our conclusions and present our immediate future work.

1.1 Business-IT alignment

The term B-ITa is already more than 15 years old (see e.g. [11]). However, despite years of research, B-ITa still ranks as a major modern-day area of concern for CIOs [3]. Table 1.1 presents a summary of several B-ITa definitions that can be found in literature.

B-ITa is, in this paper, defined as the process of matching services offered by IT with the requirements of the business. This definition is related to the definitions given in Table 1.1 as follows. First, we do not consider alignment as a steady state but as an operational process that needs continuously be improved. This is similar to those definitions that also stress that B-ITa is a process [11, 15, 16, 17], but differs from the other half, which sees B-ITa as a desired state. As a process, B-ITa has a final state that can be reached, i.e., an optimal situation of B-ITa (as can be seen in some of the definitions, e.g., [8, 12, 13, 14]).

Second, our definition emphasizes the operational level of B-ITa. Many authors in the B-ITa field approach alignment purely at the strategic level, e.g. Chan et al. [14], Luftman [8], and Broadbent and Weill [12]. In contrast, the work of Maes et al. [15] seems to be applicable both at the strategic as well as the operational level, while the others seem to make no clear, explicit commitment. In our definition, with the term ‘services offered by IT’, we only consider information systems as a common denominator solution to match the requirements of the business. As our work is focused on inter-organizational settings, we explore the B-ITa concept in that context. Thereby, the ‘requirements of the business’ term covers the systems requirements derived from analyzing the goal(s) of the inter-organizational collaboration (see next section).

We analyze the B-ITa concept in inter-organizational collaborations based

Table 1.1: B-ITa definitions.

Author	Definition
Henderson and Venkatraman [11]	The allocation of IT budgets such that business functions are supported in an optimal way.
Broadbent and Weill [12]	The degree of congruence of an organization's IT strategy and IT infrastructure with the organization's strategic business objectives and infrastructure.
Reich and Benbasat [13]	The degree to which the IT mission, objectives, and plans support and are supported by the business mission, objectives and plans.
Chan et al. [14]	The situation that occurs when IS functions are amalgamated with the most fundamental strategies and core competencies of the organization.
Maes et al. [15]	A continuous process, involving management and design sub processes, of consciously and coherently interrelating all components of the business/IT relationship to contribute to the organization's performance over the time.
Duffy [16]	The process of achieving competitive advantage through developing and sustaining a symbiotic real relation between business and IT.
Luftman [8]	A state where IT is applied in an appropriate and timely way, in harmony with business strategies, goals and the needs.
Senn [17]	Ensuring that every single action performed by IT individuals is focused on building and delivering shareholder/stakeholder value by supporting business operations and/or achieving business goals.

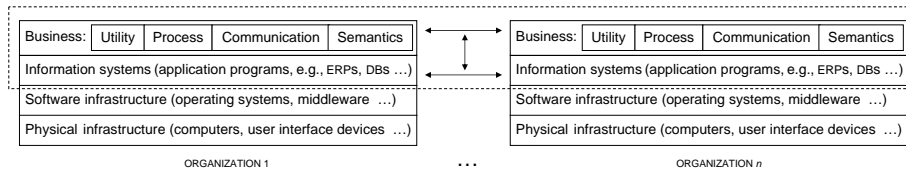


Figure 1.1: Business-IT alignment framework (adapted from [1]).

on the scheme shown in Figure 1.1. The horizontal layers classify entities in a service provisioning hierarchy in a business: physical entities provide services to a software infrastructure, which provides services to information systems, which provide services to businesses. In the business layer, we take four views on businesses: businesses provide services that have a utility, they perform processes to provide these services, they communicate with one another as part of performing these processes, and while doing that, they exchange data that has semantics. Participating organizations in an inter-organizational collaboration need both to fit the different entities (horizontal arrows) as well as to address inter-organizational B-ITa (vertical arrow). Our interest is in the upper two layers of the framework (area delimited by the dotted line), because there is where the business and IT alignment in inter-organizational collaborations takes place.

1.2 Inter-organizational collaborations

Changes in the business environment force organizations to re-think the way they are doing business. More and more organizations nowadays take advantage of the next level of reengineering approaches which capitalize on connecting and aligning the business and IT operations of one organization with those of other organizations to meet organizational goals. Participants in an inter-organizational collaboration can be seen as distinct loosely coupled stakeholders with commonly conflicting interests and goals [18, 19]. However, if they want to collaborate, they need to formulate a clear-enough common goal(s) toward which they strive together. This goal is not necessarily the goal of all participants. The common goal is an agreement among the customer-facing organization and its direct partners. This common goal might include also other participating organizations in the inter-organizational collaboration, but not necessarily.

We define an inter-organizational collaboration to be any “mix-and-match” network of profit-and-loss responsible organizational units, or of independent organizations, connected by IT, that work together to jointly accomplish tasks, reach common goals and serve customers over a period of time [20]. Our interest is in IT-enabled inter-organizational collaborations, i.e., collaborations that are made possible by IT where the participants interoperate with each other by means of information systems. A traditional example of an inter-organizational collaboration is an online travel agency where, although some of the online services are developed by the travel agency itself, it requires services owned by third parties, e.g., payment processing services, flight booking services, and car rentals. In this case, the travel agency can use a multi-stakeholder distributed system [21] or an inter-organizational system [22] to interoperate with its partners.

Chapter 2

Validation of Maturity Models

2.1 MM Development Process

The development of a MM covers several steps (see Figure 2.1). Detailed explanation of most of these steps can be found in our early work [23]. The first step in developing a MM is to determine the scope of the model, which means to set the boundaries for the model application and use, and to define the purpose of the model. This is to differentiate the model from existing MMs. The second step is about the design of the model and covers (i) the specification of the model's type – i.e., assessment versus development model, (ii) the determination of the model's architecture – i.e., staged versus continuous model, (iii) the definition of the maturity levels, and (iv) the identification of the domains to which the levels apply. This last task is not simple because after identifying the domains, they need to be validated in order to assure that they correspond to the purpose of the model. Once the design of the model is completed, process areas need to be identified for each domain so that we populate the model with observable domain assessment criteria. A process area is a group of practices in a domain which, when implemented collectively, satisfy goals considered important for making an improvement in that domain. After populating the model, it must be evaluated in order to validate its applicability and generalizability. Finally, the MM must be made available for use without forgetting its maintenance over time to keep it up-to-date.

Considering the importance of validation of MMs, the next section discusses this topic in more detail.

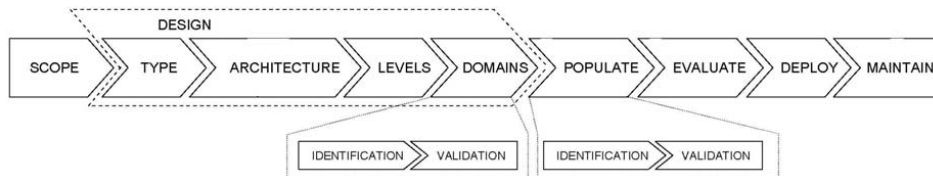


Figure 2.1: MM development process.

2.2 MMs validation criteria

The validation of MMs received significant attention since the early days of the Capability Maturity Model (CMM), the best-known MM, proposed by Carnegie Mellon University’s Software Engineering Institute (more information on <http://www.sei.cmu.edu/cmm/>). Initial validation efforts focused on comparing the costs and quality of the software engineering process of organizations that used assessment instruments with those who did not [24]. For example, Schlumberger [25] and Motorola [26] used CMM-based improvement programs as a vehicle for implementing productive changes and to evaluate if the CMM provided real benefits. This kind of validation can be conducted only when a model has been completed (see EVALUATE step in Figure 2.1). Apart from these attempts, with very few exceptions, existing literature offers almost no advice on how to empirically validate a MM.

Based on recommendations by researchers in empirical software engineering evaluation [27], requirements engineering [28, 29] and information systems development and management [30, 31], we must provide evidence that the ICoNOs MM is in fact useful, i.e., to investigate the model by empirical means in order to understand it, to evaluate it, and to deploy it in proper contexts. Such empirical investigation will assure the design of a model that can be useful for business practitioners who work in real-life inter-organizational collaborations. It is important that the ICoNOs MM addresses real-world problems to become relevant to stakeholders.

For the purpose of this paper, we consider that a valid MM is a model that is sufficiently accurate to achieve its purpose. The purpose of our MM is to enable assessing maturity of B-ITa efforts in inter-organizational collaborations to plan future B-ITa actions. With this purpose in mind, we consider the ICoNOs MM valid if it allows inter-organizational collaborations to assess their alignment efforts. Since we are going through the step DOMAINS of the MM development process presented in Figure 2.1, for us, validity comprises the completeness and suitability of the domains included in our model to reach the purpose of the ICoNOs MM. The domains are the enablers of B-ITa in inter-organizational settings that will be assessed using the model. The B-ITa domains will be considered complete only when they constitute all suitable domains that can enable such alignment. In the next chapter, we present the domains that are currently included in the ICoNOs MM.

Chapter 3

B-ITa Domains

A MM can be seen as a two-dimensional framework: one dimension stands for the maturity levels and the other dimension for the domains to which these levels are applied. From the literature (e.g., [6, 8, 32]), it is well-known that domains such as skills, technology scope, partnership, governance, competency measurements, communications, informal organization, requirements and IT architecture help to align business and IT in single enterprises. In contrast to these authors, our challenge is to identify the necessary domains not for general B-ITa in the context of single enterprises, but for the inter-organizational aspect of it. Below, we give a short summary of the domains included in the ICoNOs MM, following Figure 3.1 from bottom to top:

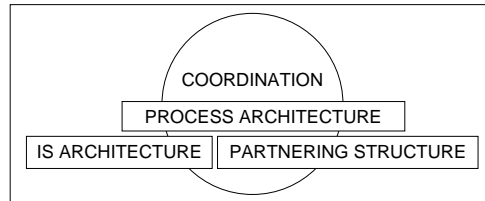


Figure 3.1: B-ITa domains in the ICoNOs MM.

- **Partnering structure**, defined as the inter-organizational work division, organizational structure, and roles and responsibilities definition that indicate where and how the work gets done and who is involved.
- **IS architecture**, defined as the fundamental organization of the information management function of the participating organizations embodied in the information systems, i.e., software applications, that realize this function, their relationships to each other and to the environment, and the principles guiding its design and evolution. It must be noted that, in our work, we distinguish IS architecture from IT architecture. For us, IT architecture consists of the (i) implementation platform, i.e., the collection

of standard general-purpose software needed to run the IS architecture. It ranges from operating systems (OSs), middleware, network software to database management software; and the (ii) physical network, i.e., the physical resources that run the software applications. This includes computers, cables, wireless access points, printers, and user interface devices to support the running of the IS architecture [1].

- **Process architecture**, defined as the choreography of all processes needed to reach the shared goals of the participating organizations. These processes are both primary business processes of the collaboration and processes needed for information exchange.
- **Coordination**, defined as the mechanisms to manage the interaction and work among the participating organizations taking into account the dependencies and the shared resources among the processes.

Figure 3.1 illustrates that understanding of both **partnering structure** and **IS architecture** is needed to efficiently support the **process architecture** of an inter-organizational collaboration. Organizations involved in inter-organizational IT alignment can (re)design the **partnering structure** and **IS architecture** separately, however, they need to understand both in order to create and maintain a solid basis for the processes required to achieve shared goals and to exchange information in the inter-organizational collaboration. **Coordination**, then, comes next to manage the dependencies among the collaborative activities.

We claim that **partnering structure**, **IS architecture**, **process architecture** and **coordination** are the necessary domains to consider when dealing with collaborations so that value is created for the participating organizations and B-ITa is achieved. Using a case study, we evaluate this theoretical statement, and we continue validating the completeness and suitability of the B-ITa domains for inter-organizational settings. The next chapter discusses the method we followed.

Chapter 4

Validation Method

The case study presented in this paper is a continuation of previous efforts to validate the domains included in the ICoNOs MM [10]. By conducting this second case study, we add reliability to our conclusions. However, since the presented case is a single case study, we can still bear threats concerning the case study generalization. As we explain at the end of this chapter, generalization from a single case is possible when using theory to derive empirical statements [33]. The objective of the case study was to investigate whether the domains included in our ICoNOs MM are present in the investigated inter-organizational collaboration and, if so, to what extent. We claim that the domains presented in the previous chapter are the necessary B-ITa domains to consider in inter-organizational collaborations. These domains help to achieve B-ITa adding value for the participating organizations. Using this case study, we want to demonstrate whether these domains are the necessary ones, or whether it is required to include more. The research question to answer with this case is:

Are the domains presented in Figure 3.1 the necessary ones to consider when aligning IT with the business in an inter-organizational collaboration? If not, what other domains must be taken into account?

Specifically, we wanted to identify both important information concerning each of our four domains and new valuable topics characteristic to B-ITa attempts that could be considered as candidates for forming new B-ITa domains. The primary data sources were professionals from the case study site. We used interviews as data collection technique. The collected information is of qualitative nature since there is no statistical information that could be obtained from a limited number of interviews with open questions. The interviews were taped to help writing the reports which we used for analyzing. This was done with the consent of each interviewee. The secondary sources of data were some documents related to the implementation of the project to which we had access.

4.1 Case Study Site

The inter-organizational collaboration we studied is a network of more than a hundred departments of the state of Tamaulipas in Mexico. The United Mexican States (Mexico) is a federal constitutional republic, i.e., a federation of thirty-one free and sovereign states and a Federal District. Tamaulipas is one of these self-governing states. Since the beginning of the administration 1999-2004, the organization of the Tamaulipas state government has not changed considerably. The government is divided in 12 secretaries. In average, each of these secretaries has 4 divisions and each division consist of at least two departments. One of these divisions is the Division of ICT (Information and Communication Technology) that is responsible for all ICT activities in the government, including development of new systems (IS architecture) and maintaining the IT infrastructure that support these systems (IT architecture). This division is the supplier of IT services within the government of the state of Tamaulipas. It is the IT-side in the B-ITa problem. The business-side (IT demand) is represented by the requirements of all other divisions and their departments (see Figure 4.1). The demand side drives the identification and prioritization of systems requirements and opportunities to exploit emerging technologies. This separation of IT management issues (i.e., supply and demand sides) in the collaboration among the secretaries of the Tamaulipas state government is a situation that fits properly with the operational B-ITa we are addressing with the ICoNOs MM.

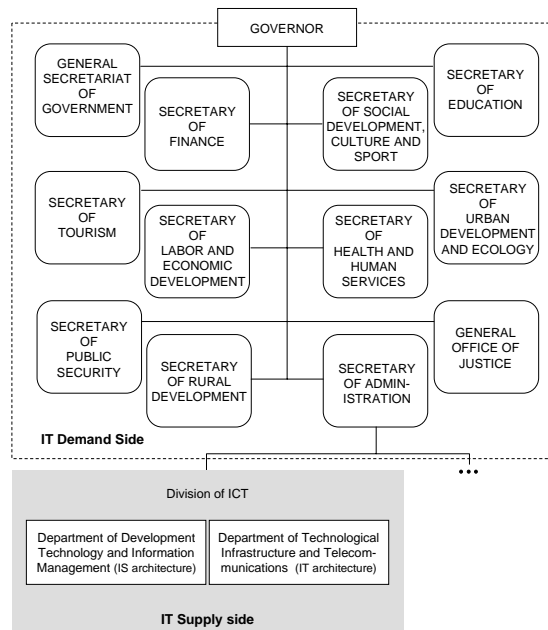


Figure 4.1: IT and business sides in the Tamaulipas state government structure.

The government of the state of Tamaulipas shares the view that modern governments must be distinguished by the results that they bring, by the solutions that they generate, and by the opportunities and transparency that they offer to the society. As a response to the necessity of having a modern government administration, the government of the state of Tamaulipas implemented Domino/Notes to allow the departments to maintain fast and uninterrupted internal communication, while offering better quality of service to citizens. The goal of the project was to increase e-mail uniformity and to allow the development of collaborative systems. This goal faces the overall requirements of the government departments: to make the service-delivery process more effective and efficient, and to create a better government-citizen relation, meeting the expectations of society.

The first project under Domino/Notes was the Citizen Attention Service System (CASS). This system helps to collect all the individual requests and petitions that the citizens raise to the governor and to the government secretaries chiefs, i.e., any request concerning public services as electricity, security and the like, that the citizen wants to submit to the government of the state of Tamaulipas.

The CASS project began in 2001. The initial situation in the area of service provisioning to citizens was characterized by much bureaucracy and poor response time. Only few of the departments had a system to manage the requests. Those systems were home-grown applications developed by IT sections of different departments. Each had its own application logic and data semantics and contributed in a unique way to a lack of homogeneity and communication among systems. For example, when a department received a citizen's request that involved other department(s), the official documents were sent by internal postal service and the department in charge had no longer direct control on the request. This control came back when the documents were received back. The communication among departments was primarily by means of telephone.

The new system facilitates the allocation, distribution and communication of citizens' requests among departments, as well as all the information related to such requests, i.e., the associated preceding events, the elaboration of the official document, the current status and the answer of the departments involve in the process to satisfy the requests. This helps to have better control in each of the processes, while having a close relation with the citizens to keep them informed on the process of their requests. A visible advantage after implementing the CASS was the reduction of response time. The system records the citizens' requests and automatically sends them to the departments that are involved, thus, avoiding bureaucracy and driving employees to work efficiently because of the feeling of being controlled by superiors by means of the new system.

4.2 Analysis Process

This section summarizes the strategies and techniques that we used to analyze the information obtained in the case. Figure 4.2 illustrates the analysis process

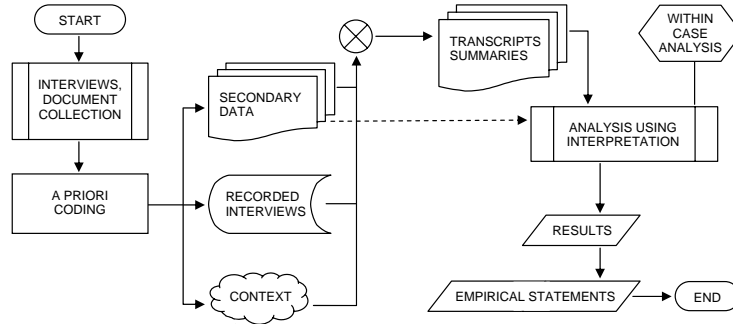


Figure 4.2: The data analysis process (adapted from [2]).

we followed. As the data was summarized in transcripts, we chose a hermeneutic approach to analyze it. This approach claims that we can understand a complex whole from preconceptions about the meanings of its parts and their interrelationships [34]. In our particular case, a hermeneutic approach helps to obtain results from analyzing the information sources, the interviewees, and the organization altogether.

According to literature [35, 36], an “a priori codification” of expected concepts is valuable when starting an analysis process because it helps to shape the theory to be tested and built. Our previous work [10] helped us to develop such codification based on the domains included in our ICoNOs MM, i.e., **partnering structure**, **IS architecture**, **process architecture** and **coordination**. This codification is later used in the analysis of the interviews transcripts (see Figure 4.2). If the codes prove important in the results of our case, then we have a firmer empirical ground for the findings. Individual transcripts summaries were created from each participant’s recorded interview. This process helped to develop a clearer picture of the answers of the participants to the questions of the interview. Specifically, the transcriptions were useful to carry out a ‘within-case’ analysis [35], i.e., the interviews write-ups helped to generate insights and to cope with secondary data of the case study site. In addition, analysis of secondary data was done in parallel to the analysis of the interview transcripts. The secondary data was collected from the documentation which referred to aspects of the domains included in our model.

As professionals, i.e., people, were the primary data sources, we used interpretation as analysis technique. Generally, people develop and use their own understanding and observations of themselves and their environment to interpret their world [34, 37]. Therefore, it was expected that the interviewees attached their own meanings and interpretations to their answers in the interviews. This situation supports our decision for using interpretation. Proceeding from the case knowledge, we made some inferences about the domains. The validation of these inferences depends on the plausibility of the logical reasoning that it is used to describe the results and to build theory [34].

As this case is a single interpretative study – since we are studying one (constantly changing) organization, it can be argued that we cannot generalize results. We consider two kinds of validity threats: (i) single case studies cannot be used to generalize, and (ii) interpretative research cannot generalize. We took some steps to counter them. First, according to Yin [36], to be able to generalize to valid statements from a case study, we need to use multiple sources of evidence and conduct multiple cases. This can help to ensure the quality of the final conclusions. Hence, we responded to the first validity threat by (i) conducting diverse case studies with the same research question, and (ii) using interviews and documents as sources of evidence. The case study presented in this paper is the second case study that is carried out to validate the domains included in our B-ITa assessment instrument.

To confront the second validity concern, we based our analysis process on theories, frameworks, and principles developed by case study research methodologists (e.g., [33, 34, 36]). In summary, they claim that the generalization from theoretical statements (e.g. a theory confirmed in one setting) to empirical statements (descriptions of other settings) is possible and valid. So, to strengthen the claim that the theory we built from previous efforts [10] is indeed generalizable to new settings, we are conducting this study to confirm the theory in a new but similar setting: both studies have been conducted in real-life inter-organizational collaborations that differ from each other in the B-ITa key drivers they have, i.e., the key drivers of the case study site presented in this paper are to improve quality and to increase effectiveness, while the B-ITa key drivers of the previous case study are to control costs and to manage risk. The present B-ITa domains validation effort is a step forward to assure that our ICoNOs MM makes sense to business practitioners who work in real-life inter-organizational collaborations.

Chapter 5

Case Study Results

The analysis was done by one of the researchers (Santana Tapia) who is involved in the development of the ICoNOs MM. Therefore, we face some validity threats that we will diminish with the future work when including the other researchers involved in this project in the analysis process. We summarize our findings in turn.

Partnering structure. The state of Tamaulipas, as a public organization, has a hierarchy of authority with powers and responsibilities understood by all, a clear-cut division of work among the departments and people, and an explicit set of procedures for making decisions. The government of the state of Tamaulipas, every four years, upon the start of a new administration, checks and revises its “Regulations, Procedures and Organization” handbook. The complete organizational structure, the description of roles and responsibilities, the course of actions for achieving results, the norms and policies on the organizational roles, and the relationships among them, can all be found in this handbook. It means that, for the CASS project, the departments already had (i) a good definition of roles and responsibilities, and (ii) an established governance structure. Although they have assigned responsibilities to the individual actors collaborating in the network, what went wrong was the inconsistent level of commitment to work effectively with a minimum waste of time and effort. In the collaboration, the points of power and authority were positioned in places which rendered it ineffective to mitigate such a situation. It was no effective use of authority to manage the work commitment program.

IS architecture. The documentation of the IS architecture of the complete inter-organizational collaboration was indeed necessary when the CASS project began. However, it turned out that this architecture was not enough to reach the goals of the project. The IS architecture included a significant number of home-grown applications and this rendered inefficient any approach to integrating them and setting up a solid foundation for CASS. This situation led to start the development of CASS from scratch.

It must be noted that for the government of the state of Tamaulipas the documentation of the architecture at the level of software applications was not enough. They also needed to define the architecture of infrastructure and technical issues (the IT architecture). For the CASS roll-out team to know which departments were ready for CASS and which were not, it was important to have an inventory of the hardware and OSs of each of the participating departments. This inventory effort revealed that they needed to acquire new hardware to support the new collaborative system.

Process architecture. After implementing Domino/Notes as new platform to develop systems in the Tamaulipas state government, the definition of **process architecture** became an important task for the success of each project that followed. For the government of the state of Tamaulipas, this architecture is necessary to align the new systems, e.g., CASS, with the requirements of the inter-organizational collaboration. Unlike our previous case study (see [10]), where the studied inter-organizational collaboration gave more priority to the **IS architecture** domain than to the **process architecture** domain, the government of the state of Tamaulipas begins a project by thinking first about the processes and, then, about the information systems. First, they define the processes that each participant will perform, as well as the collaborative processes. Then, they analyze what information systems could support such processes. In their case, these supporting systems are new systems as they lacked effective applications.

Coordination. In this collaboration, and particularly in the CASS project, the requests and petitions management process depends on several departments (for example, Table 5.1 presents the departments involved in the educative credit request process – this credit is given to students who want to pursue their university studies in other Mexican states). Such a situation led to establish a considerable number of coordination mechanisms to help control the collaborative workflow. Our interviewees converged on the use of the following mechanisms: (i) **coordination** enabled through shared goals, (ii) **coordination** enabled through agreements specifications, (iii) definition and communication of mutual expectations, and (iv) regular control meetings. All these mechanisms were used in combination to achieve concerted actions among the participating departments, i.e., to coordinate the mutual work treaties in the state of Tamaulipas.

5.1 New theoretical statements

In this case study, the validation of the domains included in our ICoNOs MM helps us to justify the claim that such domains, already empirically tested and confirmed in another setting – an outsourcing collaboration between a leading international business and technology integrator and a local provider of

Table 5.1: Educative credit request process.

STEP	ACTIVITY	DEPARTMENT	DAYS
1	Submit educative credit request	Student	1
2	Receive the request and check the academic situation	Division of Finance and Administration	1
3	Pursuit the request process	Department of Service of the ICEET	5
4	Verify the data of the credited and endorsement	Department of Investments and Portfolio	8
5	Approve/reject the credit	Subcommittee of the Trust of the ICEET	2
6	Elaborate the contract and the promissory note	Institute of Educative Credit	2
7	Get signatures of the credited and endorsement	Division of Finance and Administration	1

ICEET = Instituto de Crédito Educativo del Estado de Tamaulipas

Total steps	7
Total days	20
Total departments	5

mass-marketed services [10], are generalizable to this new setting – an inter-organizational collaboration among departments in a state of Mexico.

As in our previous case study, the findings of the case presented in this paper suggest that the four B-ITa domains (i.e., **partnering structure**, **IS architecture**, **process architecture** and **coordination**) are indeed the necessary domains that inter-organizational collaborations take into account in their efforts for aligning information technology with the business requirements. We still do not have empirical evidence to consider additional domains as part of our B-ITa domains. Furthermore, with the analysis of data, it also was possible to observe new theoretical statements comprising relations among the validated domains:

1. *The level of automation (through the existing systems) of the participants in an inter-organizational collaboration affects considerably the degree of inter-organizational business-IT alignment.*

A previous study [38] on cultural perceptions into single enterprises IT management found that, although managers were aware of the requirements to achieve B-ITa, B-ITa was practically not feasible because the organizations perceived the importance of IT as very low in the first place and therefore there was very limited attention for it. The results of the Tamaulipas case study suggest that this situation can be extrapolated to inter-organizational collaborations where single-owned information systems are essential for the collaborative work. If the social status of IT is low and the participating organizations do not have any automated information systems that could be used to support the collaborative processes, efforts for achieving inter-organizational B-ITa can take much more time in comparison to B-ITa efforts in collaborations with considerable level

of automation of its activities. Our observation was that if automated systems do not exist, there is no inter-organizational B-ITa.

2. *The order in which the business-IT alignment domains are taken into account in the efforts to achieve inter-organizational business-IT alignment should not affect the efforts' results.*

The importance of the domains varies according to the settings where an inter-organizational collaboration works. In the efforts for aligning information systems with the requirements of the business, each inter-organizational collaboration can begin its work first in the domain that best meets its objectives. As our model is a continuous MM [23], it will let inter-organizational collaborations focus, for instance, on the domains with a low level of maturity. Those domains that are associated with higher maturity can, then, be candidates for inclusion in later improvements efforts. In the CASS project, the government of the state of Tamaulipas left the partnering structure unchanged. They concentrated on partnering structure, IS architecture, and coordination in its B-ITa effort.

These two new theoretical statements need to be validated in future work. These statements are then hypotheses which we justified on the basis of the evidence provided by this case study only. Thus these theoretical statements can become admitted as true only when they can, under other circumstances, be used to deduce directly verifiable observations, i.e., if we can find enough evidence to change their nature from hypotheses to facts.

5.2 Implications of the validation's results

The case study results suggest that the four B-ITa domains included in the ICoNOs MM (i.e., partnering structure, IS architecture, process architecture and coordination) are the most important domains that the government of the state of Tamaulipas considers in its efforts for aligning business with IT. These results replicate the results obtained in our previous validation efforts [10] and help us to confirm our theory. It must be noted that, in this case study, the only topic that stands out from the case study codification, i.e., our B-ITa domains, is IT architecture (see Figure 5.1). To document the IT architecture was important in the CASS project for implementers to know which departments were ready for the new system and which were not.

Despite of this finding, we decided to leave our model unchanged. We did not consider IT architecture as a necessary B-ITa domain because of three reasons: first, the domain of IT architecture it is not a replication of previous results; it seems that not all inter-organizational collaborations consider IT architecture as an necessary domain in B-ITa attempts so, we can not generalize this new result.

Second, although we address operational B-ITa with our MM, we only consider information systems when we mention the term 'services offered by IT' in

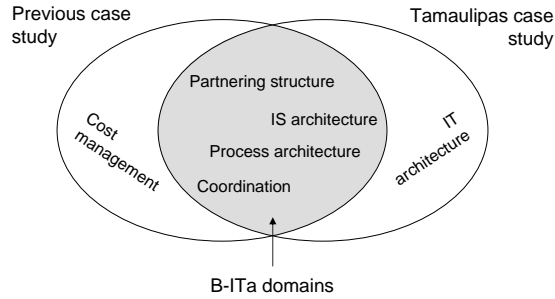


Figure 5.1: B-ITa domains found in the validation case studies.

our definition of B-ITa (see Figure 1.1). Therefore, as services abstract from the IT architecture, it is out of the scope of our work. Third, regular discussions with experts from sixteen different IT service providers and consultancy companies were conducted as part of our project, and none of them so far indicated that IT architecture falls into the necessary domains that need to be considered to achieve B-ITa in inter-organizational settings. Therefore, for the time being, we think it is safe to consider IT architecture as an additional B-ITa domain that might be addressed in B-ITa improvement attempts, but it is not a necessary domain. So, since IT architecture is not necessary for achieving B-ITa in inter-organizational collaborations, then B-ITa does not guarantee that inter-organizational collaborations consider IT architecture in their strivings for B-ITa. In future work, this last statement will also be considered as hypothesis. We want to confirm its plausibility in order to build theory and generalize it.

Chapter 6

Conclusion and Future Work

According to CIOs, better business-IT alignment relies primarily on better continuous planning between business and IT after knowing how their current alignment situation is [39]. In our research, we are developing an instrument to assess such alignment in inter-organizational collaborations: the ICoNOs MM. In this paper, we have presented how we have empirically validated this maturity model. We conducted a case study for this purpose. We make the note that this validation attempt is not the evaluation of the entire model itself. Instead, its sole purpose was to validate the business-IT alignment domains which are included in the maturity model. From results of previous validation efforts [10], we built theory claiming that such domains are the necessary domains to consider when achieving business-IT alignment in inter-organizational settings. With the case study presented in this paper, we confirm that theory in new but similar settings. This increases our knowledge of the completeness and the suitability of the domains we included in the ICoNOs MM, which helps us to generalize our results. The case study findings suggest that the four business-IT alignment domains (i.e., **partnering structure**, **IS architecture**, **process architecture** and **coordination**) are the necessary domains that inter-organizational collaborations take into account in their efforts for aligning IT with the business. A new critical responsibility for CIOs involved in such efforts should be weighing our confirmed domains in order to obtain new insights and to strive for business-IT alignment maturity. The case also helped us to distill new theoretical statements that need to be validated in future work.

Our work for immediate future includes populating the model with process areas related to each of the business-IT alignment domains. We need to identify what is a good and not so good process area for each of the domains of the ICoNOs MM to determine their maturity levels. After that, we will conduct a case study to validate these process areas and, then, we plan to validate the maturity model as a whole.

Acknowledgments

We are grateful to the professionals (Koco Galeana Zapien, Gabriel Puga Limas, Samuel Cabrera Ramírez, Oswaldo Maldonado Liges, Luis Patricio Cruz Ramírez and Nicté-Há Castro Cárdenas), who participate in the interviews and to the Division of ICT of the government of the state of Tamaulipas for their support to this second step in validating the business-IT alignment domains of the ICoNOs MM.

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