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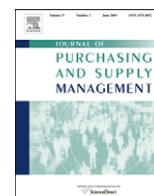
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Supply chain relationships: Exploring the linkage between inter-organisational adaptation and learning

Desirée Knoppen^{a,*}, Ellen Christiaanse^{b,1}, Marleen Huysman^{c,2}

^a Zaragoza Logistics Center, Edificio Náyade 5, c/Bari 55 – Plaza, 50197 Zaragoza, Spain

^b University of Amsterdam Business School, De Roetersstraat 11, Room E-5.34, 1018 WB Amsterdam, The Netherlands

^c VU University Amsterdam, Faculty of Economics and Business Administration, Department of Information Systems and Logistics, De Boelelaan 1105, Room 3A-24, 1081 HV Amsterdam, The Netherlands

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ABSTRACT

This paper aims to advance the process dimension of inter-organisational adaptation that takes places in supply chain relationships, building upon learning literature. Therefore, it summarizes and disentangles the different debates on inter-organisational adaptation and learning in the literature and establishes the theoretical linkage between both concepts. Two dyadic case studies show that the learning processes that underlie inter-organisational adaptations may be comprehensively classified based upon the direction of learning, resulting in “learning from” versus “learning with”, and based upon the span of learning, resulting in “incidental learning” versus “incremental learning”. The experiential nature of learning provides an explanation for the reinforcing character of inter-organisational adaptation, which is an alternative to the explanations presented in literature on supply chain relationships.

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1. Introduction

Today, many companies seek to build and maintain close relationships with selected suppliers (Cousins and Spekman, 2003; Modi and Mabert, 2007). Therefore, to a certain degree, buyers should adapt to the capabilities of the supplier, and in the same sense, suppliers should adapt to the needs of the buyer (Hallén et al., 1991). Industrial marketing and supply management—hereafter grouped under the label **supply chain relationship** (SCR)—literature refer to this phenomenon as inter-organisational adaptation (IOAD; i.e. “the modification of organisational attributes in order to improve the fit with the exchange partner”). IOAD can provide value to one or both parties, as it reduces costs, increases revenues or creates some dependence (Cannon and Perreault, 1999: p. 443). In practice, however, it is complicated to decide what aspects to adapt to, to what extent and how (Boddy et al., 2000; Stjernström and Bengtsson, 2004) IOAD deserves further attention.

Understanding supply chain relationships improves greatly when one differentiates between the *content* and the *process* of IOAD (Medlin, 2004). *Content* (i.e. outcome) has received

considerable attention and different studies indicate that the same taxonomy, which refers broadly to adaptations of products, manufacturing processes, procedures and organisational structures, can be applied equally well to both supplier and customer organisations (Brennan et al., 2003; Håkansson, 1982; Hallén et al., 1991). Considerably less attention has been dedicated to the *process* (i.e. flow of actions) of IOAD (Medlin, 2004), despite the constant calls in the literature to study the dynamics of a phenomenon (Langley, 1999). Acknowledgement of the IOAD process is relevant because it provides insight about how and why certain relationship outcomes come to be (Salk and Simonin, 2006), explaining the discrepancies between the current and desired fit between the partners. Moreover, it provides insight into the actual effort of reaching certain modified contents from the organisation itself (Boddy et al., 2000), as well as from the counterpart (Brennan and Turnbull, 1999).

This paper aims to fill the process void in the literature on IOAD. The inter-organisational learning (IOL) construct offers analytic potential for that purpose because the literature suggests the existence of overlapping between adaptation and learning (Håkansson et al., 1999; March, 1991). IOL is a process leading to a change in inter-organisational behaviour (Larsson et al., 1998), or in other words, certain learning processes lead to adaptive outcomes (Huber, 1991; Levitt and March, 1988). For example, the supplier has to learn about the buyer's service requirements before it can effectively adapt the product offering to this buyer. On the other hand, the difference between both concepts is not

* Corresponding author. Tel.: +34 976 070 154; fax: +34 976 077 601.

E-mail addresses: dknoppen@zlc.edu.es (D. Knoppen),

echristiaanse@uva.nl (E. Christiaanse), mhuysman@feweb.vu.nl (M. Huysman).

¹ Tel.: +31 20 5254330.

² Tel.: +31 20 598 6062.

clear (Brennan and Canning, 2004). Therefore, an initial research question theoretically explores the overlapping and differences between IOAD and IOL. This paper reasons, in that regard, the type of IOL processes that underlie IOAD. A second research question explores how these processes take place in practice and how they may be classified. This second question is answered through the exploration of two dyadic case studies of customer companies from the food industry and supplier companies from the packaging industry. Both are large, dynamic industries, subject to shifts in consumer preferences, technological possibilities and regulations where IOAD and IOL are of paramount interest.

The structure of the paper is as follows. Section 2 reviews the two mainstream perspectives on IOAD. Section 3 advances the process perspective through elaborating the linkage between IOAD and IOL. The method of the empirical component of the paper is presented in Section 4. The cases are then presented in Section 5 and discussed in Section 6. Finally, the paper draws conclusions and suggests avenues for further research.

2. Two mainstream perspectives on IOAD

Conceptually, IOAD has a process and a content dimension, and is a reaction to external drivers which can be moderated by external variables. Transactional and relational perspectives constitute the main bodies of literature that address one or more facets of this conceptualization, as elaborated below and outlined in Table 1.

"Adaptability is the central problem of economic organisation" according to Williamson (1991: p. 277). Consequently, his much-cited transaction cost analysis (TCA) constitutes a theory of the adaptive organisation, where managerial activity focuses on "adaptive-sequential decision making in the face of disturbances" (Lazonick, 1991: p. 197). Adaptation differs from innovation; the innovative organisation shapes the process of economic and social

development, whereas the adaptive organisation takes the environment as given, and tries to minimize its cost or maximize its profits on the basis of existing productive resources (Lazonick, 1991). In this line of reasoning, IOAD constitutes a reaction to certain drivers and embodies an outcome as such.

According to TCA, the optimal governance form has to be decided upon for each transaction (Williamson, 1986) and depends upon transactional factors (e.g. uncertainty) and behavioural factors (e.g. opportunism) (Rindfleisch and Heide, 1997). These criteria are relevant, though underutilized for exploring SCR topics such as the allocation of investments and coordination (Grover and Malhotra, 2003). IOAD, in the case of governance through relationships, is constituted by idiosyncratic investments and, when the future unfolds and uncertainties become reality, by subsequent bilateral realignment (i.e. the gap-filling of incomplete contracts, Williamson, 1991). These latter adaptations should be minor, and when that is not to be expected, a hierarchy is preferred over a relationship (Williamson, 1986).

TCA thus neglects the process dimension of IOAD; i.e. the flow of joint actions that characterize close relationships and may adequately deal with uncertainty (Heide and John, 1990). The relational approach constitutes a response to the shortcoming of TCA and builds upon two main ideas. First, transactions are not discrete but rather embedded in a past and anticipated future (Dwyer et al., 1987). Each transaction embodies both exchange of products or services and adaptation (Easton, 1992) and the sequence of adaptations has a reciprocal and reinforcing nature in line with social exchange theory (Blau, 1964). The second idea is that critical resources span company boundaries and partners that adapt and combine their resources in novel ways are likely to obtain "relational rents" and competitive advantage (Dyer and Singh, 1998). Therefore, companies increasingly join efforts to plan and solve problems requiring greater inter-organisational communication (Paulraj et al., 2008).

Table 1

Contribution of transactional and relational perspectives on conceptualization of IOAD.

	Drivers	Process	Content	Moderators
<i>Transactional perspective</i> Williamson (1986, 1991)	To minimize cost or maximize profits, in the face of disturbances		Idiosyncratic investments. Gap-filling of incomplete contracts	
Heide and John (1990) Lazonick (1991)	To minimize cost or maximize profits, on the basis of existing productive resources			Joint actions
Rindfleisch and Heide (1997)				Transactional and behaviour factors
Grover and Malhotra (2003)	Facets of transaction costs: effort, monitor, problem, advantage			
<i>Relational perspective</i> Hallén et al. (1991); Håkansson (1982)		Sequence of adaptive events		
Brennan and Turnbull (1999); Cannon and Perreault (1999); Hallén et al. (1991)	Specific needs or capabilities of the partner			
Brennan and Turnbull (1999); Brennan et al. (2003); Hallén et al. (1991)				Power
Brennan et al. (2003); Cannon and Perreault (1999); Håkansson (1982)			Products, manuf. processes, procedures and structure	
Dyer and Singh (1998)	Idiosyncratic interfirm linkages generate relational rents			
Brennan and Turnbull (1999)	To nurture and develop the relationship itself.	Decision making		Management strategy Trust and commitment
Brennan and Turnbull (1999); Cannon and Perreault (1999); Hallén et al. (1991); Uzzi (1997)				
Beverland (2005); Hallén et al. (1991)	Changing conditions of the external environment			
Knoppen and Christiaanse (2007); Krause et al. (2007)			Cognitive, relational and structural classes	
Paulraj et al. (2008)		Communication		

The relational view has developed several taxonomies of IOAD outcomes, outlined as the adaptation of products, manufacturing processes, procedures and organisation structure. Recently, this has been complemented by cognitive, relational and structural classes of adaptation (Knoppen and Christiaanse, 2007). Few constructs, however, have been provided to describe the process dimension of IOAD. Unplanned and informal processes have been said to impact upon relationship outcomes, together with the more studied, planned and formal processes (Brennan and Canning, 2004; Brennan and Turnbull, 1999). Informal processes may even be more effective than their formal counterparts (Janowicz-Panjaitan and Noorderhaven, 2008). Moreover, rich descriptions of sequences of adaptive events have been provided (e.g. Håkansson, 1982), although not abstracting these findings into process constructs. The study of Brennan and Turnbull (1999) is a relevant exception, as it provides insight into the decision-making processes underlying IOAD.

The relational view also dedicates attention to moderating variables, such as trust and power. Trust has a positive impact on the closeness of relationships (Uzzi, 1997) and leads to adaptation by both partners, whereas imbalanced power relationships lead to unilateral adaptation (Hallén et al., 1991). Potential (i.e. not enacted) power, on the other hand, is likely to drive change (Håkansson et al., 2001) when the dependent partner perceives little additional cost related to the change (Hart and Saunders, 1997). Enacted power increases the predisposition of the less powerful partner towards IOAD, but, when used coercively, it may leave less powerful partners more vulnerable, thus constraining the relationship in the long run (Hart and Saunders, 1997).

In summary, whereas the transactional perspective emphasizes an initial and major adaptation required to establish the collaboration, allowing for some unforeseen smaller subsequent adaptations, the relational perspective emphasizes the interrelatedness of the numerous small variations over time (Brennan and Canning, 2004). Nevertheless, the transactional and relational perspectives are not incommensurable. In line with the emergent change perspective (Boddy et al., 2001; Holland, 1998), the content of IOAD stems from an emergent combination of major episodic and smaller continuous adaptations. Table 1 summarizes the relative contributions of both perspectives along the various constituting components of IOAD as well as the process void, especially present in TCA.

3. Linkage between IOAD and IOL

This section shapes the process dimension of IOAD by first defining the overlapping between IOL and IOAD and then specifying the differences of both.

3.1. Overlapping between IOL and IOAD

Although learning may be studied at different levels of analysis, there is a general consensus that the individual is the initial entity where cognitive and/or behavioural changes take place (Dodgson, 1993). Subsequent levels of learners are the group, the organisation, the dyad and the network. Climbing the ladder of learners implies increase in possibilities for synergies (Kim, 1993) and the institutionalisation of knowledge (Levitt and March, 1988). Therefore, organisational learning is more than the sum of individual learning, and dyadic learning is more than the sum of organisational learning in both organisations involved. One may speak about a certain level of learning if the properties of that level have been modified throughout the learning process. The definition of IOAD suggests that the outcome takes place at the organisational level. However, this is not an isolated event,

given that the exchange partner may simultaneously adapt (i.e. bilateral adaptations, Hallén et al., 1991). Consequently, organisational modifications may be embedded in broader dyad level modifications and learners intervening in IOAD are not only the organisation (and underlying individuals and groups) but also the dyad.

In addition to defining learning through who learns, it is also important to specify the context in which learning takes place because of the stimuli it provides the learner. The context may be constituted by the individual, the group, the organisation, the dyad and the network. Inherent to the definition of IOAD is the dyadic context; i.e. spill-over effects from third parties are relatively small (Dyer and Hatch, 2004) and the exchange partner is therefore the main source of stimuli in terms of the adaptations to be made. A matrix with all possible combinations of learners and contexts may be drawn where IOL refers to several combinations (Knight, 2002). IOL underlying IOAD is a subset of IOL as shown in Fig. 1. Network learning is an example of IOL that is not part of IOAD (Knight, 2002).

The first marked combination in Fig. 1 is addressed by Knight (2000), who points out that individual beliefs, motivation and knowledge come together to affect individual capability to learn to collaborate. The second combination is addressed by Knoppen and Christiaanse (2007), who point out that operational people from both partners of their dyadic cases have developed a specific way of solving daily problems which differs from how top management solves problems. The third combination refers to the transfer of knowledge between two companies in order to optimize decisions and increase receptor performance (Hult et al., 2007). The fourth combination implies that organisations have an inter- rather than intra-organisational focus, and requires a participative orientation (Salk and Simonin, 2006). This type of learning involves shared representations, interpretations and systems of meaning (Krause et al., 2007). Thus, in a similar sense, as organisations develop a memory (rules, procedures, beliefs and culture) that maintains and accumulates experiences over time (Hedberg, 1981), the relationship may also develop some kind of memory: exchange rules and norms, inter-organisational procedures, shared beliefs and to a certain degree shared culture (Kanter, 1994; Knight, 2000). The newly-created knowledge is "unique to the collaboration and independent of any single organization's knowledge" (Holmqvist, 1999: p. 428). Note that through acknowledging this fourth level of learners we deviate from Brennan and Turnbull (1999) who only considered the first three levels of learners in IOAD.

All the previously mentioned IOL processes, although suggesting considerable overlapping with the process dimension of IOAD, have not been approached as related to specific adaptive outcomes. On the contrary, some IOL processes may even lead

Context \ Learner	Individual	Group	Organization	Dyad	Network
Individual				X	
Group				X	
Organization				X	
Dyad				X	
Network					

Fig. 1. Learning processes underlying IOAD (cells marked with X) within the broader concept of IOL (shaded cells).

to a reduced fit between partners. For example, a buyer may appropriate important product information from the supplier to subsequently start to produce the product in-house (Ahmadjian and Lincoln, 2001). Therefore, the linkage between IOL and IOAD has been drawn more precisely as is indicated below.

3.2. The differences between IOL and IOAD

Above and beyond the overlapping described in Section 3.1, both IOL and IOAD also hold unique features. The first of these features became apparent from Fig. 1. Secondly, the IOL construct embraces not only a collaborative learning orientation as inherent to IOAD, and associated with high levels of transparency and receptivity, but also a competitive learning orientation, associated with high receptivity but low transparency (transparency is “the cooperativeness of disclosing knowledge to the other organization” and receptivity is “the assertiveness of absorbing the disclosed knowledge”, Larsson et al., 1998: p. 289, building upon Hamel (1991)). Both orientations may be present simultaneously (Larsson et al., 1998), but the learning orientation in a supply chain relationship is predominantly collaborative, given that companies in the supply chain generally have very distinct core competencies and do not compete for market share (Knight, 2000). Horizontal relationships, on the other hand, are more likely to show a predominance of the competitive learning orientation where partners aim to appropriate new knowledge to improve the competitive advantage of their respective companies (Hamel, 1991).

Thirdly, the IOL construct embraces not only adaptive (exploitative) but also innovative (explorative) processes (Holmqvist, 2004; March, 1991). IOL may thus progress beyond mere IOAD and also underlie the pro-active shaping of the environment (innovation).

Fourth, IOL implies a change in potential repertoire of actions (Hedberg, 1981; Larsson et al., 1998) and only becomes observable when it leads to a change in the actual routines (Levitt and March, 1988; Larsson et al., 1998). An additional difference between the two constructs thus lies in the fact that IOL may only lead to a change in the repertoire of potential action, whereas IOAD refers to actual changes.

Fifth, IOL embraces both experiential (i.e. learning through direct experience) and vicarious learning (i.e. learning through imitating other organisations) (Huber, 1991). However, learning processes underlying adaptation are of an experiential nature (Denrell and March, 2001). An example of a direct experience may be provided by two partners jointly solving a problem, after which they have an increased understanding of each other’s decision-making criteria. An example of borrowing from other relationships may be when a focal customer applies inter-organisational procedures that have proved to be successful with strategic supplier A, also with strategic supplier B. Given the idiosyncrasy of the collaboration, nonetheless, vicarious learning seems less impacting (Dyer and Hatch, 2004).

This theoretical section three has dealt with the first research question regarding the overlapping and differences between IOL and IOAD. A subsequent question is: How does learning precede adaptations in supply chain relationships and how may it be classified? An empirical study provides the basis for the answer and is described in the following.

4. Method

4.1. Case study design

This paper builds theory drawing upon a comparative case study (Dubois and Araujo, 2007) with an embedded design

(Yin, 2003) which reduces the risk of spurious effects due to omitted but relevant levels of analysis (Rothaermel and Hess, 2007; Salk and Simonin, 2006). The agreement to conduct the study was initially negotiated with the buyer organisations, which in turn identified a key supplier. Data were collected at both ends of the dyad to take into account the perspectives of both partners and draw a rich account of the cases. Interviews for each case were held within a time span of 6 months: the first half of 2005 for the first case, and the first half of 2006 for the second case. In each case, ten interviews were held with relevant boundary spanners from different departments and hierarchical levels (see Table 2). The interviews were semi-structured and evolved around the background information (of the respondent, the organisation and the relationship), hard data to draw the exchange relationship and the topics of IOAD and IOL. The latter topics were partly addressed by direct questions (id. Hallén et al., 1991) and complemented by retrospective and detailed questions on critical incidents of the relationship. The interviews lasted approximately 1.5–2 h and were recorded for subsequent transcription and analysis.

A case study protocol was written to facilitate replication and increase the reliability of the research (Yin, 2003). Construct validity was increased through triangulating information from different respondents and having key informants review the draft reports and articles. External validity is limited, given that the paper draws only from two cases, though it was increased through the replication logic underlying the selection of the cases. More precisely, contrasting results were predicted given the different nature of the exchanged products (tailor-made versus commodity) and the different presence of learning processes. Internal validity was increased during the data analysis stage by using the explanation building technique (Yin, 2003), which is further explained below.

4.2. Analysis

The analysis of the interview data was undertaken iteratively with additional theoretical development and fine-tuning of the interview guide (Eisenhardt, 1989). In that respect, the distinction between different classes of learning processes was not imposed during the interviews, but rather emerged from the raw data. The direction of learning was the most relevant criterion to classify learning processes that underlie IOAD, resulting in “learning from” versus “learning with”. The former is defined as “organisational learning in a dyadic context, related to unidirectional transfer of existing knowledge and the receptor taking action based on this knowledge”. It takes place, for example, when the supplier receives market information from the buyer and subsequently synchronises its schedules with real consumption rather than with an order forecast. The latter is defined as “dyadic learning in a dyadic context, related to bidirectional transfer of knowledge and creation of new knowledge, and one or both partners taking action based on this knowledge”. It takes place, for example, when buyer and supplier together evaluate a project and conclude that the lack of project management skills caused the project to delay. As a result, one or both partners may decide to send key personnel to a project management course. Alternative classifications were based on the group level of learning (i.e. management team versus operational team) and on individual level learning (i.e. commercial versus planning roles). They had a lower explanatory power regarding subsequent adaptations, however, and were therefore not selected for further use.

A second powerful criterion to organise case data appeared to be the span of learning, resulting in “incidental learning” versus “incremental learning”. The former is defined as “learning through a major event” and the latter as “learning that occurs

Table 2
Interviewees per case.

Case 1		Case 2	
DairyCo	PakCo	FoodCo	CartonCo
Procurement manager (blanks and carton category) Supply Chain manager	Former second man corporation, current trouble shooter Marketing manager	e-Business director e-Business purchase manager	Financial director Commercial manager
Production manager main production site	Key account manager	Purchase coordinator carton packages	Sales representative
Head technical service main production site	Head logistics	Responsible of daily call-off from production site	Sales manager
Head logistics main production site Head design (new package development)			Sales coordinator Head informatics

gradually and continuously over time, which is often unconscious". Once these organising principles were selected, two types of qualitative coding took place. The content of IOAD was coded, using existing taxonomies from literature. Parallel to that, the learning processes were coded according to the emerged classes. Following the coding, only those learning processes which could be clearly related to an adaptation were selected. The explanation building technique then focused on explaining the different degrees of IOAD content and fit between partners by means of the different underlying learning processes.

5. Cases

IOAD constitutes a reaction to external drivers. Institutional drivers of IOAD were in both cases: (a) increasingly strict legislation regarding traceability of food products; (b) the emergence of generic low-cost brands; (c) the **ever-increase in pressure** from retail to cut prices; (d) **increase in costs of raw materials** and (e) mass individualization leading to a high pace of new product introductions. Thus, only through further collaboration and adaptation in the supply chain is it possible to track and trace products through the whole chain, cut **costs** and introduce new products swiftly. These institutional drivers are translated into case specific drivers of IOAD reported below.

5.1. DairyCo–PakCo

DairyCo is a Dutch subsidiary of a Dutch multinational, with a local turnover of **3500** million euros. PakCo is a Dutch subsidiary of a Norwegian multinational with a local turnover of 600 million euros. The relationship between DairyCo and PakCo goes back 25 years and stems from a constant exchange of tailor-made paperboard packages (blanks) for fresh dairy beverages. The classic blanks, which were developed almost a hundred years ago, are of vital importance for DairyCo as they aid in building the product image related to quality and freshness. Besides this primary package, PakCo also delivers the majority of the filling machines, maintenance of the machines, and expertise in product development. An intensive exchange of information takes place in order to achieve the complex balance between quality (cost) of supplied materials and necessity (cost) of maintenance of the filling machines.

Over the last few years, the relationship has experienced an **increase in** scope of business as the number of fresh dairy producers in the Netherlands dropped from 6 to 2. Consequently, more attention was drawn towards improving the boundary spanning processes and deepening the collaboration. Another driver of IOAD was the poor quality of the paperboard package, as

expressed by a sudden low vendor rating in 2005. The procurement manager of DairyCo illustrates the gravity of the situation:

We organized a meeting...I was representing DairyCo on my own, whereas they had sent a 7-man team from different parts of Europe...I have to admit that my legs were shaking. So I told them, in a monologue that went on for three quarters of an hour, that if they were not going to improve the supply quality, then we would get rid of them as a strategic supplier...I told them of our requirements... they were 'all ears'.

These main drivers initiated several IOAD processes, as pointed out below. Table 3 shows the overview of the different processes and their relationship with the content of IOAD.

5.1.1. Learning processes underlying IOAD: learning from a partner

Over the years, PakCo has transferred technological knowledge regarding the filling process to DairyCo. It made clear to DairyCo that when problems arise during the filling process, machine technology and packaging material come together to be jointly responsible. Consequently, buying the blanks and the filling machines from the same supplier has important advantages when tackling operational problems. Over time, DairyCo has learnt how PakCo deals with this interrelatedness of product and technology and appreciates the transparency of PakCo in that regard, as drawn by the production manager of DairyCo:

If other suppliers send a shipment of materials with potential problems, we just return it... but if PakCo informs us about potential problems with a shipment ... and they send a technician together with the shipment, we will accept it because we know that potential problems will be resolved.

On the operational level, transfer of technological knowledge takes shape in several ways. First, two to three technicians from PakCo are present 8 h a day at the DairyCo sites in order to solve technical problems that arise. A PakCo call centre provides technical assistance during the remaining 16 h. Second, PakCo visits the DairyCo production facility every 2 weeks to carry out preventive maintenance. In both cases, a technician from DairyCo helps out, in order to internalize skills and knowledge associated to maintenance and problem solving. Third, PakCo provides feedback on technological possibilities when DairyCo develops proposals for design changes. In that regard, DairyCo's excursion to the PakCo site was considered successful, given that DairyCo, by seeing and *sensing* the PakCo production site, learnt about the issues of the supplier and their consequent technological constraints. As a result, the requests of DairyCo towards PakCo have become more feasible.

The other way around, supplier learning from the customer is also present in the case. The classic tailor-made blank is maybe

Table 3
Overview learning and adaptation: DairyCo–PakCo case.

	Incidental	Incremental
Learning from	DairyCo learns about technological constraints of PakCo during the visit to the supplier's site → DairyCo develops more feasible requirements → adaptation of product	DairyCo learns from PakCo about interrelatedness machine technology and materials → DairyCo decides to buy more machines from PakCo → adaptation of manufacturing processes DairyCo learns from PakCo about operational aspects of its filling process → DairyCo is increasingly autonomous when solving problems → adaptation of procedures PakCo learns from DairyCo about exchange norms → PakCo replaces key account manager to better deal with these norms → adaptation of organisation PakCo learns from DairyCo about requirements market → PakCo changes the closing mechanism of the blanks → adaptation of products PakCo learns from DairyCo about demand patterns in retail → PakCo changes production plan → adaptation of procedures PakCo receives formal complaints from DairyCo about procedural aspects → PakCo implements improvements based on those complaints → adaptation of procedures
Learning with	Partners jointly learn about the low vendor rating → Partners decide on establishment of task force in which both companies participate → bilateral adaptation of organisation structure Partners exchange conditions, aims and expectations in the task force → Partners become more comprehensive and generate novel ideas for improving the relationship as well as that they avoid unfeasible requirements → bilateral adaptation of production processes and procedures Partners jointly learn about new American filling technology → Partners get an increased understanding of the filling process → adaptation of processes	Partners jointly learn about planning and inventory issues during institutionalized meetings → Partners align plans and programs → bilateral adaptation of procedures Partners exchange operational novelties and problems → Partners come up with proposals for improvement of the filling process and decide on changes → adaptation of processes Partners learn from each other about effective communication in their respective organisations in order to pursue relationship goals → Partners decide on having double roles → bilateral adaptation of organisation

the best example of how PakCo learnt from DairyCo about the needs of the market. This blank has been developed over time and the head design of DairyCo complains in that regard that it took PakCo a long time to really understand that the consumers preferred an alternative closing mechanism of the blanks than the one proposed by PakCo. Moreover, supplier learning took place when the customer expressed that it was difficult to work with the Account Manager from PakCo, given the lack of mutual understanding and different way to deal with problems. Consequently, the supplier changed the Account Manager and the newly appointed person synchronized better with the client. This fit referred in particular to the fast moving nature of exchange and the professional way of problem solving and decision taking. The trouble shooter of PakCo expresses it as follows:

The old way of thinking had to disappear in our company; we did that by changing our attitude as well as by changing the persons that were not able to change their attitudes.

Some institutionalized processes aid PakCo in learning from DairyCo. First, they learn about trends in the marketplace during a meeting held every 2–3 weeks. In that meeting, DairyCo informs PakCo about planned promotions and design changes enabling PakCo to adapt its products in time. Second, DairyCo communicates demand patterns to PakCo, so that PakCo can decide on inventory levels of supplied materials and optimize its production processes and associated costs. For example, knowledge on the possible fusion of two supermarket chains and the resulting change from the DairyCo brand to a generic low-cost brand caused PakCo to develop a more conservative production plan. Third, PakCo learns which aspects of its processes give room for improvement through the multiple complaints regarding problems with machines and blanks originating from DairyCo. Therefore, PakCo established a new procedure in order to channel and adequately deal with complaints.

5.1.2. Learning processes underlying IOAD: learning with a partner

In contrast to learning from a partner, which was of a predominantly gradual and continuous nature, learning with a partner occurs especially in relation to particular incidents. The most frequently mentioned incident in the relationship was PakCo's sudden low vendor rating from DairyCo. Consequently, PakCo established a task force to tackle specific problems and improve customer service. DairyCo did not leave PakCo on its own to solve the problems and participated in this task force with a full time person. Since then, frequent multidisciplinary meetings and phone calls between the DairyCo Purchase Manager and the PakCo Account Manager have taken place. These phone calls started off with a specific problem but ended up talking about the functioning of the relationship in general. Both partners emphasize that it is vital to explicitly state objectives and problems of their respective organisation and the expectations from the partner. This knowledge exchange allows them to anticipate unfeasible requirements as well as to generate novel ideas that are beneficial for both. DairyCo learnt for example that a cause of late deliveries by PakCo was that DairyCo did not respect the 4-week fixed horizon of production while PakCo learnt what kind of events in the consumer market led DairyCo to generate these too late requests. Moreover, both partners felt that it is only through a joint effort that improvement can be reached:

It's like a train...it takes a bit of effort to pick up speed, but now that it's rolling we've generated idea after idea to improve our joint processes (DairyCo Purchase Manager).

The same train metaphor is used by the PakCo Marketing Manager:

The sudden low vendor rating triggers analysis, and once that train starts rolling, improvement initiatives emerge from both DairyCo and PakCo. DairyCo aids in that regard: they don't just say 'this or that isn't good and you've got to sort it out'.

The results of the first year of existence of the task group were formally reviewed during a meeting with people from the board and management of both companies. Changes were considered positive and joint objectives for the next period were established.

Another incident refers to the occasion when PakCo installed new machines at the DairyCo site. Technicians from PakCo were unfamiliar with the new technology, developed by their headquarters, and consequently learnt about this latest generation of machines whilst at their client's production line. DairyCo technicians observed this lack of experience and were highly involved in the start up. Thus, the technicians of both partners went through the learning process of getting to understand and grapple with the new technology together. Through the extensive exchange of knowledge between both parties, they ended up with a more complete understanding of the new technology.

Besides the previously mentioned incidents, joint learning also takes place in a gradual fashion: for example, during the meeting held every 3 weeks between the supply chain departments of both companies. The purpose of this meeting is to coordinate planning and inventory issues. The logistics manager of PakCo points out:

we talk a lot about what is going to happen, and how we will deal with issues in the order handling process... understanding each other's problems makes it easier to have a win-win orientation and decide on actions that are beneficial for both.

The bidirectional knowledge transfer during these meetings causes participants to come to a shared vision, which in turn leads to decisions that are optimal for the relationship, rather than for an individual partner. For example, DairyCo, in one of these meetings, informed PakCo about the change in market requirements regarding labeling. PakCo, in turn, responded that it could deliver the blanks with the new labels in a short time frame. DairyCo was surprised, given that other suppliers would always need months to respond, with the argument of finishing existing inventories. As a result of the meeting the supply chain manager of DairyCo resumes: "PakCo enables us to react flexibly to the market".

Joint learning also takes place in the meeting held every 6 weeks between technicians of both partners. The purpose of the meeting is to review all aspects of machine and product quality and both parties can suggest ideas for further optimization. On the other hand, some opportunities for joint learning are still not being exploited. Both parties are aware that a joint package-developing process would considerably improve the time to market of new concepts. Nonetheless, this process has still not been implemented due to internal barriers.

Finally, joint learning implies that the involved boundary spanners play a double role: one within the relationship, and the other within the mother organisation. Potential conflicts between these roles and associated goals are dealt with by mutual agreement, as illustrated by the DairyCo Purchase Manager:

This is not a standard **buyer-supplier** relationship. I bear my soul to them...If I have an internal issue, regarding the relationship, I tell him (PakCo Account Manager) "listen, this is my internal problem - my wage depends on that - solve that please, so that my internal problem gets resolved"...And that also happens the other way around.

In a similar vein, internal communication strategies regarding relationship themes are also defined in mutual agreement. These strategies aim to pursue relationship goals, while respecting the internal roles of the involved boundary spanners.

5.2. FoodCo-CartonCo

FoodCo is a Spanish subsidiary of a Swiss multinational company with a local turnover of 1500 million euros. It is an established producer of high-quality food products, ranging from baby food to frozen meals. CartonCo is a Spanish subsidiary of an American multinational company with a local turnover of 24 million euros. The relationship between FoodCo and CartonCo dates back 40 years. The compact carton supplied is a secondary package and is increasingly becoming a commodity product. This market condition causes the buyer to be dominant over the supplier, though at the same time both companies express the desire to deepen the relationship.

A main driver of IOAD was the decision of the corporate management of FoodCo in 2001 to coordinate and optimize supply processes by implementing the supply chain module of a public electronic market system in all the subsidiaries of the FoodCo Corporation as well as its key suppliers. FoodCo invited CartonCo to be the pilot supplier given its reliable image, as drawn by the purchase coordinator of FoodCo:

they adjust to the agreement; if they say white, it is white, if they say black, it is black...it is not a continuous negotiation; we establish conditions and then we work according to those conditions...I can see that also in the plant; people who work with this supplier are confident that they will supply a given material within the agreed time frame and with the correct quality ...they are not stressed about that

Another driver of IOAD was the introduction of a restricted tender system by FoodCo for commodity products. Given the commodity nature of the majority of CartonCo's products, it had to offer its bid from that moment on via the tender system and compete with other selected providers. These main drivers initiated several IOAD processes, as pointed out below. Table 4 shows the overview of the different processes and their relationship with the content of IOAD.

5.2.1. Learning processes underlying IOAD: learning from a partner

The introduction of the e-Supply Chain system embodied changes in several boundary spanning procedures. The projected benefits of this system were related to the digitalization of data as well as to greater **information sharing**. Consequently, CartonCo learnt about new ways to coordinate business processes with the clients and established an account manager dedicated to the FoodCo account to facilitate a uniform and global approach towards the client. This was experienced as a shift from a personal towards a more centralized and uniform service. The CartonCo sales representative regrets that nowadays he only visits the client once a week, whereas some years ago this was 3-4 times a week.

CartonCo was very efficient in implementing the new system and procedures and constituted therefore a successful pilot case. FoodCo recognized that barriers of implementation stemmed from their own organisation or from the software provider, rather than from the supplier. More precisely, the lack of alignment of incentives of purchasing coordinators with those of the purchasing manager was considered a major barrier. Consequently, incentive systems were changed to motivate purchase coordinators to pursue successful and fast implementations of the e-Supply Chain system with subsequent suppliers.

When CartonCo requested an additional message by FoodCo, which was intended to be beneficial for both parties, FoodCo took almost 2 years to implement that message. Nonetheless, CartonCo accepts this approach from FoodCo and regards the e-Supply Chain system as a "project of the future" which fosters the

Table 4

Overview learning and adaptation: FoodCo–CartonCo case.

	Incidental	Incremental
Learning from	CartonCo learns from FoodCo about new ways of electronic interfirm coordination → CartonCo decides to be the pilot case → adaptation of procedures CartonCo learns from FoodCo about constant shifting requirements of consumer market → CartonCo changes key account manager → adaptation of organisation FoodCo learns from CartonCo about barriers in implementation → FoodCo aligns internal incentive systems → adaptation of organisation FoodCo does not learn from CartonCo regarding an e-message that reduces response times → lag in adaptation of procedures CartonCo learns from FoodCo about commodity status of the product and new rules of the market → CartonCo starts programs to reduce costs, such as six sigma → adaptation of procedures	CartonCo learns from FoodCo about new ways of inventory management → CartonCo establishes a project team to deal with this topic and prepare implementation → adaptation of procedures CartonCo learnt from past experience that FoodCo will ask for price reductions whenever supply processes are improved → CartonCo develops unilaterally a forecast system → adaptation of procedure
Learning with	Partners exchange conditions, aims and possibilities when establishing the framework agreement → Partners increase understanding of the other → adaptation of procedures Both partners fail to take advantage of the planning & schedule procedure in order to optimize the supply chain → lack of bilateral adaptation in procedures	Both partners fail to jointly learn about forecast method and quality → lack of bilateral adaptation of procedure

relationship with FoodCo. This reference to the future seems to stem from the discourse found at FoodCo:

Basically, they've had to adapt...we proposed implementing the e-Supply Chain system in order to support the future way of collaborating...they studied our proposal, and adapted to our vision of the **future** (eBusiness Purchase Manager).

The introduction of consignment stock, suggested by FoodCo, constitutes another theme of learning for CartonCo. Following the "invitation" from FoodCo, CartonCo formed an internal multi-functional team to prepare a proposal for its implementation. CartonCo would become the owner of the stock of cartons at the FoodCo sites and therefore needed to change its stock registration systems. Procedures related to invoicing would also change; invoices would be generated after the consumption of materials rather than after shipment.

FoodCo's introduction of a (restricted) tender system for commodity products constitutes another major event through which supplier learning took place. Increased price competition caused CartonCo to **lose** a tender, decreasing the exchanged volume by almost 30%. Until that time exchange had been rather constant and the atmosphere of the relationship had been characterized by their many years of shared history. But this incident raised **CartonCo's** awareness regarding the commodity status of their product and the related rules of the market. The financial director of CartonCo expresses in that regard:

There has been an absolute change in mentality ... these tenders regard delivery in several European countries, so we cannot think in a local way ... we have to build adaptive capabilities in order to respond to changing requirements of the market.

Consequently, CartonCo has implemented six sigma and provided English language courses for boundary spanning personnel. Moreover, CartonCo became more calculative in its actions, as illustrated by the critical tone adopted by the sales manager of CartonCo:

I will have confidence in this relationship as long as we will be able to reduce stocks and as long as they will keep their word and buy us the amounts agreed upon.

Besides the major learning steps associated to the previously described events, learning also takes place in small steps in a

continuous fashion. In that regard, it seems that CartonCo learns more from FoodCo than vice versa. In CartonCo we heard statements like:

They're well trained and professional people who may serve as a mirror for many **things** (CartonCo Sales Representative).

Moreover, the interviews within CartonCo provided much more evidence of CartonCo explaining the behaviour of FoodCo than vice versa. Over the years, CartonCo had learnt about the internal process barriers at FoodCo, given its size and complexity, complicating interfirm matters. These learning processes are not directly related to specific adaptations. Indirectly, they are important, however, in order to understand the predominance of "learning from" over "learning with" in this case. The following section draws the scarce instances of joint learning and related adaptations.

5.2.2. Learning processes underlying I/OAD: learning with a partner

The establishment of a framework agreement, preceding the introduction of the e-Supply Chain system, implied knowledge transfer between both partners and the explicit definition and follow-up of mutual responsibilities. The sales coordinator of CartonCo expresses:

The framework agreement obliged us to think aloud and become concrete, to express conditions and responsibilities... the e-Supply Chain system functioned as an arbiter in that regard ... I considered this process to be more beneficial than the technical aspects of the subsequent system implementation.

Besides this example based on an incident, "learning with" in this case seems only to take place gradually and as a natural product of the years of collaboration:

If you work on a daily basis with a company, every day covering more themes of shared interest with more ease, well, the relationship **improves** (eBusiness Purchase Manager FoodCo, referring to CartonCo).

And, on a more individual level:

We've known each other now for so many years; we know each other's strengths and **weaknesses** (CartonCo Sales Coordinator, referring to FoodCo).

Besides the previous examples, “learning with” is rather absent. First, partners do not take advantage of the introduction of a shared rolling “Planning & Schedule”; i.e., FoodCo informs CartonCo weekly about its production schedule and related carton consumption for the next 10–12 weeks. Thereby, FoodCo is committed to buying CartonCo’s production derived from the forecast of these first 8 weeks (fixed horizon). This procedure could facilitate joint learning and optimize the supply chain. Nonetheless, after 2 years of implementation its function is still symbolic, demonstrated by: almost every interviewee mentioning a different number of weeks which are supposedly fixed; and, the supplier emphasizing that it admits changes within the fixed horizon as a sign of customer service. Second, CartonCo unilaterally developed a parallel forecast system, given the low reliability of the forecast provided by FoodCo. The argument for not working jointly on an improved solution was that it is difficult to move FoodCo given its size and complexity. Moreover, FoodCo’s reaction to a past improvement proposal was to ask for a price reduction. Consequently, CartonCo preferred to avoid its customer to bargain again and unilaterally developed this solution. Thus, an opportunity for joint learning was not exploited.

6. Discussion

6.1. Learning processes underlying IOAD: a comprehensive classification

Empirical data showed that a relevant criterion to classify learning processes underlying IOAD is the direction of learning, resulting in “learning from” versus “learning with”. The former refers to individual companies that learn and act, and has been broadly addressed in the literature. The latter involves joint activities, either during learning or during subsequent acting, and has been less broadly covered. This is not surprising as the study of joint action in general has only emerged recently (Heide and John, 1990), especially when it comes to knowledge creation (Holmqvist, 2004). Even so, learning with is especially interesting, because it is likely to create new knowledge given synergies (Larsson et al., 1998). The two cases differed markedly in the presence of “learning with”. DairyCo and PakCo exchanged tailor-made products and showed a high degree of “learning with” leading to a rapid improvement of the effectiveness of boundary-spanning processes. FoodCo and CartonCo exchanged products that became more commodity like and institutional drivers made the relationship become more arms’ length. Consequently, the customer did not need to engage in a close relationship and a low degree of “learning with” took place, leading to several sub-optimal boundary-spanning processes, such as parallel forecast systems and incoherent use of the frozen window. Acknowledgement of the nature of the exchanged product is thus vital for understanding the observed degree of learning with.

Both “learning from” and “learning with” can be further subdivided according to the span of learning, resulting in “incidental” versus “incremental” classes. Incidental learning that is reliable (i.e. leading to stability in shared beliefs) and valid (i.e. leading to increased understanding, predicting and controlling of the environment) is related to IOAD (March et al., 1991). Reliability and validity are likely to be increased when both partners consciously try to enrich the experience of the incident, through joint reflection and interpretation (March et al., 1991), as illustrated by the review meeting on the functioning of the task force with the board and management teams of both DairyCo and PakCo. A reduction in reliability and validity, however, loosens the bond between partners, as illustrated by the FoodCo–CartonCo

case where the major events described led to an increased distance between the partners.

Incremental learning, on the other hand, is likely to be reliable due to its repetitive nature. Nonetheless, its validity may be threatened because of epistemic boundaries that hinder the flow of knowledge between different “communities” within the same dyad (Brown and Duguid, 2001). Examples of such communities are the maintenance technicians of PakCo and DairyCo, and the people in charge of daily order processing at FoodCo and CartonCo. Incremental learning takes place within these communities, but may not be shared with other communities when there are large epistemic differences. This is illustrated by the significantly different approach to problem solving of top management versus order processors of the FoodCo/CartonCo dyad: the top management community highlights a professional method to deal with problems, as opposed to the order processing community who focuses on personal aspects to deal with problems. Consequently, top management-driven improvement programs were not fully implemented.

6.2. The experiential nature of learning reinforces IOAD

Learning processes underlying IOAD are of an experiential nature, which refers to a sequence of events over time in which one course of action is sampled from a set of alternative courses of action. The alternative which was most successful in the past is likely to be chosen again (Holland, 1998), leading to a preference for positive experiences from the past and a bias against risky alternatives or new alternatives that require practice (Denrell and March, 2001). The experiential nature of learning explains in the DairyCo/PakCo case how the experience of the positive outcome of a joint improvement action made partners rapidly choose another joint improvement action.

Experiential learning, however, does not always lead to positive outcomes (Levitt and March, 1988). CartonCo, for instance, had a negative experience in the past regarding an improvement action that intended to optimize the relationship with FoodCo; i.e. FoodCo immediately asked for a price reduction when it noticed that CartonCo was cutting costs. Consequently, some time later and regarding another subject, CartonCo chose to not involve FoodCo in an improvement action, in order to avoid the client bargaining again for lower prices. A joint development would have been more appropriate in this case because FoodCo owned relevant information. Furthermore, the people from CartonCo and FoodCo have become so familiar with each other after many years of working together, that people stick to old but seemingly successful procedures, rather than working according to newly-defined procedures that aim to optimize the relationship. This may avoid problems in the short term, but it creates supply chain inefficiency in the long term.

Experiential learning literature thus offers an alternative explanation for the reinforcing nature of IOAD. SCR literature rather searched for the cause outside the phenomenon (e.g. trust and power), whereas this paper argues that the phenomenon itself (past experiences as part of the experiential learning process) may also be the cause of an increasing or decreasing fit between partners.

7. Conclusions

This paper has defined the theoretical linkage between IOAD and IOL through elaborating the overlapping and differences between both constructs. We argue that the overlapping can be described in terms of levels and context of learning. Learning processes that take place at the level of the individual, organisa-

tional and dyad and within in a dyadic context, constitute a subset of the broader IOL domain that may lead to IOAD. Within the selected subset, important differences still exist and reside in: learning orientation; degree of novelty; observability of change and source of learning. The first contribution of the paper thus lies in firmly establishing the linkage between IOAD and IOL.

The scarcely available studies on IOL have mainly performed macro- and statistical analyses (Salk and Simonin, 2006). This paper, on the other hand, provides a relevant way to classify learning processes underlying IOAD based on detailed empirical data. Learning from is more commonly found than learning with, both in practice and in the literature. The nurturing of learning with, however, through structured feedback and joint evaluation is vital to improve the fit with the partner (Huber, 1991). This takes more place when the exchanged product is tailor-made compared to commodity products. Incremental learning, on the other hand, is more commonly found than learning through incidents. These incidents offer only meager samples of experience and inferences are therefore more difficult to make (March et al., 1991). A conscious approach towards learning from incidents, however, by considering the variety of views of boundary spanners of both partners, may facilitate the creation of shared meanings and a more holistic understanding of the supply chain (Dodgson, 1993). The second contribution of the paper then lies in opening up the black box of IOAD and providing a deeper understanding of the four learning processes that lead to concrete adaptations.

The experiential approach to learning of this paper highlights that a bias may exist towards existing and proven procedures. This leads employees not actually to use new and more optimal alternatives, but rather to stick to old, but proven, behaviour that is detrimental for the relationship as a whole. Consciously fostering of learning which may counterbalance the risk of bias and avoid the collaborative relationship to become trapped in a negative learning spiral. A final contribution of the paper then is providing an alternative explanation for the reinforcing character of IOAD.

8. Limitations and further research

A potential limitation of the study lies in the cross-sectional research design, while, due to the ongoing character of change, a longitudinal design would have been more appropriate (Johnson and Leenders, 2006). Nonetheless, the retrospective character of the questions aimed to draw a dynamic account and interviews were spread over a six-month time span, which allowed to interview some people before a major event and others afterwards. Another potential limitation is that interviewees may express a desired rather than a real situation, especially when being asked about such a sensitive topic as collaboration. Nonetheless, triangulation of responses has resulted in a more complete picture of reality.

Previous research has related IOAD with power (Håkansson et al., 2001) and trust (Uzzi, 1997). The proposed learning classes permit the refinement of the interdependencies between IOAD and moderating variables in future research. For instance, trust contributes positively and power negatively to enriching incidental learning (Hart and Saunders, 1997). Future research may also further the experiential learning approach in order to deepen understanding of situations when IOAD does not result in improvement of the relationship. For instance, the risk of bias will differ for each of the learning classes.

Once IOAD is thoroughly understood from a dyadic perspective, the level of analysis may be elevated to the network (Easton, 1992). In that regard, it can be argued that too much IOAD may

lead to: (a) inertia regarding changes in the marketplace (Beverland, 2005; Uzzi, 1997); (b) too high a dependence on the other party (Brennan and Turnbull, 1999) and (c) high sunk costs that impede taking advantage of other relationship opportunities (Han et al., 1993). Thus, IOAD seems beneficial up to a certain threshold, after which it becomes detrimental to long-term competitiveness. Understanding the process dimension of IOAD is the first step to determine the optimal degree of IOAD in future research.

For managers, it is important to realize that IOAD is not limited to the consequences of strategic managerial choice, but that it also results from continuous learning processes on different organisational levels. Thereby, a bias may exist towards existing and proven procedures which may be counterbalanced through joint discussion of structured feedback on daily operations. Moreover, managers should take advantage of critical incidents that provide the opportunity to jointly learn and increase the effectiveness of adaptive activities. The dynamic processes of adaptation constitute one of the future challenges for almost all companies in an increasingly networked economy.

Uncited references

Johnson et al. (2004)

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