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Trust, power and transaction costs in B2B exchanges – a socio-economic approach¹

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Biography

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ABSTRACT

The advent of the Internet has enabled organisations to reconfigure their inter-organisational relationships. This study presents three frameworks to analyse the outcome that the use of Internet based electronic markets has on the nature of inter-organisational relationships: transaction cost economics, social exchange theory and an integrated framework that combines the first two. The integrated framework proposes that the nature of inter-organisational relationships depends on the interaction between the logic of transaction cost economics and the need for trust and interdependencies between exchange parties. A single case study is used to illustrate the way the three frameworks can be applied to analyse the use of electronic markets in inter-organisational exchanges. The study finds that the integrated framework provides a more complete understanding of inter-organisational relationships, and suggests a modular approach to the implementation of electronic marketplaces.

KEYWORDS: electronic markets, inter-organizational relationships, transaction costs, trust, dependencies

¹ This is a preprint of an article accepted for publication in *Industrial Marketing Management*

1. Introduction

Over 10 years ago, Venkatraman (1994) argued that the role of information technology (IT) in organisations changed from a focus on efficiency enhancements during the 1970s and 1980s to become a fundamental enabler in developing a flexible network of inter-organisational relationships in the 1990s. His study of IT-enabled business transformation was one of the first to acknowledge the role of IT in enabling organisations to redesign the nature of inter-organisational exchanges from a focus on transaction processing to an emphasis on knowledge sharing. At the same time, since the late 1990s, business to business (B2B) relationship literature has reported on the impact of the adoption of Internet technologies, in the form of online customer relationships management and electronic procurement solutions, on the management of B2B relationships and the practices of marketing managers (Garcia-Dastugue & Lambert 2003). The aim of this paper is to improve the current understanding of IT as an enabler of inter-organisational relationship transformation by proposing a framework to analyse the influence that IT use has on the nature of inter-organisational relationships.

B2B relationships have been studied for over two decades in the industrial marketing literature. The studies have drawn on a variety of disciplines ranging from economics (Coase 1937; Williamson 1986) to organisational studies (Sako 1992; Smith & Van de Ven 1994), and from sociology (Blau 1964; Emerson 1962) to law (MacNeil 1980). The research generally differentiates between two types of buyer-supplier relationships: transactional, discrete or arms-length relationships, and collaborative, relational or obligational relationships. The former are characterised by low interdependence, short term commitment, pre-arranged terms and conditions in a written contract, narrow communication channels, low trust, and low asset specificity. In contrast, the latter are characterised by strong interdependences, high levels of trust and commitment, long term span, high transaction costs, terms and conditions loosely specified, and high asset specificity (MacNeil 1980). Transactional relationships can therefore be characterised as economic exchanges, concerned with the economic exchange of goods and/or services between parties, while collaborative relationships involve both economic and social exchanges. The social exchanges involve factors such as interdependencies, friendships, closeness and trust (Easton 1997). Transactional relationships have been studied predominately drawing from transaction costs economics (TCE), while relational exchanges theories, in particular concepts drawing from social exchange theory (SET), have been employed to understand collaborative relationships (Lambe, *et. al.* 2001; Morgan & Hunt 1994).

In his study, Venkatraman (1994) built on increasing evidence in the information systems literature that the deployment of IT to support B2B transactions – in the form of inter-organisational systems (IOS) – has significant consequences for the nature of inter-organisational relationships. Most of these early studies were grounded in the economics literature, in particular transaction costs economics. For example, the use of IT to support B2B exchanges was found to lower transaction costs, leading to an increase in outsourcing (Malone, *et. al.* 1987). Clemons *et. al.* (1993) found that IT use also reduces the transaction risks. Lower transaction risks encourages organisations to engage in collaborative relationships with a small set of suppliers. Cunningham and Tynan (1993) acknowledged the insights that can be gained by drawing from B2B research, rather than relying solely on one (economic) approach, and called for IT studies on IOS to link with existing research on relationship marketing. They claim that such links can provide valuable insights into the use of IT in an inter-organisational context. More recently, IT literature has examined the use of IT in B2B relationships relying on concepts such as trust, dependency and power which have been largely used in B2B marketing studies (Allen, *et. al.* 2000; Hart & Estrin 1991; Pavlou 2002; Ratnasingam 2005; Webster 1995). However, while the B2B marketing literature has devoted significant attention to integrating the social and economic attributes that characterise B2B relationships and to comparing and

contrasting these attributes to explain both relational and transactional exchanges (Dwyer, *et. al.* 1987; Lambe, *et. al.* 2000; Webster 1992; Wilson & Vlosky 1997), IT research lacks a comprehensive framework to explain the use of IT in both collaborative and transactional relationships. The current approach has been to argue that while TCE is appropriate for studying the use of IT in transactional relationships, a relational perspective (e.g. SET) should be employed to study collaborative uses of IT (Christiaanse, *et. al.* 2004; Kumar, *et. al.* 1998; Markus & Christiaanse 2003). However, transactional and collaborative characteristics coexist within a particular relationship to different degrees (Grover, *et. al.* 2002). For this reason, Grover, *et. al.*'s (2002) study called for IT research to integrate the traditional TCE approach with what they call "relationalism" concepts – i.e. concepts used in B2B marketing literature to explain relational exchanges - to provide a better framework to understand the impact of IT on buyer-supplier relationships. Our attempt here is to develop a framework that integrates TCE and relational exchange theory, and in particular SET, to explain IT use. This approach is consistent with Lambe, *et. al.*'s (2001) recommendation for B2B marketing research that "*SET should be used in conjunction with another theory(ies) to fully explain BTB exchange governance*" and that "*because it complements the 'relational' governance explanation of SET, TCA would appear to be a theory that could be used with SET to more comprehensively explain exchange governance*". The authors argue that "*future research of relational BTB exchange should use both SET and TCA whenever possible*" (pg. 28-29).

The paper is structured as follows. The next section introduces the focal IT applications this study addresses – electronic markets (EM) - and identifies their main functionalities. We then discuss the research methodology and explain the rationales for using an interpretative case study research design. The profile of the organisation under study is described next. This is followed by an explanation of the frameworks used to study the use of EM in B2B relationships, together with the way these frameworks can be applied to analyse the data from our case study. The next section evaluates the different frameworks and discusses the implications for research and for organisations that consider adopting EM. Finally, we summarise our findings, identify the limitations of the study and offer some recommendations for future research.

2. Electronic markets: definition, role and characteristics

This study uses the term EM to refer to all types of inter-organizational systems arrangements between buyers and suppliers². In addition to the simple matter of buying and selling (Bakos 1998) electronic markets also include a range of collaborative functionalities such as supply-chain management solutions and fulfilment (Christiaanse, *et. al.*, 2004).

During the 1990s, with the exception of very large organisations which had introduced electronic data interchange (EDI) systems during the 1980s, EMs were barely used in B2B relationships on a global scale. For example, in 1998, while 95% of the Fortune 1000 firms had implemented EDI, only 2% of the remaining 6 millions businesses in the US had done so (Chwelos, *et. al.* 2001). The advent of the Internet in the

² Traditionally, there were two types of IT applications used in inter-organisational relationships: IOS and EM. IOS were used to support the information flows between organisations engaged in long term relationships, while EM were used to mediate the exchange of goods and services between organisations engaged in a stand alone transactions (Turban, *et. al.* 2006). The distinction is similar to Garcia-Dastugue and Lambert's (2003) division of Internet-enabled mechanisms into market mechanisms (EM) and coordination flows (IOS), Today this distinction is blurred, as new collaborative EM applications have been developed to support exchanges previously served by IOS (Christiaanse, *et. al.* 2004).

commercial domain in the late 1990s has opened up the access to electronic commerce solutions to all kinds of organisations. In contrast with EDI, Internet relies on open standards and public access network which significantly reduce the costs of using IOS. Lower costs means that more organisations can afford to adopt Internet based IOS (Turban, *et. al.* 2006). According to a Goldman Sachs Group report, while Internet B2B commerce made up only 0.2% of the total B2B commerce in 1997, by 2001 this proportion had increased to 2.1% in 2001 and was expected to grow to 10% in 2005³ (Turban, *et. al.* 2006). As Internet becomes the norm for a typical B2B exchange, EM functionalities are expected to play a much greater part in shaping relationship management. According to Garcia-Dastugue and Lambert (2003), while *"it is unlikely that the Internet will change the reasons why firms maintain close relationships with other supply chain members ... this (advances in Internet technologies) progress releases some constraints on how management can coordinate activities in the supply chain. The challenge managers have is to capitalise on the state of the art of IT to improve performance of their businesses. Choosing the coordination mechanism that best fits each type of relationship in the supply chain is part of this challenge"* (pg. 261-262). Therefore, understanding the impact that the use of EM will have on the nature of inter-organisational relationships has important implications for formulating and implementing effective relational strategies.

Figure 1 presents an overview of the different functionalities of EMs.

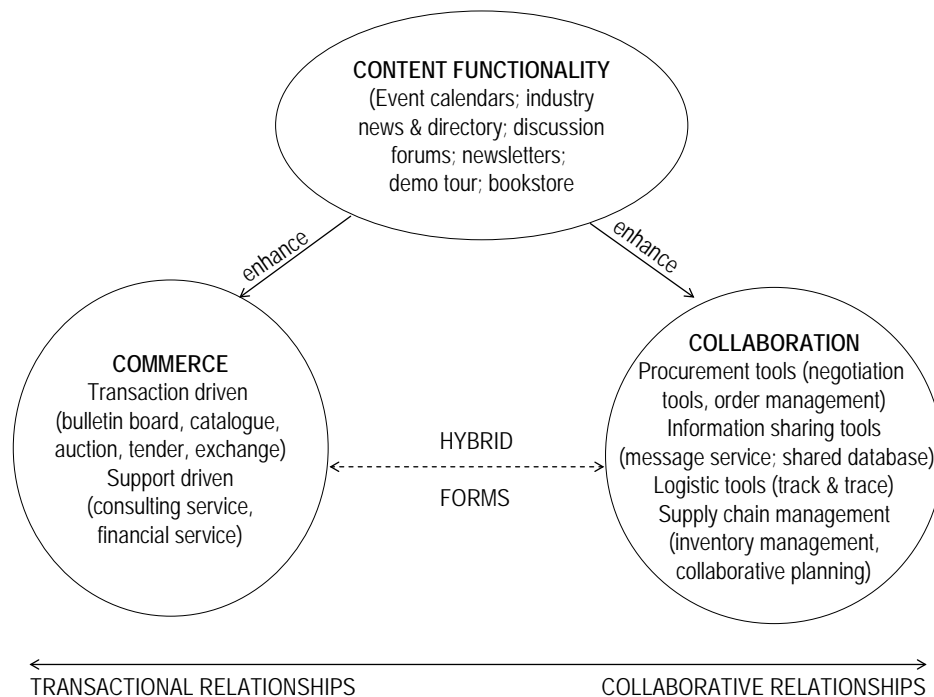


Figure 1. EM functionalities and types of inter-organisational relationships

³ Similar uptake of B2B online commerce was reported across the globe. For example, by 2004, electronic commerce represented 9% of the total turnover for European firms, while in 2005, 44% of European firms were making online purchases and 15% were making online sales (Anonymous 2005). In the US, B2B commerce represented 18.96% of all commercial transactions between organisations in 2003, an increase of 1.3% from the previous year, while in Japan the percentage of organisations using B2B commerce increased in 2003 to 30% (Anonymous 2005).

Generally, it is argued that commerce functionalities support transactional exchanges, collaborative functionalities provide the channel for collaborative exchanges, while the content functionalities serve to augment EM's core transactional or collaborative functionality (Markus & Christiaanse 2003). As in the case of inter-organizational relationships, hybrid forms of EM are possible, where both commerce and collaborative functionalities are provided, but where more weight is placed on one functionality.

Markus and Christiaanse (2003) argue that whereas transactional oriented EMs can be explained based on theoretical frameworks such as TCE, relational exchange theories (such as SET) are more appropriate to analyse the outcomes of collaborative EMs. We maintain that both TCE and SET provide only a partial understanding of EMs used in any category of B2B relationship, and a complete picture can be gained only through the lens of the TCE SET integrated framework. The way in which the TCE, SET and the integrated frameworks can be applied to study the outcome of EM use in organizations is explained in this paper using a case study approach. The case study concerns the use of an EM in the petroleum industry. The next section discusses research methodology adopted in this study.

3. Research methodology

Generally, approaches to organisational research can be classified as positivistic – which take a hypothetico-deductive approach to investigation – and interpretivist or non-positivistic – which maintain that the methods of natural science are inadequate to the study of social reality (Williams 2000). Interpretivist studies assume that knowledge of reality is gained only through social constructions such as language and shared meanings (Klein & Myers 1999). Therefore, interpretivist researchers argue that the phenomena under study can be understood only through exploring and interpreting the meanings that people assign to them (Orlikowski & Baroudi 1991), within their own subjective frame of reference (Lee 1991; Williams 2000).

Interpretive methods have been largely used in information systems research⁴ (for a review see Myers & Walsham 1998). In contrast, marketing research has been dominated by positivist approaches, stressing rationality, objectivity and measurement. However, since the 1980s a number of researchers have attempted to introduce non-positivistic research approaches to the marketing discipline, which, they argue, provide additional insight into neglected aspects of marketing (Arndt 1985; Hudson & Ozanne 1988; Lowe, *et. al.* 2005) such as the contextual influences on organisational behaviour in B2B marketing (Arndt 1985; Hakansson & Shehota 1997). Lowe, *et. al.* (2005), for example, note that in their study of B2B relationships, Hakansson and Snehota (1997) have identified the importance that the contextual nature of the interaction between organisational actors, which involves socially constructed meaning as well as the construction of identities, plays in understanding organisational behaviour. They argue that *"the pattern of activities in an interactive, relational context, is, according to Hakansson and Snehota (1990:536), guided or is a context 'framed' through interpretation and ex-post rationalisation of past experience involving a social process of communication through codes, symbols and routines."* (Lowe, *et. al.* 2005, 193). Anderson, *et. al.* (1994) also argued that qualitative case studies play an essential part in refining their proposed constructs for analysing business relationships in a network context. This suggests the need for an interpretative case

⁴ A special Issue of the Journal of Information Technology on Interpretive Research in Information Systems was published in December 1998 (Myers & Walsham 1998). The nature and method of interpretive case study research were laid down in Walsham's study (1995). Klein and Myers' (1999) paper suggested a set of principles for the conduct and evaluation of interpretive research, and Nandhakumar and Jones (1997) explored the data gathering methods used in interpretive research.

study approach to study B2B relationships which would allow the researcher to explore the respondents' own subjective interpretations of the relational behaviour within their particular context. Examples of non-positivistic case studies of B2B relationships in marketing research include a special issue of the *Journal of Business Research* on building theory from multiple case studies using the grounded theory approach (Vloski & Wilson 1997), and a dual qualitative case study to provide "*inductive gist for further conceptual development*" (Anderson, *et. al.* 1994, pg. 2). The approach taken here is similar to Anderson's (1994) in that the discussion of the case study is intended neither as a "test" of the theoretical framework developed above, nor as a direct evidence of its validity. Rather, it is intended to clarify the framework by grounding the abstract categories and the relations between them in an empirical context, while at the same time providing a guide for further research developments.

The study adopts an interpretive research approach based on an instrumental case study research design (Stake 1995). The organization under study, Petrotell, is a service company belonging to one of the four major petroleum companies. Petrotell provides technical consultancy services to a range of customers, both within and outside the parent group. The selection of the case study follows the intensity criteria (Miles & Huberman 1994). While the share of B2B online transactions has increased since the early 2000, it is still proportionally higher for large organisations (Anonymous 2005). Therefore, the case was selected among a leading organisation in its industry, based on the assumption that in such cases EM usage would be most intensive, thereby providing richer information.

The assumptions of interpretivist research suggest data gathering methods that should allow the researcher to interact directly and intensively with respondents in order to enable access to the meanings that the respondents assign to the social phenomenon under study (Nandhakumar & Jones 1997). In line with the interpretivist tradition, semi-structured interviews were used with the team responsible for the management and administration of the EM in Petrotell. Following the recommendation for semi-structured interviews (Arksey & Knight 1999), the interview guide included only a limited number of fixed questions which were mapped onto broader research objectives (see Table 1).

Table 1. The interview guide and the associated research objectives

<i>Interview guide</i>	<i>Research objective</i>
What are the key Internet applications used to support customers and/or suppliers relationships?	Identify the use and key functionalities of the EM.
Are they used to the same extent with all types of partners? Explain the differences. Are there different levels of using these technologies in terms of access, amount of information, customisation?	Identify the characteristics of EM applications. Explain how/if their use varies depending on the characteristics of business relationships.
What are the reasons for the existence of these differences? Are such differences related to interpersonal relationships, confidence in the other party, communication costs, or the risks involved in the transaction?	
Which are the main advantages/disadvantages in using the EM applications? Are these related to trust, cost reductions or transaction risks?	Identify the outcomes of the use of EM applications on the level of trust, transaction costs and risks.

The semi-structured nature of the interview enabled the researcher to maintain some structure in the research process, while following the tenets of the interpretive research and providing access to the participants' views and interpretations of actions and events (Walsham 1995). The semi-structured approach was also helpful in building in flexibility into the interview process enabling the researcher to explore relevant avenues of questioning as they emerged, while at the same time allowing the respondents to develop their own views on the topic at length (Arksey & Knight 1999).

Consistency of data gathering was facilitated by having a single researcher conducting all the interviews. This is in line with the approach taken to case studies in marketing research (Webb & Lambe 2007). To ensure the validity of the interview, transcripts were sent to the respondents within 24 hours. The team in charge of EM management included only three members: a strategic architect, a managing director and one designer. Due to the limited number of informants, attention was focused on triangulating the interview data to ensure data validation with secondary sources. The secondary sources included publicly available company documentation such as annual reports, industry case studies, and internal documentation dealing with EMs and customer relationship management.

The interview transcripts were analysed using the techniques suggested by Miles and Huberman (1994): open coding for data reduction (Strauss & Corbin 1990), and data displays for descriptive and explanatory data analysis. Coding followed a deductive approach (Miles & Huberman 1994), as an initial list of codes was developed based on the categories that emerged as relevant from the literature review. The initial list of codes included two categories: the use of EMs, including the extent of use and the functionalities, and the three relational concepts, trust, transaction costs and dependency. The list of codes was discussed with two other researchers and changes were made iteratively as the researcher checked the list of codes with the evidence from the case studies and the feedback from the discussions with the two colleagues. Following Miles and Huberman's recommendation (1994), the codes were organized into a range of data displays including checklist matrices and casual networks to further reduce the data, to capture the relationships among the different concepts, and finally to draw conclusions and verify them. Based on these

displays, case narratives were developed to describe the use of EMs in relation to the three relational concepts. Following Stake's recommendation (1995), the narratives informed conclusion drawing.

The evaluative criteria for positivist research, such as the demonstration of reliability and generalizability, the adherence to a "proper" protocol that includes rules for sample selection to avoid biases and standard questionnaire format, are inconsistent with the flexible, adaptive nature of the interpretative approach (Hudson & Ozanne 1988; Stake 1995). In their study of seeking alternative – non-positivistic - ways of conducting marketing research, Hudson and Ozanne (1988) suggest two criteria which have consistently been applied to interpretive research. The first criterion is whether the phenomenon has been examined in its natural setting. The case study approach has enabled us to study the use of an EM within its settings (Yin 1994), which is discussed in the following section. The second criterion is whether the researcher has provided a thick description, that is that the description of the phenomenon should be detailed and inclusive of contextual aspects, and the language and terminology of people being investigated should be respected. Following the recommendations of Rubin and Rubin (1995), semi structured interviews were used to provide a thick description of the case, and as suggested by Stake (1995) the analysis is based on in depth descriptions of the case, relying on the terminology of the respondents (see section 4).

3. Background: the organisation's profile

Petrotell is a service company and is part of one of the four leading petroleum companies (Shell, Chevron Texaco, Exxon Mobil and BP Amoco). The consultancy services provided by Petrotell include both business operations consultancy such as benchmarking and performance monitoring, and technical services such as hydraulic power solutions and software engineering. At the time of the study, the majority of its customers were the parent group's operating companies. These internal customers, labelled by the interviewees as "*large customers*", were customers with large and lengthy contracts; external customers, labelled "*small customers*" by the respondents, had contracts which typically ran for up to a year. The explanation for the clear distinction between internal, large customers and external, small customers can be found in the context in which Petrotell operates. The petroleum industry is dominated by the four major companies. All four companies are involved in all the activities in the petroleum supply chain (Ernst & Steinhubl 1999), and they all possess the technological capabilities that Petrotell commercialises (Acha 2000). It is thus highly unlikely that external customers will require technological consultancy services, and even if they do, it is improbable that they would choose a company belonging to their competitor. Consequently, the external market for Petrotell services is restricted to the smaller and less financially powerful companies than Petrotell's parent group's own operating companies. The external contracts are therefore more likely to come from smaller organizations that do not possess the expertise of the big four companies.

Despite being lower in value, external customers were highly profitable since they enabled Petrotell to leverage the various products already offered to internal customers across a much larger market at very low cost: "*from the products that the business groups have developed for large customers, we can take individual components that can be sold to smaller customers. In this way we can increase the market without increasing the costs.*" The need to attract smaller customers in order to achieve efficiencies in operations was one of the strategic drivers that led to the creation of Petrotell during the 1990s, with the aim of integrating technical expertise from across the various business groups within the parent organisation: "*(Petrotell) was created in order to reduce the cost overheads by offering the opportunity to sell the technical skills provided by the company's different business groups (operating companies) to a larger market.*".

The case study focused on the use of an EM in Petrotell to support the interaction with its customers. The EM was developed in 1997 to support the delivery and execution of consultancy services. The EM was seen as an integral part of this strategy to increase the efficiency in operations. The role of the EM platform was to *"to deliver web based services so that we could achieve operational and financial benefices"* which were to be achieved by *"channel(ing) through this platform a percentage of the services provided by the operating companies"*. EM was hence seen as an additional channel to reach the customers, and the focus was on *"efficiency and productivity"*.

Petrotell's EM includes the entire range of functionalities identified by Markus and Christiaanse (2003); these are offered to customers at three levels. The first level includes the delivery of generic (uncustomised) content functionalities including access to a generic library, newsletters, discussion forums, Petrotell promotional information and a generic list of contacts. Customised content functionalities, such as access to the customers' own customised libraries and contacts; and commerce functionalities such as cost allocations and knowledge repositories are delivered at the second level. At the third level Petrotell adds collaborative functionalities which are tailored to the specific needs of its customers, including shared databases. The distinction between the small and large customers is important as different EM functionalities are targeted at different categories of customers: while content, commerce functionalities are used with all customers, collaborative functionalities are targeted at large customers.

4. Frameworks for analysing EM use in inter-organisational relationships: theory and practice

This section discusses the way in which TCE, SET and an integrated framework can be applied to explain the outcome of EMs on the nature of inter-organisation relationships, with reference to the Petrotell study.

4.1. Transaction costs economics & EM

According to the TCE perspective, the principal role of IT in general and EM in particular is to **reduce transaction costs**. Transaction costs involve ex-ante costs associated with searching and contracting, and ex-post costs involving monitoring and enforcing the exchanges (Williamson 1986). In one of the first TCE-based IT studies, Malone *et. al.* (1987) found that IT use reduces the time and cost of communication, decreases the costs of the product selection process, and allows for a tighter coupling of information processes that increases the speed, reduces the errors, and allows for better linkages between the buyers and suppliers' information systems which lower both ex ante ex post transaction costs. This outcome was confirmed in subsequent studies: EMs are found to reduce searching costs (Bakos 1998), to improve coordination (Hart & Estrin 1991), and to reduce the costs of explicit coordination (Clemons, *et. al.* 1993). The initial conclusion of IT researchers was that while lower transaction costs favour transactional exchanges, the use of EMs should lead to the development of transactional relationships (Malone, *et. al.* 1987).

In our study of Petrotell, the provision of non-customised content functionalities at level 1 is targeted at potential customers or at customers with very small contracts who do not want access to higher value added services. These non-customised functionalities provide a cost efficient way for Petrotell to attract potential customers: *" (their) purpose is to cross sell our products (and) to build awareness, to determine the customer to contact us and engage them in discussions, to see what else we can sell them"*. The EM is used to lower ex ante transactions costs associated with searching for customers. The delivery of customised content functionalities, such as online libraries and discussion forums, commerce functionalities including remote consultancy services and collaborative functionalities such as shared databases speed up

the delivery process, and decrease the information processing and communication costs with customers at level 2 and 3 by replacing offline- with cheaper, online-communication. Faster and cheaper communication and coordination during the delivery of consultancy services led to lower ex post transaction costs. For example, shared databases enable Petrotell consultants to conduct most of their work remotely: "*being able to do this process remotely means reducing this costs overhead not only in terms of reducing the travel costs, but also in terms of a more efficient use of time for the consultant.*". This speeds up the delivery of customer services, and reduces communication and coordination costs. However, customised EM functionalities also require constant maintenance of the service delivery to individual customers. For example, dedicated discussion forums require a Petrotell expert to monitor and coordinate the discussions, while customised libraries and shared databases require constant updates. These maintenance costs add to the overall information processing costs. Consequently, the outcome of EM use on transaction costs in Petrotell is twofold. On the one hand EM use enables online service delivery and reduces ex ante and ex post transaction costs. On the other hand, by customising content functionalities EM use increases ex post transaction costs with large customers.

While TCE research seems to agree that EM use reduces transaction costs, its results are divergent in what concerns the impact on overall **transaction risks**. Transaction risks include operation and opportunism risks. Operation risks take account of the fact that other parties in a transaction may wilfully misrepresent or withhold information, or under-perform their agreed responsibilities. The risks arise from information asymmetries and from difficulties in enforcing agreements. Opportunism risks are the risks associated with a loss of bargaining power directly resulting from the execution of a relationship. Few potential suppliers for a product and the loss of control over resources transferred to the supplier over the relationship lifetime are two sources of opportunism risk (Clemons, *et. al.* 1993).

Clemons *et. al.* (1993) argue that the adoption of an EM lowers operations risks as the EM provides increased information availability and processing capacity, and both reduces information asymmetries between the parties and improves monitoring and incentives. These results were confirmed by subsequent studies supporting the argument that the use of EMs brings about collaboration (Garcia-Dastugue & Lambert 2003; Garicano & Kaplan 2001).

In Petrotell, the use of collaborative functionalities such as shared databases improves the ability of the organization to monitor the flow of information with the customer, reducing the operation risks associated with the customer misrepresentating or withholding information.

In the literature, the impact of EM use on opportunism risks is less clear cut. It is argued that the open nature of the Internet reduces switching costs, while simultaneously improving the firms' ability to monitor compliance with contracts (Clemons, *et. al.* 1993). Lower switching costs means higher negotiating power as the firm has many alternative partners (Fontenot & Wilson 1997). At the same time, better monitoring reduces the risk of loss of control of resources (Clemons, *et. al.* 1993) and particularly of information and expertise (Teece 1987). Therefore, the use of an EM alleviates the risk of opportunistic behaviour inherent in relational exchanges leading to collaborative relationships (Clemons, *et. al.* 1993). This collaborative effect of EMs has been confirmed by a number of studies (Bakos & Brynjolfsson 1997; Christiaanse & Kumar 2000) However, while there are undoubted collaborative benefits to using EMs, their use is also found to increase opportunity risks, either in the form of vulnerability costs, such as "*the costs of adopting specialised procedures, erosion of control over internally generated information*" (Hart & Estrin, 1991, pg. 376), or due to higher uncertainties as buyers face the risk of incomplete and distorted information and sellers face the possibility that their offers will not be appropriately valued in an unproven market system (Geun Lee & Clark 1996/1997).

In Petrotell, the customisation of content functionalities increases customers' switching costs and thus restricts their choice of potential suppliers: "*the tailored domains require high maintenance and this means high maintenance costs for use. With these companies we have the biggest contracts and are highly profitable. Developing tailored domains for them serves to increase the switching costs they would incur by moving to other suppliers*". As customers have fewer choices, Petrotell is able improve its bargaining position in later negotiations. Consequently, Petrotell's opportunistic risk in the exchange is reduced. At the same time, delivering consultancy information services online via the content functionalities of EMs enables Petrotell to maintain control over its resources by preventing customers from transferring the information to third parties: "*previously, tonnes of information have leaked out. They were printed, on CD and were given (by customers) to third parties. We want now to protect the IP. One way to prevent third parties having the same information that we offer to our customer is to continually update the information on the site.*" Consequently, the second source of opportunistic risks – loss of resource control – is reduced. No evidence was found that the use of EMs would lead to vulnerability costs that would, in turn, increase opportunistic risks. On the contrary evidence showed an increase in Petrotell's ability to control the flow of information.

Consequently, the use of EM in Petrotell reduces both transaction costs and risks, largely supporting the suggestion of Clemons *et al.* (1993) that the introduction of an EM supports the development of collaborative relationships. However, the increase in transaction costs as a result of the use of customised content functionalities seems to go against the logic of transaction costs economics.

4.2. Social exchange theory & EM

The SET framework can be used to explain the impact of EM use on the nature of inter-organisational relationships depending on EM's effects on trust and dependencies.

Different categories of trust have been identified in the organisational literature. **Risk based trust** is defined as confidence in one's expectations about another's behaviour, while **goodwill trust** is understood as confidence in another's goodwill (Nooteboom 1996; Smith Ring & Van de Ven 1994). Trust can also be defined at the **personal level** (trust between individuals), and at the **organisational level** (individuals in an organisation may "*share an orientation toward another organisation*" (Zaheer, *et al.* 1998, pg. 143)). The level of trust between parties using EMs depends on the type of EM functionalities used. When transaction-driven functionalities replace face-to-face communication with online communication social exchange is hampered and the development of personal trust is inhibited (Bunduchi 2005). In addition, trust may be reduced as a consequence of rigid monitoring and controlling of the exchange (Gallivan & Depledge, 2003). Collaborative functionalities support trust building through a number of mechanisms, including (i) direct monitoring of the exchange; (ii) the use of feedback mechanisms and the adoption of cooperative norms (Pavlou 2002); (iii) the provision of constantly available information and the opportunity to order products and services directly (Bauer, *et al.* 2002); (iv) open sharing of information (Gallivan & Depledge, 2003); and (v) the embedding of structural assurances mechanisms in the form of the security of technical solutions (Ratnasingam 2005). Consequently, EM can sustain both transactional (low trust) and collaborative (high trust) relationships. Empirical research has also found a positive association between the extent of EM use and the level of organisational trust. This association indicates that EM are more likely to be used in already collaborative relationships (Hart & Saunders 1998; Vlosky, *et al.* 2000).

In Petrotell the use of EM supports the development of organisational trust with customers. First, the customisation of content and collaborative functionalities such as discussion forums and message services allows Petrotell to exchange confidential information via the EM: "*if the customer has its own customer domain (level 3) then he can have a discussion forum internally, confidentially*". Confidential information

sharing supports customers' confidence in Petrotell's good faith. Second, public discussion forums build organizational trust by enabling transparent service delivery. Public discussion forums allow open sharing of information between customers and with Petrotell. As a result, any service failure with a particular customer will be instantly noticed not only by a Petrotell representative but also by all other customers. *"we need to maintain our reputation by maintaining good services ... each service failure will contribute to decrease the customers' trust, so in order to increase the customers' trust we need to assure that the channel is as transparent as possible; the transparency is sustained by the existence of discussion forums. ... on non e-channels, if there is a failure in delivering a service, it can pass days or months without anyone noticing it. On the e-channel, service failure will be noticed immediately, as the e-channel is much more transparent."* Higher visibility means that Petrotell can address a service failure more quickly, hence increasing the customers' faith in its ability to deliver according to agreements (risk based trust). Higher transparency also builds customers' confidence in Petrotell's good faith (goodwill trust).

The use of EM in Petrotell has, however, a negative impact on personal trust. Commerce and content functionalities, such as remote consultancy services and discussion forums, reduce the degree of personal contact between Petrotell and its customers by replacing face-to-face and phone communication with online communication. Online communication obstructs the social exchanges that are the primary mechanism to support personal trust building. The interviewees emphasised this outcome as a significant concern for Petrotell, since the lack of personal contact with customers hinders the development of personal trust. The inability to support the development of personal trust with customers was seen to damage the quality of the relationship: *"the disadvantage of the (EM) is that customers perceive that there will be less face-to-face contact ... (and) less personal contact (but) the access is 24 hours per day so it is a much more efficient tool at directing questions"*. However, customers seem willing to accept the reduction in personal contact in exchange for increased operations efficiency resulting from the constant availability of assistance.

The concept of **interdependencies** between firms is related to the concept of **power** (Blau 1964; Emerson 1962). Power is defined as 'being able to get things one wants, against opposition - not predicting what is going to happen anyway, and then advocating that outcome.' (Pfeffer 1997, pg. 54). An agent has power only if others are dependent on the resources that the agent commands (Jackson 1993) and access to these resources represents the primary stimulus for organisations to engage in interactions (Nord 1980). Electronic Data Interchange based EMs were found to create asymmetric dependencies between participants due to the costs involved for the users in switching to another provider's system (based on a different technical standard) (Meier 1995), and because of the asymmetric distribution of benefits between participants (Nakayama 2000). Asymmetric dependencies were found to deter the adoption of EMs, and to explain the use of coercive power to influence the adoption of EMs (Hart & Saunders 1998; Webster 1995). With the advent of the Internet, a number of researchers have suggested that power and dependency will be less relevant in inter-organisational exchanges due to the open standards and relatively low adoption costs it makes possible (Clemons, *et. al.* 1993; Turban, *et. al.* 2006). This argument is supported by Vlosky *et. al.*'s (2000) study, which found no correlation between the balance of power between firms and the extent of EM use. In contrast, other researchers have found that power continues to play a significant role in shaping the use of Internet based EMs. In particular, coercive power was found to degrade relationships (Allen, *et. al.* 2000; Gerst & Bunduchi 2005). Consequently, it seems there is little agreement about whether or not the use of EMs breeds asymmetric dependencies in the Internet context, and whether the exercise of coercive power influences EM adoption.

In contrast to previous studies (Meier 1995; Nakayama 2000), in the case of Petrotell the use of EM leads to stronger symmetric dependencies between participants, by creating switching costs for Petrotell and for the customers, and through creating fair distribution of benefits between the parties. First, the use of shared databases increases customers switching costs due to the use of proprietary standards for data representation. Proprietary standards mean that customers will incur higher costs if they decide to move to another consultancy provider: *"the use of the application will be embedded in the customer's processes; so even if competitors will have the same applications, will be difficult for the clients to switch the applications. The (level 3) licences allow us to own representation of the customer data. ... using the data depends on the way the data is stored, so as there is no standard format, it is difficult to be transferred to another (competitor), and thus the customer incur big switching costs"*. At the same time, Petrotell makes significant investments in maintaining and updating customers' data. These investments would be lost if the customer decided to switch. As described by the interviewees, *"developing tailored domains for (large customers) serves to increase the switching costs they would incur by moving to other customers. The customer must become dependable, which represents a strong incentive for him to renew the contract"*. Second, the use of commerce and collaborative EM functionalities benefits both Petrotell, in terms of improving the coordination of customer relationships, and the customers, in terms of improving their access to consultancy service.

Through the SET lens, the use of EM in Petrotell shows positive outcomes for organisational trust and mutual interdependencies between Petrotell and its customers, although with a negative impact on personal trust. Overall, these outcomes support the argument that the use of EM leads to the development of collaborative relationships in Petrotell. However, the SET perspective omits one crucial aspect involved in EM use – the fact that one of the major reasons why organisations use EM is to reduce costs, particularly transaction and procurement costs. Trust and dependency are clearly crucial concepts to explain the outcomes that EM has on the exchange, but so are the level of costs savings achieved as a result of EM use and the level of transaction costs involved in the exchange (Bunduchi 2005). In the case of Petrotell, the application of the SET framework to explain EM use does not account for the important role that cost reduction and increased efficiency in operations played in driving the implementation of the platform.

4.3. TCE & SET integrated framework & EM

According to the integrated TCE and SET framework, the outcome of EM use on the nature of inter-organisational relationships depends on the relation that develops between trust, transaction costs and dependency. Different EM functionalities are used by organisations to achieve different relational outcomes. For example, commerce functionalities help to reduce transaction costs between buyers and sellers (Bakos 1998), while collaborative functionalities not only serve to reduce the costs associated with information sharing (Markus & Christiaanse, 2003), but also build organizational trust (Bunduchi 2005). Collaborative functionalities may also lead to the development of higher levels of dependency between parties through the use of proprietary standards (Meier 1995). The overall outcome of EM use on a relationship will depend on the way an organisation combines different commerce and collaborative functionalities to generate intended or unintended outcomes that impact trust, dependency and transaction costs.

As a channel for inter-organisational exchange, EM mediates the interactions between the three relational concepts: trust, transaction costs and power, and their combined influence on the relationship. Figure 3 demonstrates how the integrated framework can be applied to explain the nature of relationships in the context of EM.

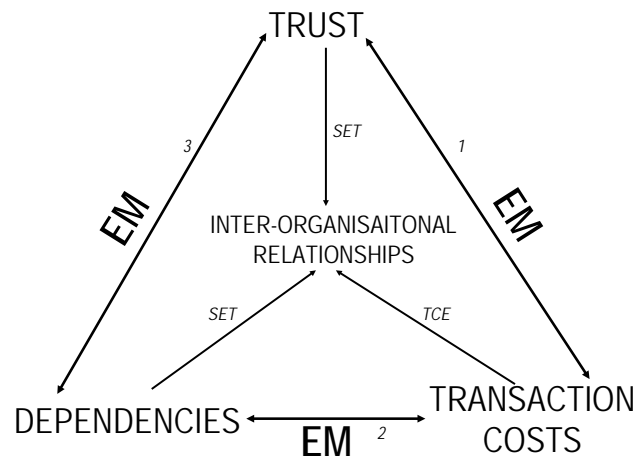


Figure 2. TCE & SET integrated framework & EM

Trust as a requirement of EM use has been related in the literature to **inter-organisational dependencies** (line 3 in figure 2). Trust acts as a mechanism to support mutual dependence between participants, to mediate their coordination requirements and to alleviate the users' perceived loss of power (Meier 1995). Using the same argument, lack of trust was found to act as the prime motivator for the more powerful firms to exercise control by manipulating the data standards embedded in the system. Data standards contain the rules of trade so that, control over standards gives control over these rules to the more powerful firms, who are able to alter the standards to suit their own requirements without any need to heed the needs of their less powerful trading parties (Allen, *et. al.* 2000). Therefore, in the absence of trust, EM use increases asymmetric dependencies between parties. At the same time, the use of coercive power to force the adoption of EM by dependent users was found to breed more mistrust (Allen, *et. al.* 2000), supporting Kumar *et. al.*'s (1995) argument that asymmetric dependencies decreases trust between exchange parties.

In Petrotell, the use of collaborative functionalities to increase the interdependencies of Petrotell and their customers would not be possible in the absence of organisation trust. The reason is that such interdependencies are created because the customer provides Petrotell with access to confidential data relating to internal business processes and operations. Petrotell builds a picture of this confidential data in its own databases using proprietary standards for data representation. If customers do not trust Petrotell not to abuse the information provided, such exchanges cannot take place. At the same time, the exchange of confidential information enabled by the customised content and collaborative functionalities led to organisational trust building and facilitated the development of interdependencies: *"Intimacy is created by data exchange and project collaboration, which are facilitated over the web, which will embed (Petrotell) more closely with the client that is using the portal"*. Consequently, the pre-existence of customer trust as well as the positive impact that EM use had on customer trust enables Petrotell to use the collaborative functionalities of EM to build interdependencies between its customers. This finding supports previous findings on the relation between trust and symmetric dependencies (Kumar, *et. al.* 1995; Meier 1995),

There has been less research published on the relationship between **trust and transaction costs** (line 1 in figure 2) in the context of EM than on the relationship between trust and interdependencies. A limited number of case studies report that in the absence of trust, EM use was found to lead to ill-feeling and resentment within the user community, to tensions and conflicts and ultimately to the withdrawal of some users (Allen, *et. al.* 2000; Gerst & Bunduchi 2005). As conflict tends to increase transaction costs both during negotiation (Zaheer, *et. al.* 1998) and during monitoring and enforcement, it can be inferred that in

the absence of trust EM use should increase transaction costs. The need to avoid extra transaction costs may also explain the positive relationship observed between the extent of EM use and the level of trust (Hart & Saunders 1998; Vlosky, *et. al.* 2000). We found no studies in the mainstream literature that explore the relationship between dependency and transaction costs (line 2 in figure 2), in the context of EM use.

Our study of Petrotell demonstrated a direct relationship between organisation trust, dependency and transaction costs and risks. First, as we have discussed, the presence of organisational trust enabled Petrotell to use collaborative functionalities, increasing the interdependencies with the customers and enabling Petrotell to reduce operation and opportunistic risks. These improvements were achieved through better resource control, higher switching costs and improved monitoring of information flows, suggesting that the existence of organisational trust enables an organisation to reduce transaction risks by using an EM. Second, using content and commerce functionalities to support online delivery of services and reduce transaction costs may result in reductions in levels of personal trust as online communication replaces face-to-face contact. Third, higher transaction costs can be seen as a secondary effect of using EMs to reduce transaction risks and to increase trust and dependencies. These effects of EM use - reducing risk, and increasing trust and dependencies - are achieved through the customisation of content functionalities at level 2 and 3 and the provision of collaborative functionalities at level 3 (see sections 4.1 and 4.2). However, customisation results in extra maintenance costs and higher transaction costs. Transaction costs increase from level 1 (no customisation) to level 3 (customised content and collaborative functionalities). The higher transaction costs explain why customised collaborative functionalities (i.e. level 3) are provided only to customers with whom Petrotell has a significant interaction (usually "large customers"). An EM reduces ex post transaction costs by replacing the most expensive offline interaction with the cheaper online interaction. If the number of interactions between parties to a transaction is high, using an EM will result in big savings in transaction costs. The big savings in transaction costs should compensate for the higher costs of maintaining customised EM information and application services for "large customers". In contrast, for customer relationships involving limited interactions the maintenance costs for collaborative functions embedded into an EM are not offset by the reduction in transaction costs. For this reason, Petrotell provides level 3 licences only to "large customers" and level 2 licences are developed for "small customers". A similar argument can be made to explain the differentiation between the level of content functionality customisation for Levels 1 and 2. Level 1 offers only generic content functionalities aimed at prospective of former customers. At this level, the EM operates as a marketing tool. The transaction costs at this level are very low and there is no customisation of functionality. In summary, the degree of customisation of EM functionalities increases as transaction costs in a relationship increase. As discussed in section 4.1 and 4.2, customisation enables Petrotell to reduce transaction risks, and to increase organisational trust and symmetric dependencies with its customers. These outcomes support collaboration in customer relationships. Consequently, the ability of Petrotell to use the EM to achieve these collaborative outcomes depends on the level of transaction costs involved in a relationship. This finding suggests that the level of transaction costs plays a significant role in shaping the outcome of a relationship. High transaction costs not only discourage the use of coercive power (Marchington & Vincent 2004), but also provide the organisations with incentives to develop new relational channels (through customising EM functionalities) that improve transaction risks, organisational trust and symmetric dependencies.

The integrated framework finds, in line with the findings of the TCE and SET frameworks, that Petrotell used EM to support collaborative relationships. This observation emerged through the interweaving of the influences that various EM functionalities have on the different relational concepts. First, in order to achieve lower transaction risks, higher organisational trust and mutual dependencies the use of customised content and collaborative EM functionalities requires the existence of high transaction costs and strong

organisational trust between the parties before the adoption of EM. Second, the use of collaborative and content EM functionalities can increase organisational trust. Higher organisational trust enables the use of these collaborative and content EM functionalities to increase interdependencies with the customers. Third, the savings in communication and coordination costs due to online delivery of services are achieved at the expense of personal trust. Fourth, the customisation of EM functionalities to support organisational trust and symmetric dependencies and to reduce transaction risks translates in higher transaction costs.

5. Implications

The analysis of the Petrotell case has shown that while the TCE and SET frameworks can each independently assess the impact of EM adoption on transactional and respectively relational characteristics, the integrated framework explains the outcome of EM use based on the interrelations between trust, dependency and transaction costs. The impact of EM use on the nature of Petrotell's relationships with its customers depended on the way the organisation assessed the various trade-offs involved in using different EM functionalities, and the choices that it made about which outcomes to pursue at the expense of others. The explanations proposed by the three frameworks are summarised in Table 2.

Table 2. Petrotell and EM outcomes: results from the three frameworks

<i>TCE</i>	<i>SET</i>	<i>Integrated framework</i>
<ul style="list-style-type: none"> All (online) functionalities reduce both ex ante and ex post transaction costs by enabling faster and cheaper communication and coordination during the online delivery of services / products Any customisation of content functionalities (discussion forums) and collaboration functionalities (shared databases) reduce opportunism risk by increasing switching costs and reducing the loss of control over resources to the parties but at the expense of higher information processing costs Collaborative functionalities reduce operation risks by increasing the ability of the company to monitor the relationship 	<ul style="list-style-type: none"> Customised content and collaborative functionalities increase organisational trust by promoting the exchange of confidential information Uncustomised content functionalities increase the transparency of service delivery which increases organisational trust Online content and commerce functionalities reduce personal trust by replacing face to face communication and personal contact Collaboration functionalities increase the parties' switching costs which lead to higher dependencies All (online) functionalities support mutual distribution of benefits increasing inter-dependencies 	<ul style="list-style-type: none"> High transaction costs and organisational trust are required to support the use of customised content and collaborative functionalities to reduce opportunistic risk, to increase organisational trust and to support the development of inter-dependencies Collaborative functionalities support the development of organisational trust which facilitates the creation of dependencies All (online) functionalities reduce transaction costs at the expense of personal trust by replacing more expensive but more personal face to face contact with cheaper but impersonal offline communication Customised content and collaborative EM functionalities reduce transaction risks, support organisational trust and symmetric dependencies at the expense of increasing ex post transaction costs.

The true test of the usefulness of the frameworks lies in their implications for EM development and implementation. Organizations adopting web-based solutions to manage their procurement or customer relationships should be clear about both about the effects of adoption of these solutions on their relationships and, more importantly, about the ways in which these solutions can be implemented in order to support the achievement of their relational objectives. The integrated framework is distinctly different from the TCE or SET framework in terms of its implications for action.

Both the TCE and SET approaches advocate the implementation of two distinct sets of functionalities, one for transactional relationships and the other for relational exchanges. Customised content and collaborative functionalities ranging from shared databases and private discussion forums should be implemented in relational exchanges as they alleviate the operational and opportunistic risks associated with this type of relationships (TCE) or because they nurture trust building and the development of dependencies (SET). Content and commerce functionalities such as public discussion forums, electronic auctions and online financial service should be implemented in transactional relationships in order to reduce transaction costs (TCE) or to simply enable the exchange without any consideration of their impact on relational characteristics (SET).

This recommendation is consistent with the existing view in IT research that it is important to differentiate between commerce functionalities – to support transactional relationships - and collaborative functionalities

– to support relational exchanges (Markus & Christiaanse 2003). It is also in keeping with research in B2B marketing on the use of IT, which differentiates between Internet-based market mechanisms to support one-off transactions and coordination flows to support close business relationships (Garcia-Dastugue & Lambert 2003). In practice, this recommendation translates in organisations implementing EM on different levels, having a different set of EM functionalities at each level, generally one set of commerce functionalities and one set of collaborative functionalities. Partners are given access to these levels depending on the type of relationship, i.e. strategic partners engaged in relational exchanges have access to the collaborative level (e.g. level 3 in Petrotell), while typical exchange parties engaged in transactional exchanges have access to the commercial level (e.g. level 1 and 2 in Petrotell).

This approach to EM implementation treats all strategic relationships of a particular organisation as they would be identical in terms of relational characteristics. This is however not the case. Research in B2B marketing has shown that different strategic relationships have associated different levels of trust, different levels of transaction costs and risk and different levels of dependencies. For example Lambe *et. al.* (2000) differentiate between enduring and interimistic relational exchanges, the former characterised by high trust and long term inter-dependencies, and the later characterised by the absence of trust and high up front dependencies between parties. Therefore, the relational objectives that an organisation pursues in its strategic relationship might vary. The integrated framework suggests a different approach for implementing EM with strategic partners that caters for this variety in relational objectives. Rather than devising one set of functionalities for relational exchanges and another one for transactional exchanges, organisations should develop their EM functionalities in a modular way. EM functionalities would be built in modules around a core function (i.e. electronic communication), and the organisation would mix and match between different EM modules according to the relational objectives they pursue in their different relational exchanges. As a result, each relational exchange would be supported by different packages of functionalities organised around different modules (rather than using predetermined levels of functionality) depending on the requirements and objectives of that particular relationship. Access would be granted per module rather than per level, with a customer or supplier having access to a range of modules. Such an approach would require a much more careful evaluation of strategic relationships when implementing EM, in contrast with the traditional approach which relies on the pre-existing categorization of existing relationships into typical and strategic. This approach acknowledges the fact that in reality, no exchanges are either purely transactional or purely relational, but rather they vary along a continuum between these two (theoretical) extremes (Macneil 1980). The particular combination would depend upon the trade-offs between the different desired outcomes from EM use. The decision to use, or not, a particular functionality or module should be based on an assessment of these trade-offs on with reference to the objectives for a particular relationships.

6. Conclusions

This study extends the contributions made by previous research regarding the role that EM functionalities play in shaping the different transactional and collaborative outcomes in buyer-seller relationships (Gallivan & Depledge 2003; Markus & Christiaanse 2003) by providing a theoretical framework to identify and analyze the economic and social mechanisms through which these different outcomes are achieved. The paper proposes a framework based on the combination of TCE and SET approaches to analyse inter-organisational relationships and the outcome that the use of EM has on the nature of these exchanges. This integrated framework argues that the nature of an inter-organisational relationship depends on the interaction between three relational features: transaction costs, trust and dependency. Consequently, the

impact that the use of EM will have on inter-organisational exchanges will be determined by the way the EM channel affects the interaction between these characteristics.

For practitioners, the study provides a framework to assess the various options organisations have in deploying different EM functionalities. The framework can also guide the choice of functionalities that enable an organization to achieve its relational goals when adopting an EM approach by identifying the trade-offs between the different impacts that EM functionalities have on relationships. In this way, organizations can anticipate which functionality will best suit their objectives at any time, and change the emphasis on commerce and/or collaborative functionalities according to the current needs, rather than choosing a particular model of EM use and then reacting to unforeseen outcomes that might damage their objectives.

While helpful in advancing the understanding of inter-organisational relationships in general, and EM use in inter-organisational exchanges in particular, the proposed study has a number of limitations. First, the framework is developed based on existing literature, which is limited in its exploration of the linkages between the different relational concepts, in particular between dependency and transaction costs. Second, the case study presented here is used as an illustration, rather than for theory testing. While an interpretative single case study approach has helped to gain insight into the linkages between the different constructs, its narrow perspective precludes attempts to generalize the applicability of these precise linkages to a broad population of organisations. Furthermore, the case discusses the use of EMs only from a supplier perspective – buyers are not included in the analysis. The framework also suggests that EM implementation should be approached on a modular basis taking into account the trade-offs involved in using different functionalities. While the case study offers some example of these trade-offs, to be of value future research should carefully analyse the outcomes of the different functionalities on the range of relationships constructs and clearly map any trade-offs. These limitations call for future research to (1) explore in depth the linkages between EM use and the relational variables; and (2) to test the applicability of the framework in broader empirical settings. A qualitative multi case study research of EM use, including the perspective of all different categories of participants, would be appropriate to achieve the former objective, while a quantitative survey of organisations using EM would serve to achieve the latter.

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