

Challenging the Paradigms on Up-Stream B2B E-Commerce?

Niels Christian Juul
Department of Computer Science
Roskilde University
 Denmark
ncjuul@acm.org

Kim Viborg Andersen
Department of Informatics
Copenhagen Business School
 Denmark
andersen@cbs.dk

Sara Korzen-Bohr
Department of Informatics
Copenhagen Business School
 Denmark
skb.inf@cbs.dk

Abstract

Based on a survey (N=392) of adoption of B2B e-commerce within the up-stream part of the Danish grocery sector value chain, this paper shows that technical-rational arguments and organizational readiness hold explanatory strength for adoption whereas the power and market perspective fails to explain adoption of e-commerce. Also, we found that factors that can explain e-commerce adoption fail to explain any pattern in the adoption data for the Web-EDI subset of e-commerce. Further on, the paper calls for a careful examination on how we design future studies. The paper suggests that rather than just replicating variables from previous generations of B2B e-commerce, focus should be directed towards a new set of variables for explaining the uptake of XML-based e-commerce.

1. Introduction

Our analysis of the adoption rationale within the up-stream value chain (production and wholesale) of the Danish grocery sector tests the capability of three perspectives (technical-rational perspective, power and market position perspective, and organizational readiness) to explain adoption of different avenues for digitalization of interorganizational business transactions.

The grocery sector is often labeled one of the front runners adopting the suite of IT business applications such as SCM, EPR, (e)CRM, e-procurement, etc. (Clark & Schiano, 1996; Austin & McFarlan, 1997; Lee, Clark & Tam, 1999; McFarlan & Dailey, 2000; Nakayama, 2000; Lange, 2002). Also, national statistics on e-commerce from Denmark have labeled the grocery sector as one of the leading adopters of e-commerce (Statistics Denmark, 2002). A unique characteristic of this sector is the duality of goods where some are dependent on instant transportation from producer to end-consumer (i.e., vegetables, dairy and meat

products) whereas others are less time restrictive (rice, coffee etc.). Also, the sector has undergone internationalization with suppliers operating on a highly competitive market and intensified retail competition.

IS research during the late 1990s were pointing to the pros and cons of EDI in terms of lock-in, etc. arguing that EDI essentially would benefit the larger companies with a strong power position and enable to cash-in on large quantities of data transactions with multiple business relations (Damsgaard & Truex, 2000; Krcmar, Bjørn-Andersen & O'Callaghan, 1995).

With the rapid diffusion of the Internet, the rhetoric among business consultants and the large business associations was that, the smaller enterprises could be better of adopting e-commerce exchanges, Web-EDI, XML etc. The discourse shifted from "Do EDI or Die" to "Do EDI and Die". Yet, research on digital technologies in business integration and communication points out that internet-based e-commerce is an inch deep and a mile wide (Kraemer, Dedrick and Dunkle, 2002) and that adoption of EDI has experienced constant growth rates (Andersen, Bjørn-Andersen and Henriksen, 2003). In this paper we address whether the variance in adoption of B2B e-commerce can be explained by technical-rational perspective, organizational readiness, or a power and market perspective. Second, we are exploring whether parameters used for traditional B2B e-commerce uptake of EDI can be used in studying newer e-commerce innovation as Web-EDI.

2. Our research model on adoption of e-commerce, EDI and Web-EDI

We here define B2B e-commerce in its broadest sense possible, as the application of digital exchange of documents, digital goods or services with other companies where either the message media, transportation technology, data integration, and/ or message format is facilitated by means of digital tools to enable the ex-

changing partners smoothing and expanding the front-end and back-end office integration of ordering, service fulfillment, transportation, and payment of the products and services.

A subset of B2B e-commerce is EDI where companies exchange structured documents with other companies with a minimum of human interference. Also, Web-EDI or EDI-light (the company key, edit or control data that are transmitted to the receiver electronically) is here considered a subset of B2B e-commerce.

Equally important to the definition of the dependent variable is being explicit on the independent variables mapped in the study. In this quantitative study we focus on three sets of factors impacting e-commerce adoption: technical-rational, power and organizational readiness (Tornatzky & Fleischer, 1990).

Relying on the *technical-rational* literature on e-commerce adoption (Bergeron & Raymond, 1992; Cox & Ghoneim, 1996; O’Callaghan & Turner, 1995), the first perspective would argue that adoption of e-commerce would be associated with a view of e-commerce as a technical solution, business concept, or as a communication tool. Onwards, we expected that size of the company could be an indicator of the technical-rational perspective. (Attewell, 1992; Thong, 1999). We define size by the number of inventory, customers, suppliers and transactions. Thus, the larger number of inventory items, the more customers and suppliers, and the larger number of transactions, the more support we would attribute to the technical-rational perspective.

Second, our research model includes a category on *the overall market and power context* encompassing market conditions such as competitive market forces and market uncertainty (Porter, 2001). One view of power is that it can hinder or alter implementation patterns of IS (Markus, 1983). In our context, *power context refers to the obligation of a firm to adopt an innovation in order to keep a customer or supplier*. Iacovou et al. (1995) distinguished between competitive pressures and imposition by trading partners. Bergeron and Raymond (1992) included the benefits from strategic repositioning of the firm due to implementation of EDI in their survey.

In our survey data we expected that these benefits would occur more frequent in later stages of the value chain, hence that the wholesalers would be more likely to adopt e-commerce relative to the manufacturers/producers. Also, the power and market hypothesis could materialize if the customers with many suppliers would be more likely to adopt e-commerce as compared to suppliers with many customers.

The third perspective included in our model of determinants for B2B e-commerce adoption is related to *organizational readiness* (Keen, 1981; Hammer &

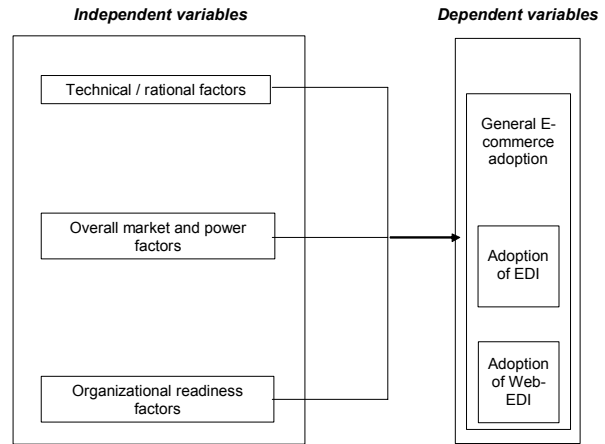


Figure 1. Our research model for adoption of B2B e-commerce

Stanton, 1995; Yapp, 1999) Rigidity in organizational structures and at employee level as a barrier for adoption of EDI was studied by e.g. Clemons and Row (1992) who found “...considerable resistance among the expected adopters of EDI within consumer packaged goods industry.” We have included organizational readiness in our model by focusing on the *knowledge/ awareness of web-based e-commerce, participation in briefings on business processes and IT and use of IT-based administrative tools*. Thus, we were guiding our survey analysis to find possible correlation between the knowledge/ awareness of B2B and the adoption of B2B.

The three perspectives serve as independent variables in our research model pictured in Figure 1. The dependent variables are the adoption of EDI, Web-EDI, and B2B e-commerce in general. In the section on collection of data, we describe how we distinguish between the three classes of dependency variables.

3. Collection of data

The primary source for the results reported here is a self-administrated survey sent during fall of 2002 to 2,848 companies within the up-stream part of the grocery sector value chain. The overall response rate was 13.8% (N=392) which is only marginal lower than the survey of Lai and Guynes (1997) and Crum et al. (1996) that had 18.4 and 19 percent respectively. The questionnaires were sent to the IT-manager and the top management in the companies by the end of August 2002 and returned over the following month. No reminders were send out, but the questionnaires returned until mid October were included in the survey. In addition, a longitudinal survey of suppliers to the grocery sector, 1993-2001 is used to characterize the

sector. The data were collected by the Danish Provisions Suppliers' Association (DLF). DLF is also engaged in promoting EDI within the grocery sector. Andersen et al. (2000) report on the results from the data collected from 1993 to 1998. In the end of Section 4 we extend these results with more recent data up till 2001.

The primary survey is sponsored by the Danish European Article Numbering Association (EAN-Denmark) that allocates EDI location numbers and has co-sponsored a Web-EDI program (LE@N) targeted towards SMEs. The population is divided into three groups of respondents. The first group consists of *companies who subscribe to LE@N*, which enables them to transmit orders and invoices. This group contains a total of 185 companies of which 29.9% responded. The second group consists of companies that has *attended LE@N information meetings or acquired information about LE@N* at EAN-Denmark. This group consists of 101 companies of which 19.8% responded.

The third group consists of 2,563 companies *randomly selected from a pool of 30,000 upstream companies within the Danish grocery sector value chain*. This group was characterized by not being engaged in any formalized exchange of digital data with the major wholesale or producing company appointing them for the pool. The response rate in the third group was 12.4%. Thus the three respondent groups reflect variance in their familiarity/ awareness of Web-EDI and EDI in general.

The companies responding to our questionnaire distribute themselves almost equally between producers (42%) and wholesalers (58%). And the majority of the

companies state that they use a finance-IT system (85%). 70% of the companies state that they use e-commerce in the broad sense, of this group 55% state that they use EDI and 48% that they use Web-EDI (included 18% that use both EDI and Web-EDI).

40.4% of the respondents from the third group (appointed for the survey by a company not using any formalized exchange of digital data with them) answer positive to the question about using EDI (27.4% of the same group say they use Web-EDI). This illustrates that the company appointing them for the survey could very easily change the communication towards an EDI solution. This maturity towards adoption of EDI is even more significant as 66% of the same group admit they do e-commerce in general.

4. Overall adoption of B2B e-commerce in the Danish business environment

Researching the rationale for adoption of B2B e-commerce among suppliers and wholesalers within the grocery sector is complicated by the fact that most suppliers deliver goods not exclusive to the grocery sector but also to other wholesalers and retailers in other industry segments. The grocery sector is at the upstream value chain side characterized by a variety of suppliers and wholesalers including farming, fishing, industry, importers, transportation, financial services, and energy supply. The motivators and inhibitors to adopt e-commerce might therefore come from a variety of channels of deviating importance to the suppliers and wholesalers.

Table 1. Use of EDI over private networks and Internet in the US, Denmark, Germany, Japan, and Global, 2002

Percent using ...	U.S. ^a	Denmark ^a	Germany ^a	Japan ^a	Global ^b
EDI	42.5	69.1	67.7	63.8	44.3
▪ over private networks only ^c	17.1	16.5	30.8	34.1	19.4
▪ Internet-based only ^c	8.4	20.3	10.1	7.9	8.4
▪ both ^c	16.1	31.5	26.6	21.8	15.9

Note: ^a Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for Denmark by sector are 69 establishments in manufacturing, 67 in wholesale & retail distribution, and 64 in banking & insurance; by size are 100 establishments classified as SME and 100 as large.

^b Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.

^c Percent based on total sample.

Source: CRITO (2002) and Bjørn-Andersen & Andersen (2003)

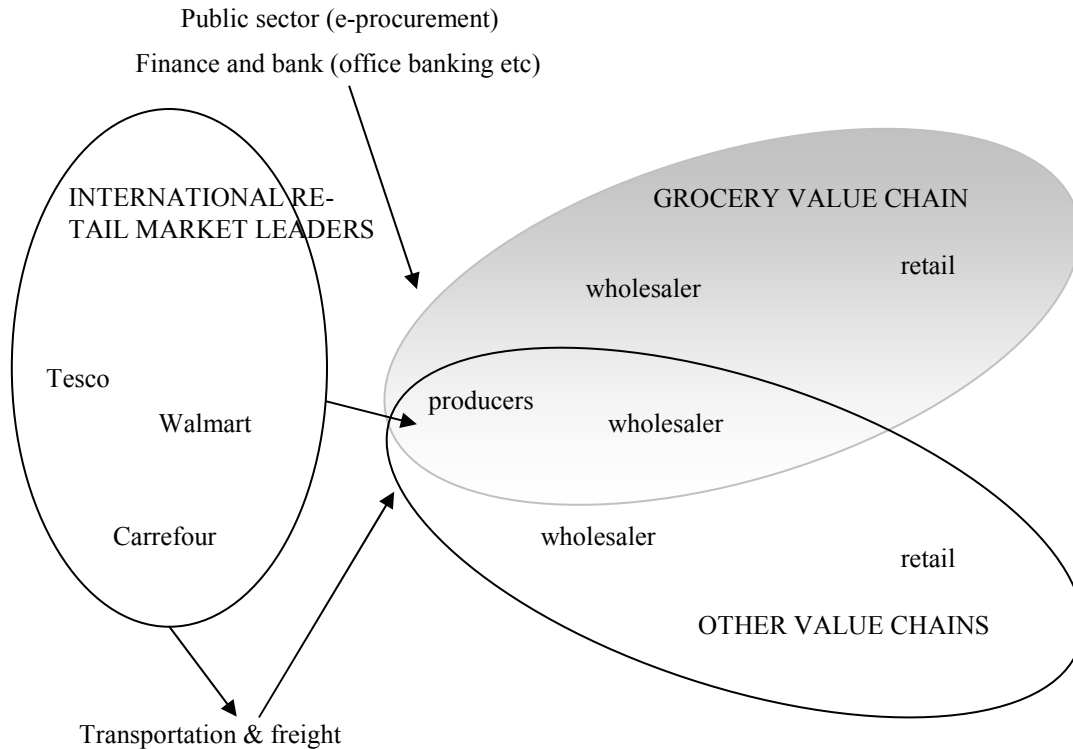


Figure 2. The business environment for adoption of B2B e-commerce in the grocery sector

Also, the international business environment impacts the streamlining of business processes using IT. Companies such as Wal-Mart and Carrefour (the world largest and second largest grocery retailers) and the UK leader Tesco impact not only producer alignment of data but also the transportation and freight companies. These world leading retailing companies are prompting proprietary standards rather than the “open” UN EDIFACT / ANSI X.12 standards. The public sector and the financial sector are also pushing B2B e-commerce with e-procurement and office banking. This could also serve as a motive for adopting e-commerce.

The overall Danish business environment has a leading uptake of EDI, with seven out of ten companies (with more than 25 employees) using EDI over private networks and the Internet (Table 1). Yet, if including businesses with less than 25 employees, only 18 percent of the companies use EDI (Statistics Denmark 2002). The *total internet-based B2B e-commerce turnover* constitutes less than two percent of the Danish GDP (2000) amounting to the same level as the other Scandinavian countries and well above the EU-average level (Andersen, Bjørn-Andersen and Dédrick, 2003).

Focusing on EDI, the *number of assigned EAN-location numbers has increased* in the period 1990-2002. EAN Denmark estimates that at present there are about 50,000 companies that are able to use EDIFACT. The amounts of assigned EAN-numbers have increased significantly from 1990 to 2002. Also, there has been a *rapid increase in the EDI-traffic through third party vendor with annual growth rates of 30-45%* (Andersen and Juul, 2003).

The Danish grocery sector is at the *retail level* dominated by *two strong players* (Coop Denmark and Danish Supermarket) (Press, 1995). Each of these has a variety of outlets ranging from discount stores to mega-stores operating on an individual profit basis. The number of retail outlets has decreased while the size of the individual shops has increased (Supermarkedshåndbogen, 2002). This could indicate that the readiness for up-stream B2B e-commerce has increased if economics of scale and power arguments are driving factors for the adoption.

The ordering of goods from the stores is for the major part canalised through the parent company although the document-flow of order confirmation, invoices, transportation notices, etc is handled directly between



Figure 3. Percentage of grocery suppliers having 1, 2, 3, 4, 5, 6, or more EDI-exchange partners per year 1995 – 2001

the producer, wholesaler and transporter with the individual shops.

At the wholesales and producer level, the market structure is characterized by a large number of small players specializing in few products. Although a large part of the goods are imported goods directly by the two dominating retail players, there are still about 30,000 national suppliers, producers, and wholesalers within the grocery sector. At the production level, some hold a very high degree of market segmentation i.e. Arla Foods (diary products), Carlsberg brewery (beers and soft drinks), House of Prince (tobacco) and Danisco (sugar). Most of the products from these market leaders are ordered as standing orders since the turnover rate of goods is very high on these products. This permanent business relationship supports the adoption of B2B e-commerce solutions such as EDI for these companies and their customers. However, the majority of goods are acquired from the large pool of suppliers and with less frequent turnover.

In Figure 2 above we have illustrated that many players – also outside the national grocery value chain surveyed in this paper – could determine the adoption and exploitation of EDI. We did not specifically survey the importance of global leading international market retail players, the importance of the public sector, freight and transportation, or the financial sector. Nor did we address the fact that companies in the grocery value chain is also part of other value chains that might

have a more reactive or proactive approach to e-commerce.

Our secondary survey shows that the *number of suppliers to the grocery sector which are able to transmit EDI messages has increased during 1993-2001*. Onwards, each company is also *using more different types of EDI-messages*. From 1993-2001, the most frequent message type has been orders and invoices. Other messages such as transportation notice, control messages, and specifications of orders are only marginal used and have diffused only slowly during 1993-2001.

As illustrated in Figure 3, *the number of partners each company exchange EDI-messages within the grocery sector is growing significantly*. In 2001, 16% of the companies that use EDI exchanged EDI-messages with one partner only, whereas in 1995 44% of the companies had one EDI business partner only. In 1995, only 16% of the companies exchanged EDI with more than seven business partners. In 2001, 45% of the companies exchanged EDI messages with more than seven partners. At the overall application of IT in their business relationship, the manufacturers have the greatest degree of digital exchange outside their own sector (64%) whereas the wholesale has only 43% outside their own sector. Yet, despite the overall EDI growth and high cross-sectored EDI-use the overall EDI-diffusion is still modest, less than 15% of the SMEs

Table 2. Adoption of e-commerce, EDI-adoption and Web-EDI from a technical-rational perspective. ², Gamma, and P-values

Perspective	E-commerce adoption		EDI adoption		Web-EDI adoption	
	χ^2	Gamma	χ^2	Gamma	χ^2	Gamma
Perceiving IT as a technical solution	-	-	-	-	-	-
Perceiving IT as business concept	10.5**	0.37*	9.2**	0.36**	-	-
Perceiving IT as a communication tool	-	-	-	-	-	-
The company has more than 400 inventory no. ^{a)}	5.8*	0.27*	2.8*	0.21*	-	-
The company has more than 200 customers ^{a)}	9.4**	0.34**	9.1**	0.36**	-	-
The company has more than 50 suppliers ^{a)}	16.8***	0.45***	14.2***	0.44***	-	-
Monthly transaction volume ^{b)}	17.6***	0.34***	30.5***	0.50***	-	-

Note. “-“ indicates no correlation. A significance level with a p-value less than 0.001 is in the tables marked ***), whereas a p-value less than 0.01 is marked **) and a p-value less than 0.1 is marked *).

Split number is selected as median value.

Monthly transaction volume is categorized in quarts: 1-320; 321-1,062; 1,063-4,000; >4,000 transactions per month.

use EDI. The grocery sector is at a substantial higher level. 41% use EDI and 70% use e-commerce.

The results put forward in this section indicate that:

- the overall adoption of EDI is at a very high level by international comparison
- the number of assigned location numbers has increased,
- there has been a rapid increase in EDI-traffic through third party vendors,
- the number of suppliers in the grocery sector who are able to transmit EDI messages has increased, and
- there has been a growth in the number of partners each company exchange EDI-messages with.

5. Survey data analysis

The analysis of the survey data is primary based on bivariate analyses. We have, accordantly to our research model, correlated the variables indicating the three different adoption perspectives with the dependent variables in two-way cross-tabulations. The correlations are tested with chi-square and gamma tests. The primary reason for choosing chi-square test is that most of the variables are at *nominal level* (categories) rather than ordinal (ranked from small to large) or interval (scale). The gamma test is used because the nominal variables are binary. The chi-square test shows how strong the correlation between the two variables is. As

an elaboration of the chi-square test we use the gamma test to show the “direction” of the correlation, this only being possible with the nominal variables that are binary.

6. Analysis of adoption factors

6.1 The significance of the technical-rational perspective

Our survey analysis shows that the size of the company *correlates* with adoption of B2B e-commerce and EDI. We have used the *number of customers, suppliers, transactions and goods* as indicators of size (Table 2). Company size is traditionally found to be an indicator of adoption of innovations (Attewell, 1992; Thong, 1999). The arguments are that larger organizations generally have more slack resources and that they are involved in a larger variety of activities, which requires more innovativeness. Our survey enables us to distinguish between adoption of three types of B2B e-commerce technology. Whereas adoption of general B2B e-commerce and EDI is positively correlated to the independent variable this is not the case for Web-EDI. This could support that EDI is a tool for larger companies whereas the less resource demanding Web-EDI is more suitable for smaller companies, still bearing in mind that larger companies are more innovative in general and thus more open to all types of B2B e-commerce innovations including Web-EDI. This is

Table 3. Organizational readiness and adoption of e-commerce, EDI-adoption and Web-EDI. ², Gamma, and P-values

Perspective	E-commerce adoption		EDI adoption		Web-EDI adoption	
	χ^2	Gamma	χ^2	Gamma	χ^2	Gamma
Knowledgeable about Web-EDI	28.9***	0.55***	3.1*	0.22*	-	-
Participated in briefings on business processes and IT	12.3***	0.38***	3.5*	0.23*	-	-
Use of administrative IT-systems	22.2***	0.58***	5.3*	0.45*	6.4*	-0.49*

Note. “-” indicates no correlation. A significance level with a p-value less than 0.001 is in the tables marked (***), whereas a p-value less than 0.01 is marked (**) and a p-value less than 0.1 is marked (*).

also in line with our sample of Web-EDI customers using LE@N. There are, however, no correlation – positive or negative – between Web-EDI adoption and any of our four company size indicators in Table 2.

The number of suppliers and overall volume of transactions (both physical and digital transactions) holds the best explanatory power with respect to adoption within the technical-rational perspective. Specific for EDI-adopters, the volume of transactions hold a very high explanatory power for adoption. Our interpretation of this correlation is that economics of scale matters for adoption of EDI.

With respect to the perception of IT the statistical analysis pointed towards that perceiving IT as a business concept holds the best explanatory power. That is the case for e-commerce and EDI users whereas Web-EDI users do not load positively or negatively on any of the three operationalized perceptions of IT. Thus the less strong the company perceives e-commerce as part of their business operations the less likely the company is to adopt e-commerce or EDI. By contrast, adoption of Web-EDI is not correlated to a business perception of IT, a technical approach to IT, or viewing IT as a communication tool.

The analysis of the significance of the technical-rational perspective leads to the conclusion that these considerations did not influence the motivation for adoption for Web-EDI users whereas traditional considerations such as company size and transaction volume played a role for e-commerce and EDI users when they decided to adopt the technological innovation.

6.2 The power perspective

Our second perspective – *the power hypothesis* – argues that the position in the value chain could explain adoption of e-commerce. In the grocery sector we expected that the power perspective would turn out significant for at least EDI. Our analysis shows, however, no statistical significant difference between being a

wholesaler or producer with respect to adoption of e-commerce, EDI, or Web-EDI. Also, we analyzed the data to determine whether the large suppliers were relative less frequent users of e-commerce than the large wholesalers.

The result of that analysis turns out unrewarding for the power perspective when focusing on position in the value chain (producers or wholesalers) as an indicator of power. In a similar survey of the Danish steel and machinery industry it was found that there was a strong correlation between position in the value chain and EDI adoption. In that particular sector the position of the wholesaler had a strong relationship to EDI adoption (Henriksen, 2002). This could lead to the conclusion that given the role of wholesalers in the grocery sector the power perspective is less relevant. As described in section 4 the grocery sector is characterized by multiple channels not always following the traditional structure of the value chain. An interpretation could therefore be that especially EDI is not considered to be a tool for exploiting a strong position in the grocery value chain. The results of the test of the power hypothesis are therefore challenging our thinking on EDI adoption since EDI traditionally has been viewed as the perfect suit for exploiting a strong position in the value chain (Chatfield & Bjørn-Andersen, 1997; Riggins & Mukhopadhyay, 1994).

6.3 Organizational Readiness

The third perspective – *organizational readiness* – is here measured as the knowledge and awareness of web-based e-commerce and implementation of an IT-administrative tool such as ERP-systems (e.g., J.D. Edwards, SAP R/3 and BAAN) or smaller financial management systems (e.g., Navision Axapta/ Attain). The participation in briefings on business processes and IT also accounts for organizational readiness to embrace e-commerce, EDI, etc.

All three dimensions of organizational readiness hold statistical significant explanatory power with respect to adoption of B2B e-commerce and EDI (Table 3). This is most significant for the e-commerce adopters. Briefings on IT and knowledge about Web-EDI have either no or rather weak explanation of adoption of Web-EDI and EDI.

For adopters of Web-EDI, the correlation with adoption and back-office systems is negative: companies with administrative IT-systems are more likely *not to use* Web-EDI (gamma value of -0.49). Although the statistical significance of this finding is weak it does suggest that the users of Web-EDI have no or rather limited IT-infrastructure and that transactional benefits from Web-EDI is limited to entry and receive order/invoice at a single point in the company rather than in distributed applications.

7. Discussion of results and conclusions

We propose a set of substantive and methodological implications that can be learned from our study. *Substantive*, our analysis of adoption of B2B e-commerce demonstrates that among the three explanatory perspectives we defined and operationalized in our survey, the technical-rational perspective (perception of IT and size of company) and organizational readiness (knowledge and use of back-office IT systems) holds explanatory power. The power and market perspective (wholesaler or producer and the ratio of customers relative to suppliers) did not give any explanation.

Our analysis of the motivators for adoption of a range of technological innovations supporting electronic commerce shows that it is only possible to capture the explanatory variables for e-commerce and EDI within the range of the three defined perspectives: the technical-rational, power, and organizational readiness. As for the more specific and newer e-commerce innovation, Web-EDI, the selected eleven dependent variables did not indicate what might have been the motivation for adoption. In general this points towards a re-orientation with respect to the search for explanatory variables when motivators for e-commerce adoption are researched in the future.

The importance of size and the inability to demonstrate the significance of power contradict our previous study of wholesales and producers in the steel and machinery industry where we found that "...the mix of motives [to adoption] is not related to the size of the company. Large size and midsize companies did not answer differently than the smaller companies. The primary positive decision-drivers are related to market and power issues as well as soft organizational issues." (Henriksen, Andersen, & Pedersen, 2002).

Paying attention to the business structure of the grocery sector, our findings are even more interesting. Three strong wholesalers that command the forward value chain to the retail shops dominate the sector. This market structure has emerged through a long series of primarily domestic mergers and acquisitions. With a pool of 30,000 suppliers one could expect that they use their market position to force the up-stream part of the value to streamline the business processes using B2B e-commerce.

Methodological, the most striking finding of our study is that the approaches to study adoption of e-commerce might need to be refined to find explanatory variables for uptake of web-based e-commerce. In particular, we would encourage case-studies that combine process and factor approaches (Chan & Swatman 2003). Factors that determine overall e-commerce adoption holds the same level of explanation for the EDI-subset category of e-commerce but were not able to explain any pattern in the adoption data for the web-based EDI subset of e-commerce. This could suggest future studies to rethink whether adoption of web-based e-commerce follows an entirely different line of rationalities.

Yet, our research on e-commerce adoption has *several limitations*. First, there is evidence of a *response bias* since the group of adopters of Web-EDI relative accounts for a much larger proportion of our respondents than the other group of respondents. While this suggests caution in interpreting our estimate of the differences between the three groups, it does not affect our testing of the three perspectives on adoption motives.

Second, we did not in this paper address *path-dependency* since we are addressing the importance of the size of the companies at only one point in time. The variance in size could be a result of adoption of e-commerce and not an explanation of adoption. Hence we cannot conclude that the larger the company, the more likely e-commerce user. However, we stress that size did not correspond positive nor negative on Web-EDI. Size did turn equal significantly for both EDI and overall e-commerce adoption.

Third, we did not investigate *issues of trust* that has been hypothesized to contribute to EDI adoption and usage (Saunders & Clark, 1992; Hart & Saunders, 1997) or the importance of international and other national sectors (financial, transportation and the public sector) in adoption of e-commerce.

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