Proceedings of the 28th Annual Hawaii International Conference on System Sciences — 1995

The Impact of Electronic Data Interchange on Interorganizational Relationships: Integrating Theoretical Perspectives

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Abstract

This research examines the ways electronic data interchange (EDI) is used to coordinate and control interorganizational activities and resource transactions between car manufacturers and suppliers. The objective is to develop a research framework with a solid theoretical base that will be capable of capturing the richness of changing interorganizational relationships. To this end, the paper discusses the integration of three theoretical perspectives: transaction cost analysis, resource dependence theory and the network perspective. The main concepts of the framework are described in terms of the environmental context, coordination strategy, efficiency, structure and dependence. The effectiveness of the framework is demonstrated by the development of ten illustrative propositions that could be tested in practice.

1: Introduction

Within the broad group of interorganizational systems [9], electronic data interchange (EDI) seems the most important application with a far reaching impact on the way business is done. It is usually defined as the exchange of structured electronic documents between computer systems of two or more organizations [14]. Unlike traditional applications of information technology (IT), EDI potentially affects relationships between organizations [9;24] as well as their internal structures [5].

The objective of this research is to investigate the impact of EDI on the coordination and control of interorganizational activities and resource transactions in the automotive industry. Thus, our main interest is with how EDI use affects various aspects of the interorganizational relationship, such as coordination, power and forms of cooperation. The key questions are:

- What are the effects of EDI use on interorganizational coordination?
- How are the benefits and costs of EDI use distributed among trading partners?
- What are the effects of EDI on the structure of interorganizational relationships?

However, defining and quantifying the costs and benefits associated with IT has always been very difficult [21;26;33]. Major problems include attributing quantitative values to qualitative benefits, isolating the impact of IT from other changes, showing causality and proving that a particular benefit is solely due to IT, and proving productivity gains without an accepted measure of productivity.

The need for far reaching interorganizational adjustments makes EDI different from internal IT investments, causing additional problems when assessing its effectiveness. While the direct gains from EDI, such as reduced personnel or mailing costs, are relatively easy to measure they tend to be unimpressive [38]. Equally, the direct costs of setting up an EDI link are relatively low. The major costs and benefits are normally indirect; e.g. inventory control, improved trading relationships or EDI-induced business process reengineering [37]. To appraise the qualitative changes (e.g. a change in the governance structure), the organizational context needs to be fully understood. Similarly, the real monetary values of changes in organizational dependence are difficult to estimate [43]. Normally, organizations do not conduct post implementation evaluation studies for EDI as they regard it as a strategic investment to remain competitive [33;34].

There is no single theoretical perspective that explains the impact of EDI on interorganizational relationships; existing approaches (see below) tend to be too narrow to address the complexity of the observable phenomena. Therefore, this study develops a multidisciplinary framework for a more comprehensive understanding of the role of EDI and related technologies. The framework

is being applied in the context of a comparative case analysis of supply relationships in the automotive industry. The framework acts as a foundation to examine the production network of supply relationships for car manufacturers. Taking this network perspective, rather than individual dyadic relationships, offers significant insight at the cost of considerable complexity. To cope with the complexity, we defined our organization-set [2] as a series of focal networks comprising the car manufacturers (at the center) and their first tier component suppliers (see also [43]).

The paper focuses on the development of the research framework, from the underlying theoretical approaches, and its application in the context of the study. Space does not permit a presentation of the interim findings of the study, which is still in progress. We begin by discussing the theoretical perspectives which provide the basis for the framework before moving on to describe the framework itself and, finally, its application.

2: Discussion: Integrating theoretical perspectives

Out of a number of potentially fruitful approaches we have drawn on three major perspectives: transaction cost analysis [44], resource dependence theory [31] and the network approach [17]. These establish three analytical dimensions that, taken together, allow us to analyze the effect of EDI on the efficiency, socio-political and structural aspects of production networks. Before integrating the perspectives, we shall consider their strengths and weaknesses, as shown in Table 1.

2.1: Transaction cost theory

Transaction cost theory has great power to examine the efficiency and cost structures of exchange relationships which provide the basis for the choice of governance mechanisms. It views organizations as constantly changing their boundaries, periodically absorbing transactions within their hierarchies while, at other times, spinning transactions off to be governed through markets. The focus is on the circumstances under which transactions might be externalized (taking place in the market) or internalized (hierarchical transactions) in order to reduce transaction costs. As transaction costs can be difficult to measure directly, additional environmental constructs are included, such as asset specificity, uniqueness, uncertainty and complexity of the exchange, as well as behavioral factors, such as opportunism and bounded rationality.

Changes in IT can affect transaction costs [10]; for example, EDI can simplify certain transactions, indirectly changing the efficient boundary of the firm. With the introduction of 'lean production' and electronic trading in the automotive industry [46], understanding the efficiency of interorganizational cooperation is central to our concerns.

However, transaction cost theory has a number of limitations. Firstly, it does not make any universal claims that are applicable to all organizations, nor does it accurately predict what will happen in a specific situation. Secondly, it takes little or no account of organizations' strategic choices, their abilities to adopt particular technologies (e.g. EDI) or the complex interdependencies that comprise the structure of an industry. Its preoccupation with the economic dimension means that transaction cost theory tends to neglect the political aspects of interorganizational relationships. Thirdly, there are weaknesses in operationalizing the concepts of transaction and transaction costs [28]. Finally, it fails to consider the transition costs that may render sub-optimal structures cheaper than the optimum.

2.2: Resource dependence theory

However, many of the weaknesses of transaction cost theory are the strengths of resource dependence theory, which focuses on the political and behavioral aspects of interorganizational relationships. Similarly, its emphasis on process complements transaction cost's emphasis on structure. By concentrating on resource acquisition and dependence, it explains many of the underlying political characteristics of relationships. Assuming that organizations strive to optimize their self-interests, the objective of a firm is to minimize its dependence on other firms and maximize the dependence of other firms on itself. However, functional autonomy can never be realized fully [31]. Due to the need for interorganizational resource exchange, organizations try to secure access to important resources and balance asymmetry and reciprocity. For example, in the automotive industry, manufacturers depend upon certain suppliers because of a lack of supply alternatives and, similarly, an individual manufacturer may represent a significant proportion of the supplier's turnover.

The key limitations of the resource dependence approach mostly concern a lack of conceptual and operational definition of the concepts involved and their relationships, as well as a lack of empirical validation. However, in our case, an additional limitation is that, like transaction cost theory, it is based on dyadic relationships between two organizations. This is at best ungainly to apply to the networks of automotive manufacturers and suppliers.

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	Transaction cost theory	*Resource dependence theory*	*Network approach*
Theoretical foundations	• Functionality paradigm • Neoclassical framework	• Socio-political paradigm • Open systems theory • Social exchange theory	• Structural paradigm • Social exchange theory • Industrial marketing • Resource dependence theory
Assumptions	Cost of transactions is critical for the choice of an optimal governance structure	Organizations try to gain control over necessary external resources	Organizations are social units that interact with other firms within a wider network
Unit of analysis	Specific transaction relation	Dependence relation	Network of interdependent relations
Scope	Analyze the economic costs of setting up, operating and maintaining a business relationship	Consider the political and behavioral dimensions of organizational interaction	Describe and analyze organizational behavior through the structure of the network
Nature of EDI	Mediating technology to lower transaction costs and improve information handling	Control mechanism to expand influence and status	Structural enabler to improve flexibility, exchange and adaptation processes
Strengths	Examination of efficiency and cost structures	Holistic approach that considers political and behavioral dimension	Dynamic approach that extends the analysis to a network of interrelated firms
Weaknesses	• Narrow focus on economic aspects • Discrete and static analysis that assumes existence of optimal structure • Neglects transition costs	• Overemphasizes political motives and disregards structural considerations • Lack of conceptual and operational definition	• Relatively ungrounded theoretically • Slow development of concepts and data gathering tools
Contribution to this study	Conceptualizes efficiency of interorganizational coordination	Analysis of asymmetric power and dependence relationships	Analysis of structural aspects of interorganizational coordination

Table 1. Comparison of theoretical perspectives.

2.3 Network approach

This last problem is the natural preserve of the network approach, which provides the necessary concepts and constructs with which to describe and analyze complex networks. Recently, interorganizational networks, based on cooperation and strategic alliances, have been increasingly observed, for example, in the automotive industry [4]. Network analysis has been widely used in anthropology [8], sociology, economics and organizational behavior [17] but its application to industrial systems and interorganizational coordination is relatively new [11].

The primary contribution of network analysis to this study is its ability to help conceptualize structural variables. These are properties of links (strength, directionality and symmetry), the position of an organization in a network, the content of links (task based exchanges versus social exchanges) and the properties of the network itself (connectedness, density, reachability). These variables in turn affect interorganizational influence, resource exchange and interorganizational relations. Thus, the application of network analysis

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methods has several advantages. First, structural analysis synthesizes data across different blocks of organizations, i.e. manufacturers and their suppliers at different levels of the supply chain. Second, it permits the assessment of individual company strategies in the context of other relationships. Third, the network model offers a broader context for assessing the implications of EDI. However, its limitations include doubts regarding its theoretical grounding [30] and the lack of concepts and tools relevant to business relationships as opposed to social ones [41].

3: Developing the research framework

Thus, the three approaches complement each other very well, in that the weaknesses of one are mostly mitigated by the strengths of one of the others. Although each perspective has a distinct focus, various concepts have parallels in the other two theories. For example, transaction cost theory shares an interest in vertical integration and opportunism with resource dependence theory. Drawing on the three theoretical perspectives, we extracted the three themes of efficiency, dependence and structure as a foundation for the framework. These are the key dimensions of automotive manufacturer-supplier relationships most likely to be affected by new coordination mechanisms [6;25]. In this section, we discuss the selection of concepts within the three themes, in order to produce the final research framework, depicted in Figure 1. The framework comprises: the environmental context and the coordination strategy as well as efficiency, structure and dependence. In each area, the selection of both quantitative and qualitative measures that capture the richness of the relationships involved is inherently problematic. We have made use of existing validated measures, mainly from the organizational literature, but the context of the automotive industry made it necessary to modify some and add new ones.

3.1: Environmental context

Environmental variables feature within all three theoretical approaches [1;43]. They not only affect the structure of relationships but also the coordination of activities [12] and this is especially the case in the turbulent automotive industry. According to the literature, uncertainty is a key environmental dimension affecting the relationships and the mode and costs of transactions [27;31;44]. A principal source of uncertainty is the variability of resources. The perceived magnitude of environmental uncertainty is a function of the complexity or heterogeneity of the environment [27;44]. An uncertain environment is characterized by the decision makers' need for large amounts of information which are widely distributed in a heterogeneous environment. Following Achrol et al. [1] we conceptualize the environment as a dynamic reality without well-defined shape, size or elements. Therefore, it can best be characterized as a perceptual variable and relevant measures are the perceived rate of change and environmental uncertainty, its variability and instability as well as complexity.

3.2: Interorganizational coordination

When environments are changing rapidly, due for example to increased competition, then organizations become more complex and differentiated in their internal structure and processes [27]. This can also apply to the coordination of activities within a production network. We argue that the scope and intensity of EDI use is largely determined by the needs of interorganizational coordination. These are high in task scope, i.e. they require inputs from different kinds of organizations, and are large-scale in that they require intense effort for a long duration covering many tasks. Our assumption is that as organizations increase their interaction, EDI use increases in parallel. This coordination mechanism, in turn, affects the efficiency and interdependency of relations.

In terms of intensity, information intensity [32] is seen as a function of the 'information content' of the product and 'information intensity' of the value chain. Product information intensity indicates the extent to which the organization's customers utilize information for the selection, purchase, use and maintenance of its products/services. Value chain information intensity represents the extent to which the organization requires information to acquire, manufacture, distribute, sell and maintain its products or services.

Indicators of the scope of EDI use include the implementation status and level of integration into internal planning and control systems, which is related to the overall level of computer applications in an organization. Additionally, the total number of EDI trading partners and the number of different EDI messages indicate the extent to which EDI is being used. The intensity of interaction through EDI can be measured through the percentage of a firm's supply base involved in an EDI linkage and the number of different messages exchanged as well as the percentage of the total volume of purchases transmitted using an EDI system. A more subjective measure would be an organization's own assessment of their EDI use in comparison to their competitors.

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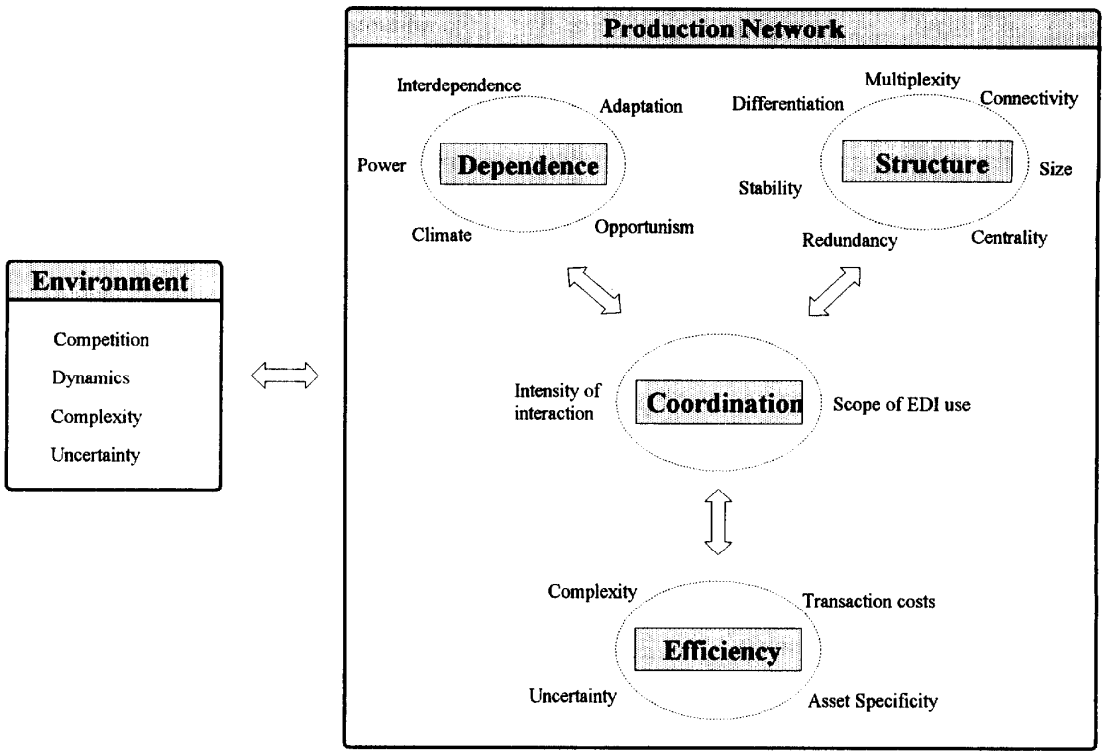

Figure 1. The research framework

3.3: Efficiency

The organizational literature suggests that greater efficiency is achieved through the routinization of work and the bureaucratization of structure [39] but there much less agreement about the best approach to effectiveness [3]. These concepts are particularly problematic for interorganizational networks because of difficulties in defining the focus of investigation.

Regarding cost efficiency, the introduction of EDI would be expected to lead to a fall in transaction costs along the supply chain. However, transaction uncertainty and bounded rationality lead to mutual dependence based on asset specificity and the small numbers of alternative partners. This enhances the likelihood of opportunistic behavior and ultimately increased transaction costs. However, as the total transaction costs are often difficult to quantify, three additional constructs are needed for the analysis: uncertainty, complexity and specificity.

Within the dynamic, customer-oriented automotive industry, uncertainty is highly relevant, originating in both the product and the transaction process. Possible sources of uncertainty are: the number and content of orders and the suppliers' ability to meet production schedules. Product uncertainty includes sudden changes of volume and frequency of redesign while transaction uncertainty refers to the clarity, predictability and frequency of the transactions themselves. These forms of uncertainty may lead to inefficiencies and additional costs, such as buffer stocks or non-optimal production scheduling. Efficiency can thus be seen as a perceptual variable which measures an organization's perception about change, unanalyzability, ambiguity and uncertainty in the transaction process. A more quantitative measure would be the number of days for which the scheduling process is thought to be predictable and the amount of buffer stock holdings.

Complexity can also be viewed in terms of products and transactions. Product complexity refers to the size, standardization, value and range of products exchanged, ranging from entire sub-assemblies to very simple components. Transaction complexity refers to the complexity of the processes, tasks and procedures, which again is highly relevant in the context of combining large numbers of parts and assemblies to manufacture an automobile.

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Specificity refers to the degree to which investments in an exchange relationship can be used for alternative purposes. Dedicated investments include know-how, specific manufacturing or logistics processes and the choice of location. Another source of specificity is the time and effort needed to become familiar with a trading partner's way of doing business and the extent of coordination required. Again, specificity can relate to both products and transactions. Product specificity, referring to the expertise and tools required for specific customers, is reflected in the need for suppliers to tailor their products to the manufacturers' needs. On the other hand, transaction specificity refers to the customized processes needed to support transactions with a particular customer.

3.4: Structure

The network perspective offers the opportunity to examine the impact of EDI on the structure of the focal network. Our assumption is that these structural dimensions are shaped by environmental forces and the choice of coordination mechanisms. Relevant variables include centrality and size, in terms of the number of EDI trading partners and the proportion of business covered through EDI. As networks grow, there is a tendency for connectivity to decline and differentiation and complexity to increase. Hence, connectivity (the number of channels through which information flows) needs to be considered, as well as the number and intensity of transactions and the range of message types. Other important aspects include multiplexity (membership of multiple networks) which helps to measure the number of trading partners, differentiation (the division of labor within the network) which refers to the depth of production, stability (frequency of switching between trading partners) and redundancy (number of functionally equivalent relationships).

3.5: Dependence

The resource dependency approach has been widely used with interorganizational relationships [31]. We define dependence as the degree to which an organization needs external resources in order to achieve its own objectives. This is related to the specificity of investments and how to safeguard them. Our concern is not only the total dependency, but the extent that vertical dependencies are singular or multiple. The more an organization relies on a single source, the greater the likelihood that a core organization will control the flow of resources [3]. The desire to control single sources has an effect on the structure of the relationship, namely the centrality of the network. Relevant variables include task interdependence, mutual adaptation and opportunistic behavior, and the usage of power. The entire relationship needs to be viewed against the political backdrop of the climate of the relationship in terms of mutual commitment, personal ties, goal consensus and trust.

We measure interdependence through the importance of relationships with particular trading partners, the dependence on products and the importance of logistics. The proportion of turnover with a trading partner has been used as a quantitative indicator for interdependence [18]. The importance of products and the costs of replacing a supplier can be based on the manufacturer's perceptions. The intensity of exchange of particular products (synchronous activities, close coordination required), the amount of buffer stocks and the time that passes before the non-availability of a product interrupts an organization's operations are other quantitative measures for the criticality of logistics.

In terms of adaptation, manufacturers as well as suppliers are forced to invest in the relationship in terms of internal reorganization, rationalization and improved communication, although computer controlled manufacturing technologies may reduce the specificity of equipment. However, the specificity of adaptations in communication links, logistics and coordination is increasing because each supplier-manufacturer relationship is becoming more closely integrated and managed. Relevant measures are level of investment and perceived specificity.

Where trading partners are dependent on each other, they may need commitments or safeguards to prevent opportunistic behavior [20;45]. If both parties have an investment 'at risk' they may then be willing to develop a closer relationship. A substantial investment in EDI by both parties can be regarded as such a commitment and this may reduce monitoring and enforcement costs. The number of alternative trading partners and the level of mutual adaptation are indicators of potentially opportunistic behavior as well as the past history of the relationship.

A key assumption in transaction cost theory is that market relationships are inherently based on distrust [44]; for example, buyers are supposedly worried that a single source will take advantage of them. However, whereas markets (and hierarchies) are characterized as low-trust coordination mechanisms, a climate of trust is the hallmark of interorganizational networks. Trust is a concept only recently brought into buyer-seller research [13]. Dwyer et al. [13] distinguish between resilient trust, which refers to the predictability of the moral integrity and goodwill of prospective network members, and fragile trust which can only be sustained by contractual

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safeguards. The investment in EDI may help to safeguard situations of fragile trust and build up resilient trust. In our context, the concept of interorganizational climate refers to the quality of the business relationship between supplier and car manufacturer. We use this concept to assess whether a relationship is perceived to be equitable and satisfying [15]. Possible measures are the extent of goal consensus and the perception of a productive and satisfying relationship as well as the perceived level of trust.

Power is a key concept in resource dependence theory but its operationalization is unclear and it is difficult to measure directly [18]. The traditional dimensions of power [16] were refined by Thorelli [40] into five sources of power: economic power, technological power, expertise or knowledge power, trust and legitimacy; which he then applied to a network of organizations. Reve [35] distinguishes between potential power, enacted power and perceived power, of which the first two are regarded as objective measures, while the latter can only be measured, if at all, in a subjective manner. However, all three types are somewhat difficult to conceptualize.

We attempt to measure power by focusing on the perceived extent to which a manufacturer exercises power over suppliers and how EDI use affects control and influence. This is related to the degree of consensus among organizations regarding their goals and objectives and the lack of conflict between organizations. Power can also be seen in the quality (accuracy, comprehensiveness, timeliness) of the information provided, in that a dominant trading partner may demand very high quality information but may only offer much 'worse' information in return.

4: Application of the framework

In order to show the utility of the framework, we apply it in this section to develop some illustrative propositions. These are not exhaustive propositions, nor are they always entirely consistent, reflecting the different theoretical origins. Nevertheless, we feel that they do demonstrate the power of the framework to deal with complex interorganizational relationships.

4.1: Environment

EDI use has been stimulated by factors related to environmental uncertainty, such as high levels of competitive pressure and the limited life of products [23]. Organizations can address uncertainty in product demand through flexible manufacturing for which EDI is an important enabler in terms of faster order processing and the implementation of JIT inventory management [29]. The consequent dramatic cuts in inventories and work in progress reduce complexity and costs [36]. Thus, one could predict that as environmental uncertainty and complexity in the automotive industry increase, the pressure for vertical coordination and integration of interorganizational processes will increase. This would lead to more intensive interaction and a higher degree of formalization through EDI.

Proposition 1:
EDI serves as part of a coping strategy to forecast or absorb environmental changes in order to achieve a reliable pattern of resource flows and exchanges.

Proposition 2:
Complexity and uncertainty of production, as well as logistics, drive organizations to increase their use of EDI.

4.2: Efficiency

IT has been shown to reduce transaction costs while enabling improved management of the heightened operating risk [23] but, at the same time, the cost of developing and maintaining an interorganizational information system may also increase transaction costs. These additional costs may not be equally distributed among trading partners.

Proposition 3:
EDI enables efficient coordination of production processes and expands local optimization across organizational boundaries.

Proposition 4:
Efficiency gains through EDI use are not equally distributed among car manufacturers and suppliers.

4.3: Structure

EDI might be used to increase efficiency and improve flexibility, thereby enabling more complex, information intensive market structures to replace vertical integration [29]. However, with the exception of a few, simple, low-value components, there is little opportunity for electronic markets to emerge in the automotive industry. The complex components and the associated high asset specificity and interorganizational dependence, mean that spot market transactions are rarely feasible. Rather, organizations will move to 'mixed mode' network structures that contain elements of both markets and

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hierarchies [22]. EDI enables 'loose coupled' partnerships [46]; long-term, low-conflict relationships which allow firms to focus their efforts on core competencies.

Proposition 5:
EDI facilitates 'virtual integration', contributing to the emergence of production networks by ensuring cost efficient control of production processes.

Gurbaxani and Whang [19] demonstrate that the introduction of EDI can support either centralization or decentralization of decision rights and an increase or decrease in firm size. However, complex and highly specialized relationships are best managed through hierarchical style structures.

Proposition 6:
Car manufacturers are a dominant central core whose performance objective is the efficiency of the total production network through extensive use of EDI-based coordination.

4.4: Dependence

Notionally, the use of EDI can lead to either reduced or increased dependence on trading partners. Reduced dependence can result from improved access to a range of strategic resources from other organizations. However, EDI can also increase an organization's dependence on others; for example, in JIT environments, increased interdependence is likely if EDI leads to higher coordination needs between manufacturers and suppliers. An integrated EDI link as a dedicated asset may also reduce the number of alternative sources, reducing an organization's flexibility to switch trading partners. However, organizations normally develop strategies to increase their autonomy and they are more likely to use EDI to help them manage external dependencies.

Proposition 7:
EDI can help to manage external dependencies by increasing the flexibility of an organization to respond to uncontrollable variations in the environment

New relationships normally require investments in customized assets by one or both parties in order to facilitate the production and flow of goods and services. These partner-specific investments create substantial switching costs and make the two parties highly interdependent. Where these investments (e.g. specific EDI links or process changes) are not redeployable, one party may act opportunistically. However, the investments (including EDI links) could create a substantial value-added component. Thus, the specificity of EDI investments has to be considered in connection with other dedicated assets, such as new plant located near to a customer.

Proposition 8:
To implement JIT effectively, manufacturers and partner suppliers have to make customized investments in EDI, plant and flexible manufacturing systems that create mutual dependency.

With increasing adaptation to the often idiosyncratic processes of trading partners, a climate of mutual trust is becoming increasingly important [3]. Such a climate is particularly important in a JIT environment that requires tight integration and sophisticated information exchange. Traditionally, automotive manufacturers exercised considerable power and control over their suppliers and it is questionable whether recent developments have led to more cooperative relationships [42].

Proposition 9:
EDI contributes to more cooperative relationships provided that organizations are willing to cooperate and accept interdependencies.

EDI use can increase the level of friction and conflict between manufacturers and suppliers. Both the desire for more control (manufacturers) and the reluctance to lose control (suppliers) reflect asymmetrical motives. Furthermore the interconnected environments in which these organizations operate can be seen to be political arenas characterized by injustice, information distortion, manipulation, exploitation, inequality or conflict [7;31]. This suggests that power, influence and conflict become important perspectives for an analysis of interorganizational coordination.

Proposition 10:
EDI systems could change the power balance towards manufacturers who can exert considerable influence over their suppliers.

5: Conclusion

In summary, we successfully integrated the three theoretical perspectives of transaction cost theory, resource dependence theory and the network perspective to produce a research framework. The framework comprised concepts, variables and measures derived from

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the theoretical approaches. We have shown that the application of the framework is likely to be useful for studying the effects of EDI on interorganizational coordination. The framework covers the main dimensions of interorganizational relationships that are most likely to be affected by EDI use. In this context we developed ten illustrative propositions that show the applicability of the framework. Further research will be needed to understand fully the impact of EDI and the compatibility of the theories. However, a few general points can be usefully emphasized here.

Within a complex network of transaction relationships, both quantitative and qualitative aspects need to be measured. In each of the three key areas, quantitative measurements are feasible; for example, changes in costs, organization size and the number of personal ties between trading partners reflect efficiency and dependence. Similarly, the network structure can be partly described in quantitative terms, such as the number of transactions along each link. However, limiting measurements to these quantitative aspects would ignore such qualitative aspects as uncertainty and complexity (in the supply chain efficiency), the power balance and goal consensus (regarding dependence) and the coordination and autonomy (in terms of the network structure). Thus, a combination of quantitative and qualitative measurement is essential in order to capture the richness of the relationships and the impact of EDI.

However, great care has to be taken in selecting appropriate quantitative measures from the considerable number available. It is crucial that the measures chosen satisfy criteria of measurability, verifiability and validity. Similarly, great care needs to be taken regarding the qualitative evaluation. For critical aspects such as power and dependence, which are not directly measurable, we are limited to surrogate measures, such as the perceptions of the people involved. Thus, we are constrained to some form of scale of importance or degree, which is wide open to subjective interpretation, both by the interviewees and the researchers. However, such scales can be augmented by the use of 'critical incident' interviewing techniques where interviewees having said, for example, that there is a huge adverse power imbalance in favor of the other trading partner, are asked to recall any objective consequences of this imbalance.

Acknowledgment

This paper is based on research supported by the Human Capital and Mobility program of the Commission of the European Communities. We wish to thank the referees for their contributions to this paper.

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Proceedings of the 28th Hawaii International Conference on System Sciences (HICSS '95)
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