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# STRUCTURAL CONFIGURATIONS: AN EXPLANATION FOR IOIS IMPLEMENTATION FAILURE

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## Abstract

*This paper aims to provide an additional explanation for failure of inter-organizational information systems (IOIS) implementation strategies. To do so we draw on the dimensions of structure proposed by Giddens and develop a framework of four 'structural configurations' that characterises the social context where an IOIS is implemented. On the one hand, we argue that identifying the 'structural configuration' where an IOIS is implemented is critical in devising the implementation strategy. We apply the framework to a case study of the implementation of an IOIS. Bearing in mind that the implementation outcome was unsuccessful, the framework we develop provides an explanation for the failure. We hypothesise that the framework presented in this paper may influence managerial action as it helps to anticipate the contradictions that exist between the structure of the social context and the one embedded in the IOIS. On the other hand, we argue that our framework may help researchers in contextualizing existing and future IOIS studies, and consequently it may enhance the transferability of those studies.*

*Keywords: Inter-organisational Information System, Structural Configuration, Implementation Failure, Structuration Theory, Conceptual Paper, Transferability*

# 1 INTRODUCTION

PortIC is an inter-organisational information system (IOIS) that was set up by the private<sup>1</sup> and public<sup>2</sup> agents of the Port Community of Barcelona by mid-1999. PortIC provided two main inter-organisational applications: public-to-private (G2B) –which supports the interactions between public bodies and private organisations– and private-to-private (B2B) –which supports the interactions between private organisations. By mid-2001, one year after both applications were launched, G2B was widely adopted by the diverse port agents whereas the rate of usage of B2B was far from satisfactory. The two applications had been developed by the same team project, for the same potential adopters in the same inter-organisational arrangement, they went live at the same time, adopters received similar training, and both applications run under the same technologies. Moreover, the core functional requirements for the two applications were based on a subset of the UN/EDIFACT message standard, which was defined by a standardization consortium where all the port agents –potential adopters– were represented. In short, even though PortIC management adopted the same strategies for the implementation of both inter-organisational applications, the implementation outcomes were completely different.

Considering these opposite results, we seek to answer the following question: Why did applying the same implementation strategy for the two applications did not lead to similar outcomes? By implementation strategy we mean the set of management actions and decisions that govern or influence how the implementation effort is carried out and executed. We answer this question by developing a framework consisting of four ‘structural configurations’. The framework may guide managers in devising an implementation strategy for an IOIS. In order to build this framework we draw on the dimensions of structure proposed by Giddens (1984).

The paper is organized as follows. We begin by reviewing prior IOIS research to look for studies that have dealt with our research problem and present the gap in the literature. This is followed by an introduction to the theoretical anchoring for our framework. We then present the case and use the framework to answer the question previously introduced. Next section discusses the findings of the case. Finally, we discuss the implications of our framework and present the conclusions.

## 2 EXISTING IOIS RESEARCH

There is a considerable number of papers in the IOIS literature that have proposed several predictive models for the adoption, use, and assimilation of IOIS (Chatterjee, Grewal and Sambamurthy, 2002; Hart and Saunders, 1997; Son and Benbasat, 2007). These models suggest critical success factors (Lu, Huang and Heng, 2006), which are expected to offer some guidelines for organisations implementing IOIS. On the other hand, there is a group of studies in the domain of intra-organisational information systems that has identified risks that may threaten the implementation success (Keil, Cule, Lyytinen and Schmidt, 1998; Schmidt, Lyytinen, Keil and Cule, 2001; Scott and Vessey, 2002). Although both streams of literature provide lists of success and risk factors that may shed light to the reasons for failure of IOIS implementation strategies, we consider they do not provide enough support to management in outlining the implementation strategy. These factors are antecedents of IOIS implementation and hence mainly provide a snapshot of the situation before the implementation occurs. However, any IOIS implementation usually entails a transformation of the social system where it takes place. For instance, changes in the business processes or shifts in the balance of power, which may result in conflict. Such conflict can be attributed to contradictions between certain aspects of the old and the new social systems, and may prompt potential adopters not to use the IOIS. We consider

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<sup>1</sup> Shipping agents, inland terminals, clearing agents, haulers, freight forwarders, etc.

<sup>2</sup> Port Authority and Customs

prior factor-based literature is not supportive enough in anticipating these contradictions and in turn, the conflict. Such anticipation could be possible if we were able to characterise the social system where an IOIS is implemented in a way that allowed us to foresee these inconsistencies.

In search of a way to characterise the social system of IOIS, we turn to another group of researchers that has proposed taxonomies aiming not only to characterise the IOIS but also to support the implementation. For instance, Kumar and van Dissel (1996) categorize IOIS according to the level of interdependency they facilitate: pooled interdependency, sequential interdependency, and reciprocal interdependency. The authors argue that as firms may be involved in more than one type of IOIS, a particular IOIS may exhibit characteristics of more than one type of interdependency. With this taxonomy, Kumar and van Dissel (1996) recognize that inter-organisational structures shape the choices that management has during design and implementation of the IOIS. Choudhury (1997) proposes a taxonomy of three different types of IOIS: electronic monopolies, electronic dyads, and multilateral IOIS. The author suggests that demand uncertainty (volume and technological) and market variability (fragmentation, volatility) influence a firm choice of an IOIS. On the other hand, the author states that a firm may decide to develop the IOIS competitively or cooperatively, based on the strategic significance of the IOIS and the size and bargaining power of the firm initiating the IOIS (Choudhury, 1997). Kambil and van Heck (1998) provide a categorization for the processes underlying IOIS, and propose a process-stakeholder framework for comparing the different forms of IOIS. This framework helps in anticipating the problems that may arise as a result of implementing an IOIS. Hong (2002) proposes four basic types of IOIS based on two basic dimensions: 1) the linkage – horizontal and vertical– between the different roles of adopters, and 2) support –strategic and operational– that provides the IOIS. Hong (2002) argues that different types of IOIS need to be linked to specific business strategies: growth, differentiation, focus, and cost leadership. Finally, Boonstra and de Vries (2005) categorize IOIS based on the interests of the adopters (as perceived contribution) and power (the capacity to exert the will over others in order to realize certain intended benefits). They suggest three types of IOIS: unlikely, unbalanced, and balanced. This taxonomy helps to make the interest and power of the parties explicit and change the initial specifications of the IOIS in order to improve the chance for successful use. Based on this taxonomy, IOIS failure may occur when management misunderstands or ignores the differences in interests and power between the parties.

Although these studies that propose taxonomies for IOIS may support management in anticipating potential problems managers will have to deal with during the implementation, they still neglect the contradictions that may arise during IOIS implementation between the structure of the original social system –e.g. business processes, data models, rules– and the one of the new social system, which is embedded in the IOIS. No prior effort has apparently been undertaken in the IOIS literature to understand and anticipate these contradictions. We contend that a framework that characterises the social system, and focuses on the possible contradictions between social systems that come up as a result of IOIS implementation, may provide an additional and enriching explanation for failure and help managers devise different implementation strategies. We consider that this type of explanations is relevant because, however broad it may be, it can guide managers to follow the most suitable strategy for a particular situation, or at least can help to discard the misleading ones. The next section develops this IOIS characterisation by building on the Structuration Theory as developed by Giddens (1984).

### **3 THEORETICAL ANCHORING**

#### **3.1 Structuration Theory**

Structuration Theory (ST) seeks to transcend a traditional dualism in sociology. On the one hand, there is a view that overemphasises structural influences on human behaviour and that leaves unexplained how structure develops; on the other hand, there is a view that puts too great emphasis on individual agency, thus omitting the influence of social institutions on behaviour. Giddens (1984) conceptualises

social practice as the mediation between structure and agency, and develops the core concept of ST – the ‘duality of structure’: “the structural properties of social systems are both medium and outcome of the practices they recursively organise” (Giddens, 1984, pp. 25). According to ST, a social system can be understood as structure and interaction.

Structure is constituted by “rules and resources, recursively implicated in the reproduction of social systems. Structure exists only as memory traces, the organic basis of human knowledgeability, and as instantiated in action.” (Giddens, 1984, pp. 377). Giddens splits, for analytical purposes, the ‘rules’ in two dimensions: structure of signification and structure of legitimation. Resources, which constitute the structure of domination, are “fundamental to the conceptualization of power” (Giddens, 1984, pp. 28), and can be authoritative and allocative. On the other hand, interaction –which can be communication, power and sanctions– is the activity instantiated by the agent acting within the social system. Human actors draw on rules and resources in their interactions. For instance, as human actors communicate, they draw on interpretative schemes to make sense of their interactions, which in turn, reproduce and modify those interpretative schemes. Human actors draw on norms in interaction to sanction social behaviour, thus iteratively producing and reproducing structures of legitimation. Human actors enact facilities in the wielding of power, and produce and reproduce structures of domination.

Social systems are produced and reproduced by human actors drawing on structure (rules and resources) in their interaction. Through the lens of ST, the outcome of IOIS implementation is a social system that incorporates not only a technical artefact, but also a set of rules, processes, data models, reward systems, and so on (Jones et al. 2004). Thus implementing an IOIS often implies a deep social transformation process. As Richard Watson asserts in Lee (2001): “Implementation of an information system disturbs the socio-technical system of an organisation<sup>3</sup>. The extent of this perturbation determines the difficulty of the change and the management skills that must be applied.” (pp. viii).

### 3.2 A framework of structural configurations

Based on the dimensions of structure we build the framework in Figure 1, which shows four ‘structural configurations’ that characterise the social setting<sup>4</sup> where an IOIS is going to be implemented.

For the purpose of this paper, we conflate the signification and legitimation dimensions, which Giddens (1984) separates only with an analytic aim: “The communication of meaning in interaction, it should be stressed, is separable only analytically from the operation of normative sanctions” (Giddens, 1984, pp. 28). Thus we will consider that the structures of signification and legitimation configure a unique dimension that we call rules. Rules are the modalities corresponding either to modes of signifying (meaning constitution) or normative sanctions. In our framework rules can be collectively shared by the community (inter-organisational arrangement) or unshared.

On the other hand, Giddens, in his scheme of the ‘duality of structure’, distinguishes between power (interaction), resources (modality), and the structure of domination (structure). The structure of domination is constituted by resources from which power is exercised and so the structure of domination is produced and reproduced. “The exercise of power is not a type of act; rather power is instantiated in action, as a regular and routine phenomenon. It is mistaken moreover to treat power itself as a resource as many theorists on power do. Resources are the media through which power is exercised, and structures of domination reproduced.” (Giddens, 1979, pp. 91). In order to avoid changing the common use of the term power in the IOIS literature (Hart and Saunders, 1997), we label the horizontal dimension of the framework (in Figure 1) as power. Power can be symmetric or

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<sup>3</sup> An organization here may include various inter-organizational arrangements.

<sup>4</sup> By setting we mean the time, place and circumstances in which the IOIS implementation occurs. The setting refers to the context where social action occurs.

asymmetric, which means that –following Giddens– it is the distribution of resources (which constitute the structure of domination and from which power is exercised) what is symmetric or asymmetric. We shall, therefore, use the term ‘power’ to refer to ‘resources’.

We focus our attention on the possible ‘structural configurations’ that arise when considering these two dimensions: rules and power. We consider that rules can be shared or unshared by the community we are studying, and regarding the structure of domination, the arrangement of power can be symmetric or asymmetric. We treat these two dimensions as independent because, although in a usual situation they are interlaced, in the extreme case, brute power requires neither meanings nor norms. Brute power can impose new rules and also break them.

Each cell in the framework represents a ‘structural configuration’. There are four configurations: SR-SP (Shared Rules and Symmetric Power), SR-AP (Shared Rules and Asymmetric Power), UR-SP (Unshared Rules and Symmetric Power), and UR-AP (Unshared Rules and Asymmetric Power). Graphically, the black circles represent firms (potential adopters of the IOIS); the black lines mean the prevailing interaction between these firms; and the white circles represent the set of rules which firms draw upon in their interaction. In the configurations SR-SP and SR-AP the interactions between firms pass through the common set of rules which govern the interactions. In the configurations UR-SP and UR-AP the rules are not shared, they are established between each pair of firms

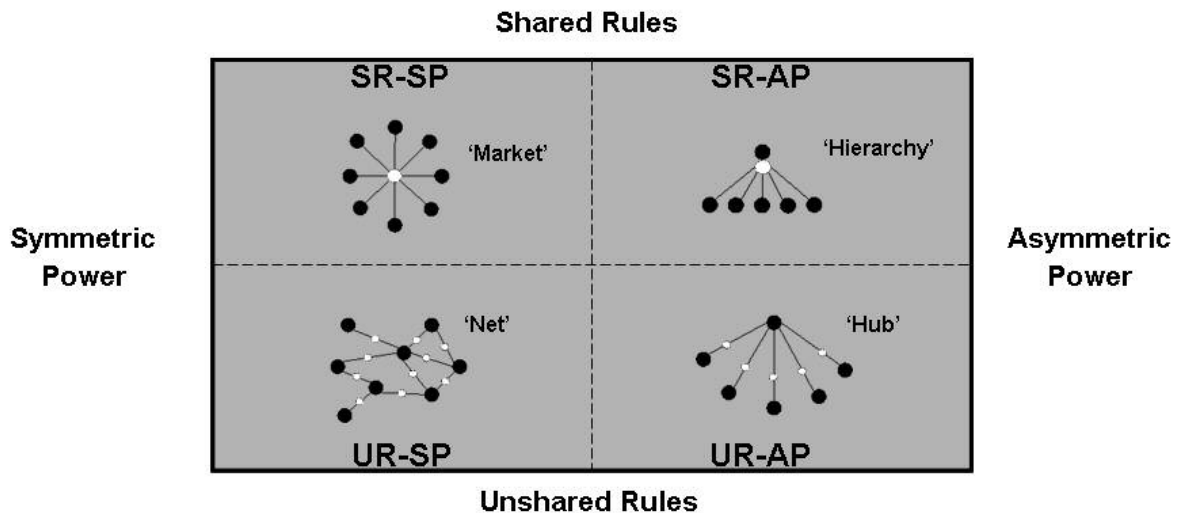


Figure 1. Modes of Structural Configuration

We label each configuration for mnemonic purposes. Furthermore, we think in ideal types to highlight their principal differences. Our purpose is to present configurations of ideal structures as a topological exercise.

The ‘market’ configuration is an example of an inter-organisational arrangement where power is symmetric, equally distributed among agents, and where the rules of meaning and norms are public and common (eg. Stock Exchange market closes to the ideal ‘market’). In the information systems literature we find several empirical examples of the application of IOIS to ‘market’ configurations (Barret and Walsham, 1999; Cunden, 2004; Driedonks, Gregor, Wassenaar and van Heck, 2005; Kambil and van Heck, 1998). Although in economics a market usually connotes competition, in our framework the interactions between firms in a ‘market’ can be competitive as well as cooperative.

In an ideal ‘hierarchy’ configuration, for instance an army, power is completely asymmetric, and interpretative schemes and norms are fully shared between actors. With these two labels, ‘market’ and

'hierarchy', we echo Coase's (1990) distinction between markets and hierarchies attending to price or power as alternative co-ordination mechanisms. Although the 'hierarchy' configuration is common inside organisations, it also occurs in inter-organisational arrangements (Busquets, Rodon and Wareham, 2007).

In a 'net' configuration, interaction is dyadic. For instance, this is the case of a network of firms where there is no dominant company and there are no vertically integrated firms. In this network, the distribution of power is symmetric, and, due to the dyadic nature of the interactions, the interpretative schemes and norms are negotiated and established between each pair of firms. So there are no shared public rules or common patterns of interpretation governing the interactions between the diverse firm. The 'net' configuration has traditionally been supported by bilateral EDI systems (Damsgaard and Truex, 2000). However, we increasingly observe industry initiatives that aim to diffuse EDI beyond the dyadic relationships (Damsgaard and Lyytinen, 2001; Markus, Steinfield and Wigand, 2006). To achieve this goal these initiatives first have to standardize the industry rules and norms.

In the 'hub' configuration interactions are dyadic between a central actor and the rest. The interpretive schemes and norms are usually established by a central actor for each of the other firms. The kinds of relationships these central firms establish with their partners usually are also dyadic. Examples of the 'hub' configuration can be found in the automotive and chemical industries, which are characterised by dominant central firms interacting –exchanging structured information– with a host of smaller partner firms on the basis of pre-established agreements for the interaction. Such agreements are usually dyadic, and their content tends to be settled by the central firms. Recently, we have seen that dominant firms in the chemical and automotive industries have jointly created IOIS in order to provide a single point of contact for the members of their industries. For instance, Elemica in the chemical industry (Christiaanse, 2005; Christiaanse and Rodon, 2005) and Covisint in the automotive industry (Gerst and Bunduchi, 2005) aim to standardise the inter-organisational processes and data and become common trading infrastructures for their industries. By implementing such IOIS promoters have attempted to create shared rules whilst retaining power asymmetry in the sector. In other words, the wide adoption of these IOIS in the chemical and automotive industries is supposed to transform the 'hub' configurations into 'hierarchy' configurations.

### 3.3 Contradictions and conflicts

Two other key notions in ST are those of 'conflict' (a property of interaction) and 'contradiction' (a structural quality). "Conflict and contradictions tend to coincide..." (Giddens, 1984, pp. 198) and allow explaining social integration or transformation. "Processes of structuration tie the structural integration or transformation of collectivities or organisations as systems to the social integration or transformation of interaction... The notion of conflict is closely tied to that of interest... Conflict, in the sense of active struggle pursued in the context of clashes of interest, is a property of interaction. ...Contradiction can be conceptualised as the opposition between structural principles" (Giddens, 1993, pp. 131).

From a ST perspective, an information system embodies interpretative schemes, norms and routines – that is, rules–, and also can change the access to information –a relevant resource (Pettigrew, 1972)–, thus affecting the domination structure (Volkoff, Strong and Elmes, 2007; Walsham, 2002). Therefore, the implementation of an IOIS goes through the creation of a new institution. When the structure –or structural configuration– embedded in the IOIS mirrors the original structure of the (inter-organisational) social setting, which can be also embedded in an already existing IOIS, there may not be any contradictions. However, conflict arises when the structure embedded in the IOIS contradicts the structure of the social setting. The extent of problems and difficulties that managers may encounter in such a transformation is given by the magnitude of contradictions between the intended final structure of the IOIS and the structure of the current setting. Moreover, such contradictions may enable or constrain management's ability to redesign and execute implementation strategies for IOIS.

The framework in this paper helps examine the changes in structural configuration that may result from IOIS implementation, and hence, anticipate and support the management of conflict.

Next we answer the question we set out at the beginning of this paper by applying the framework to a case study (Yin, 2003). The case covers the implementation of an IOIS –called PortIC– in the seaport of Barcelona. Additional material about the case is reported in (Rodon, Pastor and Sese, 2007a; Rodon, Pastor and Sese, 2007b; Rodon, Ramis-Pujol and Christiaanse, 2007c). The case material was compiled over a five-year period (2001–2005), through interviews, field visits, meeting attendance, meeting minutes, press articles, internal documents, and mailing lists. Forty-eight semi-structured interviews, averaging an hour in length, were conducted with individuals from twelve organisations at different levels (management, analysts, developers, and users).

## 4 CASE STUDY

PortIC, which was set up by mid-1999, was expected to integrate the information flows of the diverse port agents with two main goals: (1) reduce the operational costs of port agents, and (2) provide transparency regarding document exchanges and cargo movements in order to reveal inefficiencies. To achieve these goals PortIC provided two main document interchange applications: public-to-private (G2B) and private-to-private (B2B). G2B refers to the exchanges between private organisations and public bodies –e.g., cargo manifests, customs request, dangerous goods declaration. B2B refers to exchanges between private agents –e.g., booking, transport order, shipping instruction, gate-in notification.

Based on our framework (Figure 1) the social setting where G2B was to be implemented may be regarded as being a ‘hierarchy’ configuration. The rules and norms were clear and shared by the different ports agents, either public or private. In addition, the public bodies –Port Authority and Customs– had the power to change those rules. Traditionally, interaction between public bodies and private agents took place through various mechanisms: EDI, fax, email, or a proprietary application developed by the Port Authority. The G2B application was launched by mid-2000 and its adoption started soon afterwards. It reached critical mass a year after it was launched. Although the development of G2B entailed the replacement of the existing exchange mechanisms by a new one, G2B did not transform the ‘structural configuration’ of the inter-organisational arrangement.

On the other hand, the social setting where B2B was to be implemented may be regarded as a ‘net’ configuration. The rules and norms had been dyadically fixed, and in some cases they had been established by small groups of firms having business with each other forming constellations. Likewise, power in the B2B’s setting was symmetrically distributed. In the case of constellations, however, some firms had some power over others as they were able to impose some rules (e.g. frequency of exchanges, format of message content) but, if we look at the whole set of firms in the port, power was symmetric.

PortIC management adopted the same implementation strategy for B2B than for G2B. In the case of B2B, they developed an application which followed the standard defined by the same port agents, they trained the potential adopters the same way as with G2B, and they expected that firms would start using B2B because the increase in efficiency it promised. In addition, by adopting B2B, firms were supposed to integrate only once with the IOIS (PortIC) for all their partner firms within the port community. B2B was launched by mid-2000, and one year after, it had not yet bootstrapped. Potential adopters complained about the content of the standard (on which they had reached a consensus two years earlier), the rationale behind the B2B application, the performance of the application, and so on (Rodon et al., 2007a).

The IOIS management implementation strategy had failed as they had assumed that potential adopters would adapt to the B2B application. Then the IOIS management had to change the implementation strategy despite the fact that they had designed and implemented a system (B2B) which was supposed to embed the same rules (defined in the standard) for all the potential adopters. However, the managers



belatedly realized that there were different constellations within the port, each with its own rules, and firms usually participated in multiple constellations. So the IOIS management started identifying constellations and tuning the B2B application for those constellations. For instance, they started customizing content for each constellation, adding functionalities to B2B in order to help firms control the status of exchanges, and they supported the agreement between firms in the constellations about the way they should use B2B. This new implementation strategy proved successful as B2B became adopted over time through a series of constellations (Rodon et al., 2007b).

## **5 DISCUSSION**

As we have said G2B and B2B supported different ‘structural configurations’: ‘hierarchy’ and ‘net’, respectively. In the case of G2B, there were no contradictions between the structures embedded in the system and the ones in the social setting that G2B supported. The rules and norms (which were embedded first in the standard and later in the G2B application) remained the same. Likewise, power remained asymmetric. The public bodies drew on allocative resources in their attempts to support the adoption of the G2B. These resources of domination included, for instance, the economical incentives they offered to those using G2B.

On the other hand, the empirical illustration shows that in the case of B2B, PortIC management initially acted the same way as for G2B. IOIS management’s underlying assumption was that the inter-organisational arrangement where B2B was to be implemented was closer to a ‘hub’ than to a ‘net’. In addition, management considered they were in a social setting where rules could be shared, and where there was some power asymmetry as some actors would be able to force others to adopt the new rules –embedded in the application. Accordingly, B2B was implemented aiming to homogenize the rules, and hence transform the social setting to ‘market’ or ‘hierarchy’.

However, the case shows that given the complexity of interactions of a ‘net’ configuration, it is very difficult to define new rules that embrace the existing ones. The rules that were defined in the standard and embedded in B2B contradicted the existing ones. In addition, even though the firms in the seaport committed to the project (all the port agents were shareholders of the IOIS), power between them was symmetric. The contradiction between the rules embedded in B2B and the existing ones, plus the lack of power asymmetry lead to conflict and non-use of B2B. Once the management became aware of these conflicts and realized that their assumptions were wrong, they decided to focus their implementation efforts towards the constellations. In those constellations, rules were shared, and there was some power asymmetry. Thus constellations may be regarded as ‘hierarchy’ configuration. By adapting the B2B to the reality of those constellations, they were able to enhance the adoption of B2B.

From the application of the framework to the case data we can state that it is easier to carry out implementation when no changes to the ‘structural configuration’ of the social setting are involved, because it minimizes the occurrence of structural contradictions. On the other hand, even though most of the industry IS standardization initiatives (Markus et al., 2006) aim to transform the inter-organisational arrangement where they are implemented into a ‘structural configuration’ where rules are shared, the reality shows that it is very difficult to move from ‘structural configurations’ where rules are unshared to ‘structural configurations’ where rules are shared. This is in line with Damsgaard and Truex (2000) who argue that because institutional and local levels are always distinct, “EDI standards can never represent the creation of an ‘Esperanto of institutional communication’” (pp. 173). From our empirical data it comes out that in case such ‘Esperanto of institutional communication’ was created, its adoption would be very difficult in the absence of power asymmetry.

## **6 CONTRIBUTIONS AND FURTHER RESEARCH**

The argument put forward in this paper is that in defining the implementation strategy for an IOIS, management has to take into account the ‘structural configurations’ of the social setting where the

IOIS is implemented. As we show in the illustration case, the application of the same implementation strategy in the same inter-organisational arrangement did not lead to similar outcomes because the arrangement consisted of two social settings that had different ‘structural configurations’. We consider this paper not only provides an explanation for failure but also contributes to research and practice for the following reasons.

First, the extensive area in IOIS research that proposes sets of factors to explain the adoption and use of IOIS, provides lean characterisations of the context where the IOIS is implemented (Chau and Hui, 2001; Kuan and Chau, 2001; Premkumar, Ramamurthy and Crum, 1997; Ramamurthy, Premkumar and Crum, 1999; Son and Benbasat, 2007). For instance, Son and Benbasat (2007), who examine the influence of efficiency and legitimacy factors on the level of adoption and use of IOIS, categorize IOIS according to who operates them (private versus public and consortium) and the number of industries it serves (horizontal versus vertical). The authors’ study focuses on public and consortium-based IOIS that are industry specific (vertical IOIS). Based on this categorization, we can say that we study the same type of IOIS that Son and Benbasat (2007) do (PortIC may be regarded as a consortium-based IOIS in a giving industry). However, as we have seen in the PortIC case, similar factors (e.g. readiness, perceived benefits and commitment of potential adopters to PortIC) led to different outcomes for the G2B and B2B applications. Therefore, we can state that there is a need to contextualise the results of IOIS research to enhance their transferability. The framework (Figure 1) we develop in this paper may support this contextualization of IOIS studies. The framework does not attempt to substitute prior IOIS research studies. Rather, it may help frame them, and, what we think is more important, contextualise them. The framework can be used to demarcate the applicability and generality of previous acontextual studies.

Finally, this paper also adds to existing literature about the taxonomies of IOIS (Boonstra and de Vries, 2005; Choudhury, 1997; Hong, 2002; Kambil and van Heck, 1998; Kumar and van Dissel, 1996) because our framework helps anticipate the possible contradictions that may exist between the structure of the social setting and the structure embedded in the IOIS. Although the notion of structural contradiction plays a central role in Structuration Theory (ST), research in the IS field that uses the concept of structural contradiction has scarcely been used (Walsham, 2002). As it is suggested by Robey and Boudreau (1999), we think that the use of ST allows us to explain and theorise about structural transformation and change, and can shed light on the analysis of strategic conduct in studying IS implementation (as illustrated by the two examples presented earlier). Moreover, to our knowledge, the perspective of ST we adopt in this paper is novel, and it can open a new avenue for further research.

Notwithstanding the generality of the framework, it suffers some limitations due to two simplifications that we have introduced in our discussion: First, we have studied the rules and power dimensions as dichotomical dimensions. In the real world, however, there is a continuum between shared and unshared rules, and between symmetric and asymmetric power. It would be more appropriate to develop a notion of likeness of structures, or structural distance –a possible avenue for further research. Secondly, in the real world, we rarely find ideal ‘structural configurations’. Usually, ‘structural configurations’ are hybrids composed by the combination of the four ‘structural configurations’. So the task of the researcher or the manager is similar to playing LEGO with the elements we have presented. A further area of research is splitting back the dimension ‘rules’ to the two dimensions, signification and legitimation, which Giddens proposes.

## **7 CONCLUSIONS**

Given the increasing proliferation of inter-organisational linkages between firms within and across industries (Daniel and White, 2005), this paper has attempted to make practitioners think about the implementation strategy that they can adopt for the implementation and diffusion of industry IOIS. This paper develops a structurally informed framework of structural configurations that may influence managerial action. It allows managers to draw a broad picture of the situation they have to deal with

and anticipate conflicts that may arise, and thus avoid serious blunders when implementing strategy. They simply have to reflect on the broad taxonomy configuration at the starting point and the one they are seeking to achieve.

In this paper we show that, in IS research, characterising the implementation context is important (Lee and Baskerville, 2003). We think it is crucial when developing theories or presenting empirical –either interpretative or positivist– findings. We have presented a coarse-grained theory that can help to contextualize other usually fine-grained theories and so help to delimit their transferability.

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