INTRA-FIRM ADOPTION DECISIONS:

DEPARTMENTAL ADOPTION OF THE COMMON EUROPEAN CURRENCY

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ERIM REPORT SERIES *RESEARCH IN MANAGEMENT*	
ERIM Report Series reference number	ERS-2001-21-MKT
Publication	March 2001
Number of pages	33
Email address corresponding author	Yeverdingen@fbk.eur.nl
Address	Erasmus Research Institute of Management (ERIM) Rotterdam School of Management / Faculteit Bedrijfskunde Erasmus Universiteit Rotterdam P.O. Box 1738 3000 DR Rotterdam, The Netherlands Phone: +31 10 408 1182 Fax: +31 10 408 9640 Email: info@erim.eur.nl Internet: www.erim.eur.nl

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REPORT SERIES
RESEARCH IN MANAGEMENT

BIBLIOGRAPHIC DATA AND CLASSIFICATIONS		
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Library of Congress Classification (LCC)	5001-6182	Business
	5410-5417.5	Marketing
	HF 5415.2	Marketing Research
Journal of Economic Literature (JEL)	M	Business Administration and Business Economics
	M 31 C 44	Marketing Statistical Decision Theory
	M 31 L 22	Marketing Firm Organization
European Business Schools Library Group (EBSLG)	85 A	Business General
	280 G 255 A	Managing the marketing function Decision theory (general)
	280 L	Marketing Research
Gemeenschappelijke Onderwerpsontsluiting (GOO)		
Classification GOO	85.00	Bedrijfskunde, Organisatiekunde: algemeen
	85.40 85.03	Marketing Methoden en technieken, operations research
	85.40	Marketing
Keywords GOO	Bedrijfskunde / Bedrijfseconomie	
	Marketing / Besliskunde	
	Innovatiediffusie, Euro; Bedrijfsbeleid; Marketing, EU-landen	
Free keywords	Innovation; Intra-firm adoption; European Marketing; European Monetary Union; Business marketing	
Other information		

Intra-firm adoption decisions: departmental adoption of the common European currency

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Intra-firm adoption decisions: departmental adoption of the common European currency

Abstract

The subject of this paper is intra-firm adoption decisions, a relatively unexplored research area in the marketing literature. In particular, we investigate which factors influence the intra-firm adoption decisions regarding the common European currency of the treasury, purchasing and sales departments of European companies. Two sets of independent variables were hypothesized to influence the intra-firm adoption decisions, i.e. (1) variables known from the inter-firm diffusion literature, (2) variables specifically relevant for intra-firm analyses of innovation acceptance. The hypotheses are tested using data from treasury, purchasing and sales managers (441 respondents in total) from companies located in five different European countries. The results of logistic regression show that the proposed intra-firm variables are indeed important explanatory variables that should be included in intra-firm analyses. Moreover, for the inter-firm variables we found differences in the effects between departments, which demonstrates the very need for an intra-firm analysis.

Key words: Innovation; Intra-firm adoption; European Marketing; European Monetary Union; Business marketing

Introduction

Innovation diffusion theory was introduced in the marketing discipline in the sixties (Fourt and Woodlock, 1960; Robertson, 1967; Bass, 1969; Webster, 1969). In the first decade researchers concentrated primarily on adoption and diffusion processes of innovations in consumer markets, and later extended their studies to industrial innovations in business-to-business markets (Robertson and Gatignon, 1986; Gatignon and Robertson, 1989; Frambach, Barkema, Nooteboom and Wedel, 1998).

Adoption and diffusion of innovations in the business-to-business context can be studied at two levels, i.e. the *inter-firm* level and the *intra-firm* level. The inter-firm level refers to adoption at the organizational level, which, in principle, has occurred when at least one individual, wherever in an organization, has adopted the innovation. Once an organization has adopted an innovation, the diffusion of the particular innovation across the subsidiaries, departments, and individuals within the company still has to follow, i.e. the process of intra-firm adoption and diffusion. In the past decades a lot of inter-firm adoption and diffusion studies have been published, but the study of adoption and diffusion of innovations within organizations is staying behind. According to Leonard-Barton (1990, p. 48), "scholarly investigation usually has stopped at the point at which some senior manager has decided to adopt the innovation, but has not proceeded to investigate its subsequent diffusion throughout the organization."

In the information technology and organizational behavior literature we do find some recent studies on the diffusion processes within organizations (Cooper and Zmud, 1990; Attewel, 1992; Åstebro, 1995; Cool, Dierickx and Szulanski, 1997). In the marketing literature, however, intra-firm adoption and diffusion processes are, with the exception of a conceptual paper by Kim and Srivastava (1998), still a largely ignored research area. This lack of interest from a marketing point of view is remarkable, since insight into these processes is not only relevant for the management of an adopting company wanting to stimulate the use of an innovation within its

company, but also for the suppliers of innovations. This is especially true for innovations of which multiple items can be sold to (the different units of) a company, such as robots (see e.g. Mansfield, 1989, 1993), software packages (Brancheau and Wetherbe, 1990), personal computers, office furniture, machines and installations. It is important, both for top management and for suppliers, to gain insight into which adoption unit(s) within a company are most likely to adopt an innovation, the factors that drive their adoption process, and how fast the intra-firm diffusion process will be. This information provides parties, inside or outside a company, who have an interest in the quick adoption of a particular innovation, with ideas about to whom to target the new product or service, and how to promote the product to the different adoption units of a company.

Our research contributes to the work on intra-firm adoption of innovations by studying a new domain, i.e. an innovation in finance. We examine the decisions of different departments of European companies regarding the adoption of the common European currency. This is a very timely issue. The new common European currency will replace the domestic European currencies in the year 2002, while the period between 1999 and 2002 is a transition period. A single European currency has important implications for the international trade and marketing activities of companies operating in Europe. First of all, eliminating the costs of multi-currency management, financial hedging and uncertainty will reduce the costs of firms operating in different countries of the European Union. Furthermore, carrying out multinational marketing activities in the Euro would mean fewer price lists and price list revisions, and thus more stable and transparent prices for customer groups.

During the transition period, the Euro will exist side-by-side with the existing European currencies. Companies can either use the Euro or their domestic currency for invoicing purposes, pricing, settlements, etc. For companies it is, however, important that all departments, but especially the sales and purchasing departments within the company start using the Euro as soon

as possible. Consequently, insight into how the use of the common European currency by different departments of a company can be stimulated is important. The objective of this study is to find out which factors influence the adoption of the common European currency by the treasury, purchasing and sales/marketing department of European companies.

The next section discusses the theoretical framework of our study, and develops hypotheses regarding the adoption of the common European currency at the departmental level. Subsequently, these hypotheses will be tested, using data from 441 respondents on the adoption of the common European currency. These respondents included 222 treasury, 121 purchasing, and 98 sales/marketing managers from 321 companies located in five different European countries (Italy, France, Germany, The Netherlands and The United Kingdom). After presenting the results, we will formulate our conclusions with respect to the intra-firm adoption process in general and their implications for the promotion of the Euro.

Theoretical framework

A generally accepted framework for the investigation of the *intra*-firm adoption of innovations does not yet exist. Nevertheless, we can, derive both from the marketing and organizational literature on innovation diffusion, (sets of) independent variables that may influence intra-firm adoption decisions regarding the commercial use of the European common currency. Figure 1 shows the conceptual adoption model that we use for this study. Basically, we distinguish two categories of variables: (1) inter-firm variables, i.e. variables that were used in inter-firm studies of adoption and diffusion and that are relevant in intra-firm studies too; and (2) intra-firm variables that are specific to the intra-firm approach.

< Figure one about here >

Inter-firm variables

We propose that three groups of variables that were found to influence *inter*-firm adoption decisions also influence *intra*-firm adoption decisions, (i) perceived innovation characteristics, (ii) organization characteristics and (iii) network participation. However in the context of intra-firm adoption these variables are studied at the level of the *adoption units* within the organization, instead of the organization itself. Different adoption units in a company can be chosen as the focal units in an intra-firm adoption study. The intra-firm adoption can be studied at the level of a subsidiary (Cool, Dierickx and Szulanski, 1997), a department (Åstebro, 1995) or an individual end-user (Leonard-Barton and Deschamps, 1988; Brancheau and Wetherbe, 1990). Although the conceptual model in Figure 1 can be applied to all three types of adoption units, our study focuses on adoption decisions at the departmental level, and includes three departments, i.e. the treasury department, the purchasing department and the sales department.

Perceptions of the innovation characteristics (i) are generally hypothesized to influence a company's adoption decision (Robertson and Gatignon, 1986; Rogers, 1995). In the case of intra-firm adoption a particular adoption unit, in this case a department, may have specific perceptions with respect to the innovation under study (Brancheau and Wetherbe, 1990), which influence its decision whether or not to adopt that innovation. With respect to the characteristics of the organization (ii) we think that variables such as the level of formalization and centralization, are of particular importance as explanatory variable in case of intra-firm adoption decisions (Johnson and Rice, 1987). Finally, the networks through which firms are connected (iii) tend to explain the adoption behavior of companies (Westphal, Gulati and Shortell 1997; Abrahamson and Rosenkopf, 1997; Burt, 1997; Swanson and Ramiller, 1997). Since adoption decisions of adoption units within a company cannot be taken isolated from the environment outside their own organization, we think that these network variables are important for intra-firm adoption too.

Specific intra-firm variables

In addition to the inter-firm adoption variables which are also important for intra-firm adoption but at a different level of analysis, we now introduce four variables that are specifically important in explaining intra-firm adoption decisions: (i) the intra-firm communication about the innovation (i.e. communication between the adoption units); (ii) the level of conflict between the adoption units in a company; (iii) the influence of the top management; and (iv) the social influence among peers.

With respect to communication (i), an important aspect of the diffusion process is sharing information about the innovation among the potential adopters (Rogers, 1995), and with suppliers of an innovation (Gatignon and Robertson, 1989). Also within a company, a potential adopter will collect information about the innovation before making a decision whether or not to adopt. Brancheau and Wetherbe (1990) found that in case of intra-firm adoption decisions of individual employees, interpersonal contacts were more important than mass communication, in all phases of the adoption decision process. Therefore, in our study the sharing of information refers to the communication between the potential adopters within the organization.

The level of conflict regarding the innovation between the potential adopters within an organization, (ii), may play an important role in intra-firm adoption decisions. Scarce resources have to be divided among the different parties in an organization. Adoption of an innovation by one party may influence the possibility of other parties to use resources for other purposes. Since each part of the organization has its own perceptions and priorities, they try to influence the adoption decision processes in ways that will ensure that their power, status and careers are either enhanced or not endangered (Pettigrew, 1975).

Top management, (iii), can be an important factor in intra-firm adoption decisions. Management can intervene by supporting or even mandating the use of the innovation (Leonard-Barton, 1990). In line with this, Attewel (1992) argues that, in case of complex innovations involving high

knowledge barriers, the adoption decision of an individual is constrained by the individuals' ability to obtain support from a central entity within the firm.

Finally there is the social influence among peers, (iv). According to Cool, Dierickx and Szulanski (1997), the social influence of the dominant elite on the adopters inside the organization may play a more important role than the opinion leader role of the early adopters outside the organizational context. Åstebro (1995) indeed found significant effects of both management and peers on the adoption decision of departments within a company.

Our model allows for differences in the strength of the relationships between the predictor variables and the adoption decision across the departments, which is indicated in Figure 1 by the different boxes representing the different departments. Thus the outcome of the adoption decision process as well as the variables explaining the adoption decision may vary among the three departments. In our case the different departments will use the Euro for purposes that are specific to their department. The treasury department uses the Euro, for example, for financial and management accounting, while the purchasing department can pay its suppliers in Euros. The sales department can invoice in Euro or use one Euro price list. Given these differences in potential usage, the departments may have a different perceived need for the Euro, and have different reasons to start using the Euro. Since the Euro is a financial innovation, the treasury department, whose main task is to control the currency and exchange rate risk, is the expert with more technical knowledge, and special skills with respect to the introduction of the Euro than the other departments. Prior research has shown that the greater the compatibility between the task and the new product, the more successful the innovation implementation (Tornatzky and Klein, 1982; Cooper and Zmud, 1990). Consequently, typically the treasury department will be the first department in a company to adopt the Euro, which, as we will see in the next section, will give it a specific role with respect to the adoption by the other departments.

The next section discusses the hypotheses. In the case where we expect differences in strength of the relationships between a particular predictor variable and the adoption decision for the different departments, we will formulate specific hypotheses per department.

Hypotheses

Inter-firm variables

Perceived innovation characteristics

In many innovation adoption studies the relative advantages of an innovation is one of the best predictors for adoption behavior (Rogers, 1995). Therefore, in this study we focus on the perceived advantages and disadvantages as an important innovation characteristic. Characteristics such as triability and complexity, which are sometimes used in adoption studies, are less relevant for the Euro, because the Euro can be used in the same way as any other (domestic) currency.

In the case of the Euro the three departments may perceive different advantages. The reduction of currency risks and costs of multi-currency management will be important advantages for the treasury department. Stable and more easily comparable cost prices are the most important advantages for the purchasing department. Finally, after the transition to the Euro the sales department can use one Euro price list for the whole Euro-area instead of a manifold of different price lists, and also fewer price list revisions will be needed. The disadvantages of the Euro mainly refer to switching costs, which is an important obstacle for all three departments. Considerable costs are involved in changing accounting and information systems, business and financial operations and in staff training. Given the fact that all three departments will have obvious advantages due to the use of the Euro, and all are confronted with considerable switching costs, we expect that all departments are positively influenced by the perceived advantages and negatively influenced by the perceived disadvantages of the Euro.

Hypothesis 1: The probability that a particular adoption unit will adopt the Euro is larger as the innovation has:

a) more perceived advantages;

b) less perceived disadvantages.

Organization characteristics

Organizational structure variables are generally found to be related to the innovativeness of an organization (Zaltman, Duncan and Holbek, 1984). A high degree of centralization and/or formalization works against the taking of initiative in the innovation process. However, it has also been shown that high levels of centralization and formalization facilitate the implementation of innovations within organizations (Zmud, 1982). Kim and Srivastava (1998) explicitly link the level of centralization and formalization to the rate of *intra-organizational* diffusion. They hypothesize that the higher the level of centralization and formalization, the faster the rate of intra-firm diffusion, due to a reduction in both role ambiguity and conflict in the implementation of the innovation within the company. We think that for the intra-firm adoption of the Euro the element of implementation of an innovation in a company is more dominant than the element of taking initiatives. Therefore we follow the reasoning by Kim and Srivastava.

Hypothesis 2:The probability that a particular adoption unit will adopt the Euro is positively influenced by the level of:

a) centralization;

b) formalization.

In addition to structure variables, Rogers (1995) also distinguishes external organization characteristics, such as system openness, often referred to as cosmopolitanism. Cosmopolitanism refers to an external rather than a local (inside) orientation, and increases access to new information, which encourages a more rapid diffusion process (Robertson and Gatignon, 1986).

This has been found at the individual level (Gatignon and Robertson, 1985; Rogers, 1995), at the organizational level (Ozanne and Churchill, 1971; Kimberly, 1978), at the industry level (Robertson and Gatignon, 1986), and even at the country level (Gatignon, Eliashberg and Robertson, 1989).

This notion of cosmopolitanism seems also relevant in the case of adoption decisions by departments regarding the Euro, which is a European rather than a domestic currency. Therefore, a European, external orientation rather than a focus on the domestic market may increase the access to information about the European currency, and consequently increase the likelihood of adopting the Euro.

Hypothesis 3:

The probability that a particular adoption unit will adopt the Euro increases with the level of its European orientation.

Role of networks

The organizational literature shows that the environment is critical to the functioning of organizations (see e.g. Pfeffer and Salancik, 1978). Perceptions of and activities in the organization's environment also influence the adoption of innovations by organizations (Zaltmand, Duncan and Holbeck, 1984; Robertson and Gatignon, 1986). Particularly important in explaining the diffusion of an innovation, is the number of adopters in the social network in which the company participate. Many studies have shown that social network ties to adopters increase the likelihood of adopting an innovation (see e.g. Becker, 1970; Burns and Wholey, 1993; Westphal, Gulati and Shortell, 1997). One explanation for this is the notion of network externalities, also known as positive demand externalities, which refers to the condition wherein the profitability of using a product depends upon the number of other users of the same product (Katz and Shapiro, 1992; Abrahamson and Rosenkopf, 1997). Furthermore, according to Katz and Shapiro (1986), in the presence of network externalities one does not only care about current

users of an innovation, but also about future adopters. An expected increase in the number of adopters of a particular innovation will positively influence the probability of adopting it. The use of the Euro is also subject to network externalities. Not all departments will feel the effects of other companies adopting the Euro to the same extent. The purchasing department and the sales departments are in constant contact with their trading partners in the actual markets, and if their trading partners switch to the Euro, for them this will have immediate consequences. So we think that these departments are more sensitive to network externalities with respect to the Euro than the treasury department.

Hypothesis 4:

The probability that a particular department will adopt the Euro is higher as:

a) a higher percentage of European trading partners adopt the Euro;

b) a stronger increase in the number of European trading partners that uses the Euro is expected.

Hypothesis 5:

The influence of network externalities on the probability to adopt the Euro will be stronger for the purchasing and sales department than for the treasury department.

Specific intra-firm variables

The specific intra-firm variables refer to the within-company phenomena that are relevant for adoption and diffusion by the different adoption units. We start with communication.

Communication between departments

Learning theories suggest that as more potential adopters of an innovation adopt the innovation, more information is generated about its potential profitability (Abrahamson and Rosenkopf, 1997). This could lead to either faster adoption (in case of a profitable innovation) or a delay in adoption in case of a bad experience. This study focuses on departmental adoption, and the

communication among adopters refers to communication between the departments. The more communication about the Euro between the departments, the less the uncertainty about the product, and the more likely its adoption by the different departments. What each potential adopter finds out about the Euro, however, depends on its' position in the social network that disseminates the information (Abrahamson and Rosenkopf, 1997). According to Burt (1997), a particular party can act as a "broker" of information. The broker has control and information advantages. In the case of the Euro the treasurer can be considered to act as the broker. Due to its job responsibilities the treasurer has access to relevant information about the Euro, and can control the timing and dissemination of the Euro to the other departments. Given this role for the treasurers, treasurers already know a lot about the Euro, and will have less to learn from the communication between the departments as compared to the purchasing and sales departments. Therefore we propose the following hypotheses:

Hypothesis 6:

The probability that a potential adoption unit adopts the Euro increases as more communication between the potential adopters takes place.

Hypothesis 7:

The communication between the departments will have a stronger positive effect on the probability of adopting the Euro by the purchasing and sales departments than by the treasury department.

Conflict between departments

Innovation can be considered a disruptive phenomenon that can create conflict among the departments of an organization since each part of the organization has its own perceptions and priorities. They may try to influence the outcome of the decision process, which will generally result in a delay in the adoption of the innovation (Pettigrew, 1975; Nadler and Tushman, 1988). This idea has been supported for *intra*-firm adoption decisions by a study of Cooper and Zmud

(1990) on the intra-firm diffusion of Material Requirements Planning (MRP). They found that the intra-firm use of MRP was limited when not all parts of the organization did envision the substantial benefits of MRP, and were therefore reluctant to adopt it. This might also be the case with respect to the adoption of the Euro. The use of the Euro will have a higher priority for the treasury department than for the purchasing and sales departments, due to the treasurers' task responsibility with respect to currency management. The Euro as such is a less important issue for the buyers and sellers (as long as their trading partners do not impose the Euro on them), and hence it is more likely that conflicts between departments about using the Euro causes a delay in the adoption decision of buyers and sellers than in adoption decisions of treasurers.

Hypothesis 8:

The probability that a particular adoption unit adopts the Euro is negatively influenced by the level of conflict between the departments regarding the decision to adopt the Euro.

Hypothesis 9:

The influence of higher levels of conflict will have a stronger negative effect on the probability of adopting the Euro by the purchasing and sales departments than by the treasury department.

Social influence by top management and peers

Institutional perspectives emphasize the role of social factors rather than economic factors in driving adoption of innovations by organizations (Westphal, Gulati and Shortell, 1997). Also, according to Abrahamson and Rosenkopf (1997, p. 293), "it is largely internal influences that potential adopters exert on each other that persuades them to adopt." Although these findings were obtained in the context of inter-firm adoption decisions, the social influence by different actors *within* a company will positively influence the outcome of the *intra*-firm adoption decision processes of potential adoption units (Cool, Dierickx and Szulanski, 1997). The social influence may either refer to the social pressure by peers or the influence of top management to start using the innovation. Åstebro (1995) found that social influence among peers had a positive effect on

the adoption decision for three out of the four departments included in his research, while the fourth department waited for top management support before starting the diffusion. In case of the Euro it can also be expected that for some departments the influence of peers is important, while for others the influence of top management is more decisive. Given treasurers' expertise with respect to currency management the top management will probably direct themselves to the treasurers if they want to stimulate the introduction and use of the Euro in the company. Consequently, the influence of top management is expected to be felt much stronger by the treasurers than by the buyers and sellers. Moreover, treasurers probably see the signals from top management about the importance of the use of the Euro earlier as compared to the other departments. Also, it is less likely that they let themselves influence by the other departments. Therefore we propose the following hypotheses:

Hypothesis 10: The probability that a particular department adopts the Euro increases with the influence being exercised by the top management.

Hypothesis 11: The influence of the top management on the probability to adopt the Euro will be stronger for the treasury department than for the purchasing and sales department.

Hypothesis 12: The probability that a particular department adopts the Euro increases with the amount of influence that is being exercised by other departments.

Hypothesis 13: The social influence among peers will have a stronger positive effect on the probability of adopting the Euro by purchasing and sales departments than by the treasury department

Data collection

Methods

The data used for this empirical study was collected through means of a mail questionnaire in 1993. At that time, the common European currency was still called the European Currency Unit (ECU). It

was re-baptized into Euro in 1999. Three different versions of the questionnaire, one for each department, were developed and subsequently pretested with a number of banking and business people, and adjusted based on their comments. For the purpose of this research we needed companies that have multiple departments. Therefore, large companies were selected for this study. The European Business Press Group in Brussels provided a list of the top 150 companies in each country with respect to turnover. Prior to the survey mailing, an introductory letter in the respondent's native language was sent which described the study's objectives, assured the respondent's anonymity, and asked for their cooperation. Not all departments of all companies were willing to participate, and as a result a total of 672, 557, and 576 questionnaires were mailed to the treasury, purchasing, and sales departments, respectively, of companies in five different European countries: Italy, France, Germany, The Netherlands, and the United Kingdom.

Except for the Netherlands, all respondents received the questionnaire in their own language. The final English version was translated into the German, French, and Italian languages by native speakers, and then back-translated into English again. Discrepancies in back translations were all resolved in discussion with members of the research team. A total of 441 usable questionnaires from 321 different companies were returned, including 222 treasury, 121 purchasing and 98 sales/marketing managers. From only 19 companies we received completed questionnaires for all three departments; from all other companies we received only one or two questionnaires back. The response rate across the countries ranges from 17.7% for France to 30.7% for The Netherlands. The overall response rate is 24.4% across the departments and the countries.

Among the 441 respondents are 102 users of the Euro: 60 treasurers, 22 purchasers, and 20 sales managers, implying adoption rates of respectively 27.0%, 18.1% and 20.4%. On average, the treasury departments had introduced the Euro in 1987 (mean score=87.7), the purchasing departments in 1988 (mean score=88.4), and the sales departments in 1989 (mean score=89.4). An F-test showed that significant differences exist between the starting dates of the three departments

(F=2.48, d.f.=2, p=.09), which suggest that, conform our expectations, the most likely order of adoption was: treasury departments first, then purchasing departments, and finally sales departments.

Measures

Table 1 provides an overview of the measures used for this study. The first column indicates the corresponding hypothesis number, the second column shows the variable name, and the last column contains the scales used to measure the particular variable. Most questions were identical in all three versions of the questionnaire, and are only included once in Table 1. With respect to those variables that were measured differently across the departments, Table 1 includes the specific questions for all three departments separately.

< Table 1 about here >

Analyses en results

Cross-national measurement equivalence

To test the hypotheses we pooled the data across countries in order to get an acceptable sample size. A problem related to this approach, however, is that managers from different countries could respond differently to the scaling of the items. Therefore, we have to test for the cross-national measurement equivalence. Two procedures were followed, depending on whether we had a multiple item or single item scale.

For perceived advantages and perceived disadvantages we have a multiple item scale. For each department, the two constructs perceived advantages and disadvantages were measured by three and two items respectively (see Table 1). To assess the cross-national measurement equivalence of these two constructs a multi-group confirmatory factor analysis would be the most powerful approach (Steenkamp and Baumgartner, 1998), but unfortunately this approach was not possible in our study, given the small sample sizes per department per country. As an alternative, for each

department we performed a confirmatory factor analysis pooling all countries after deculturing the data, i.e. standardizing the responses to each observable variable within each country's sample separately, a method suggested by Durvasula, Andrews, Lysonski and Netemeyer (1993). Table 2 shows that for all three departments the two-factor solution is significantly better than the one-factor solution (i.e. a unity correlation between the two constructs), and moreover, the fit indices imply a good model fit. Also, all items loaded significantly on the two factors. The two factors correspond with the perceived advantages and the perceived disadvantages, respectively.

< Table 2 about here >

In order to test the sensitivity of the results for the choice of particular countries, we subsequently repeated these analyses five times, each time excluding one country. For all departments and country combinations, comparable chi-square values and fit indices were found as reported in Table 2, which provides additional evidence for the cross-national measurement equivalence. From Table 2 it is clear that both the perceived advantages and perceived disadvantages can be approximated per department as two separate constructs. Finally, for each department, the scores on the items measuring the advantages were summed and subsequently divided by the number of items. The same procedure was followed for the disadvantages.

To assess the cross-national measurement equivalence for the single item measures, we investigated how respondents reacted to the scales. For each item, all scale values were used. The respondents selected extreme values and those in-between, irrespective of their country, so that problems with scalar equivalence will be minimal (Craig and Douglas, 2000, p. 162).

Hypothesis testing

Since we expect differences between the departments in the strength of the relationships between the dependent and independent variables, we analyze the adoption decision of the individual departments. The dependent variable consists of two values: the department had or had not (yet) adopted the ECU. In line with the method used by e.g. Gatignon and Robertson (1989), Cooper

and Zmud (1990), Chau and Tam (1997), Wierenga and Oude Ophuis, (1997) and Frambach et al. (1998), for each department separately, we performed logistic regression analyses. Table 3 gives the results from the multivariate analyses.

<Table 3 about here>

The model chi-square for the three multivariate models is significant at the .05 level, implying an acceptable model fit for all three models. The classification accuracy is also quite satisfactory, with 73.1%, 90.6% and 90.5% correctly classified for the treasury, purchasing and sales department respectively. A naïve model, in which all respondents are assigned to the largest group, would correctly classify 70.0%, 82.3% and 83.8%. According to the proportional chance criterion which is advised to use when group sizes are unequal (Hair, Anderson and Tatham, 1998), the predictive accuracy should be at least 58%, 70.2% and 72.8%. Although the non-users are better predicted than the users, the total classification accuracy of our models is substantially higher than the proportional chance criterion.

Table 3 provides the most important outcomes of this study. Results from a multivariate analysis are powerful, since the effect of each independent variable is measured, while the effects of the other dependent variables are taken into account. A necessary condition for such an analysis is a limited level of multicollinearity. To assess the extent of multicollinearity, for each department the correlations between the independent variables and also the tolerance levels of the dependent variables were calculated. The highest correlation coefficients are .25, .29 and .40 for respectively the treasury, purchasing and sales department. The tolerance levels are above .82, .73 and .70 for the treasury, purchasing and sales department, respectively. These figures imply a moderate level of interdependencies among the independent variables. Especially for the purchasing and sales department, it is useful to examine also the results of a univariate analysis, where the effect of an independent variable is measured as such, i.e. without taking the other independent variables into account. Therefore, Table 4, with the results of the univariate analyses is provided too.

<Table 4 about here>

Table 5 summarizes the results for the different hypotheses. Most of our hypotheses are supported or partly supported. With "partly supported" we mean that an effect is as hypothesized for one or two departments, but not for all three.

<Table 5 about here>

Discussion

Whereas the precise results for the different hypotheses are formulated in Table 5, we will highlight a few of the findings here.

Our hypothesis that perceived advantages have a positive and perceived disadvantages have a negative effect on the adoption decision is confirmed, but it is interesting to note, that these effects show up differently for different departments. Treasury departments are triggered to adopt the Euro by a *positive* motivation (perceived advantage of the Euro), whereas for the purchasing and sales departments the triggering force is the absence of a *negative* factor (perceived disadvantages). The difference may be due to the different roles of the departments. For treasury departments the Euro is an innovation in their area of responsibility, which they like to adopt on the basis of its advantages. The purchasing and sales departments have no interest in the adoption of the Euro as such, and will only adopt it if there is not too much against it.

With respect to organization characteristics, the pattern of effects for centralization and formalization were similar for all three departments. However, the sign of the effect was opposite to our expectations. Higher levels of formalization do not accelerate, but *delay* the adoption decision of the separate adoption units. Apparently, the element of taking initiative (which is favored by low formalization) is more important for the intra-firm adoption of the Euro, than the element of implementation of an innovation in the company (favored by high formalization). These results show that the influence of formalization on the adoption and diffusion of an innovation in an organization is not univocal. This may well depend very much on the nature of

the innovation. Maybe for a more technical innovation, for example the adoption of PC's, of which the use requires the availability of technical facilities in a company, such as a network, the adoption will be positively affected by formalization. In that case a planned installation process is needed, which is easier to carry out in a more formalized organization.

As was hypothesized, network externalities play a more important role for the adoption decision of buyers and sellers than for treasurers' adoption decision. The result for network externalities shows that these are more important to departments that are in constant processes of dealing with trading partners like purchasing and sales, than with a more internal-oriented department like the treasury.

Regarding the specific intra-firm variables, we found that influence exercised by peers and top management is especially important in explaining the adoption decision of treasurers, while the purchasing and sales department are more affected by internal communication and conflicts about the Euro than the treasury department. The results suggest a "two step flow of communication" about the Euro in a company (Katz and Lazarsfeld, 1955). The finding about the role of top management suggests that by influencing the treasury department, top management may play an important role in initiating the adoption decision process. The treasurers will subsequently discuss it with the other departments. However it turns out that the flow of communication and exerting influence is not completely one-directional, i.e. from top management, to the treasury department, to purchasing and sales. The (unexpectedly) observed relatively strong influence of the other departments on the treasurer shows that the adoption of the Euro is not a top-down process only. Apparently the treasurer is sensitive to bottom-up signals from departments who are actually dealing with trading parties in the real world. Top management and peer influences are important elements of intra-firm adoption processes of innovation.

At a more general level, this study shows that with a well thought-out study of the intra-firm adoption process of innovation, valuable insight can be obtained in the differences in sensitivities of different adoption units for specific stimuli (e.g. influence of top management) and the

directions of mutual influences between the adoption units. Also it is important to recognize the special role that a particular adoption unit may play, as a function of its specific expertise (in this study the treasurer is the expert with respect to monetary currency). Our results show that the two sets of variables, both the inter-firm and the intra-firm variables, are important explanatory variables for the departmental adoption of the Euro. Of the different variables within both sets, each one is significant for at least at one of the departments. For future work on intra-firm adoption of innovation, it is recommended to include particular typical intra-firm variables such as intra-firm communication, conflict, influence of top management and influence of peers. Only using variables that are known to influence inter-firm adoption decisions to explain intra-firm adoption decisions may provide an incomplete picture of the variables that influence these kind of decisions. Moreover, we found differences in the effects between departments, which is one of the most interesting results of this study. Apparently, factors influencing adoption may play a different role for different departments in the same company, which demonstrates the very need for an intra-firm analysis of adoption of innovations.

The above-discussed results also have *practical/managerial* implications for stimulating the use of the common European currency, the Euro, in the next few years. Given that the separate adoption units are influenced by different variables, one overall promotion strategy for all potential adopters in an organization may fail to be effective. We found that the most likely order of adoption for the Euro is treasurers first, purchasers next, and sellers last. This implies that to get the intra-firm diffusion process started one should aim promotion activities at the treasurers. Thus, if the Euro is not yet used in a company, the top management may try to stimulate the treasurers to start using it, emphasizing the advantages and the usefulness of using the Euro. If, on the other hand, treasurers are already Euro users, then it is important that treasurers are stimulated to discuss the possible use of the Euro with purchasers or sellers, since their adoption decisions are largely influenced by the communication between the departments. Also, in stimulating the use of the Euro within a company, it is important

to focus on the advantages when the treasury department is approached, while in case of the purchasing and sales department it is more important to diminish the obstacles to the use of the Euro.

Limitations and future research

We investigated intra-firm adoption decisions at the departmental level. The ideal method to analyze such intra-firm decisions is to compare the responses of three departments of the same company. Unfortunately, we only had 19 companies with three responding departments in our sample. Consequently, our analyses were constrained to comparing the answers of the three departments across the companies. However, we have substantial and representative samples for the three departments and their way of approaching the adoption decision within the context of their organization. Moreover, the data set contains data about the adoption of the Euro in the departments of different companies at a particular moment. Unfortunately, it does not offer multiple observations over time, as one would like to have. Future research on intra-firm adoption and diffusion of innovations should preferably follow adoption units of a company over time, to be able to gain further insight into the dynamics of the intra-firm adoption decision processes over time.

Finally, the reader should realize that the data collected on the single European currency took place several years ago. Nevertheless, we think that the underlying mechanism determining the adoption of the European currency has not changed that much and we have been able to acquire interesting insights in this mechanism.

Our work has demonstrated that taking a closer look at intra-firm adoption processes of innovation is both interesting and relevant. Much more work needs to be done, in different settings, both with respect to types of organizations and types of products and services. Furthermore, we focused only on adoption at the departmental level. Intra-firm adoption decisions can, however, also take place at the subsidiary or individual employee level. We hope

that our work will soon be followed by more research in this area, so that a comprehensive body-of-knowledge of intra-firm adoption and diffusion processes of innovations will emerge.

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Figure 1 Conceptual intra-firm adoption model of the Euro.

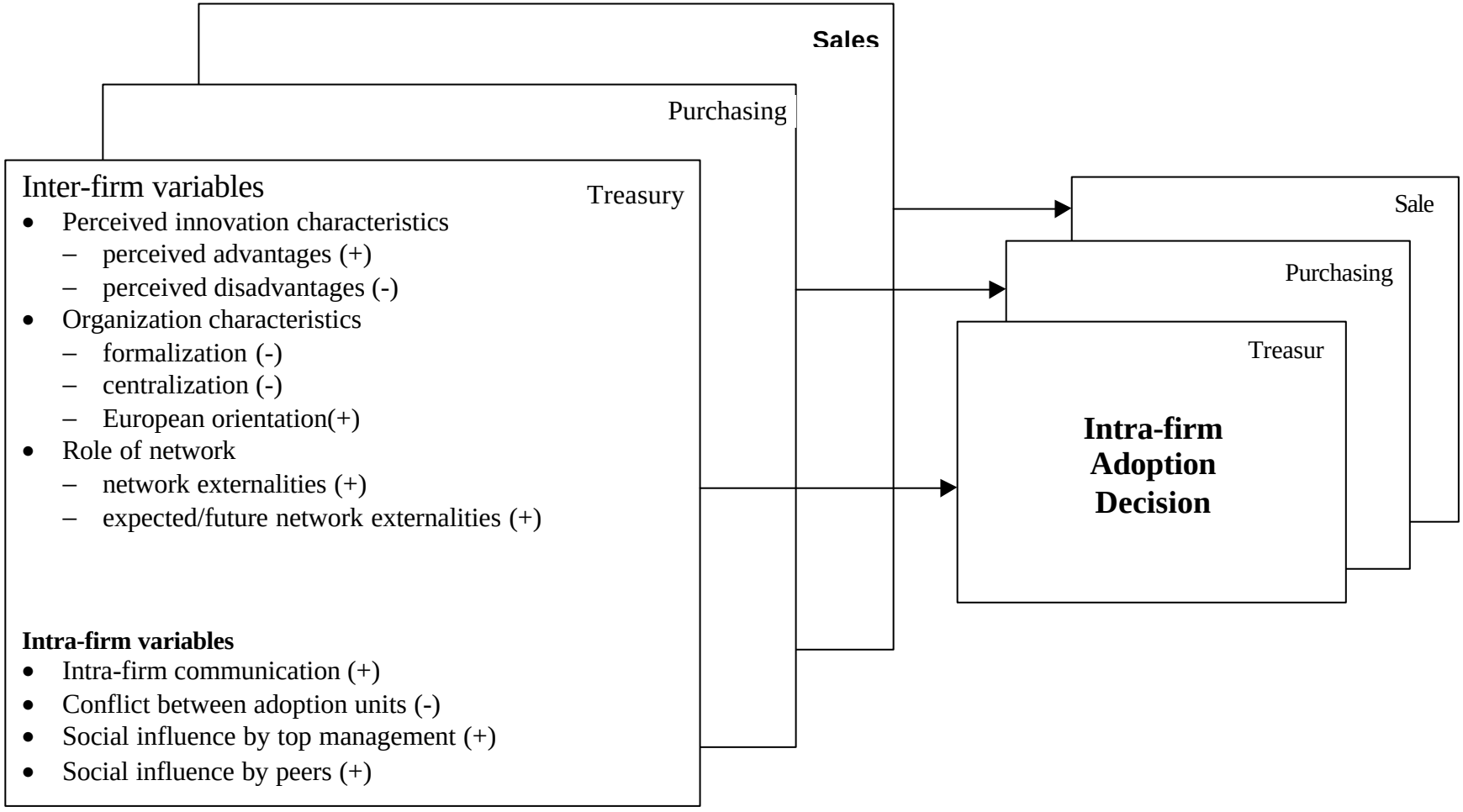

Table 1: Measures.

H	Variable	Measure
	Adoption	Is your department currently using the Euro? Yes / No. If Yes, since when?
1a	Perceived advantages	Please indicate how likely the following potential advantages of using the Euro are (5-point scale: 1=very unlikely/unimportant; 5=very likely/important): *Treasury:* the use of the Euro will reduce currency risks; the use of the Euro will reduce transition costs; the use of the Euro will simplify treasury management; *Purchasing*: stable cost prices; cost prices of our department's suppliers are more easily comparable; the Euro is a neutral currency that will simplify trade negotiations with our department's suppliers. *Sales*: fewer price list revisions will be needed if an Euro price list is used; invoicing in Euro gives the possibility to offer trading partners a longer payment term; the Euro is a neutral currency that will simplify trade negotiations with our department's suppliers.
1b	Perceived disadvantages	Please indicate how likely the following potential disadvantages of using the Euro are (5-point scale: 1=very unlikely/unimportant; 5=very likely/important): *Treasury*: the costs of changing over to the Euro are high; the advantages of using the Euro are not quantifiable *Purchasing*, *Sales*: the costs involved in changing business operations for the Euro are high; the costs involved in staff training about the Euro are high.
2a	Centralization	How would you describe your organization in terms of the decision-making processes relating to the adoption and use of the Euro? The decision process is: 1=very decentralized … 5=very centralized.
2b	Formalization	How would you describe your organization in terms of the decision-making processes relating to the adoption and use of the Euro? The decision process is: 1=with few rules … 5=with many rules.
3	European orientation	In how many member states of the European Union do you have trading partners? 0 … 12
4a,5	Network externalities	What % of your European trading partners should have adopted the Euro before you start using it? … %
4b,5	Expected network externalities	To what extent do you expect an increase in the number of European companies that will use the Euro for commercial purposes? 1= no increase … 5=strong increase.
6,7	Communication	To what extent do you agree or disagree with the following statement (1=strongly disagree … 5=strongly agree): There is a good flow of communication between the departments in our company regarding the commercial use of the Euro.
8,9	Level of conflict	To what extent do you agree or disagree with the following statement? Between different departments within our company, general agreement exists about the decision to use the Euro for commercial purposes. (1=stronlgy agree … 5=strongly disagree).
10,11	Top Man. Influence	Did top management try to influence your department's adoption decision? (0=no; 1=yes).
12,13	Social influence among peers	Did the purchasing, sales or treasury department try to influence your department's decision whether or not to adopt the Euro (yes / no)? Thus, each department can be influenced by 0, 1 or 2 other departments.

Table 2: Confirmatory Factor Analyses – Results for the pooled analyses.

	Finance	Purchasing	Sales
Chi-square for 2-factor solution (5 df)	9.35	7.41	4.22
Chi-square for 1-factor solution (6 df)	138.26	34.42	44.02
Fit indices for 2 factor model:			
GFI	.98	.97	.98
CFI	.98	.99	1.00
NNFI	.97	.97	1.02
RMSEA	.065	.060	.000
CAIC	71.48	63.58	58.69

Table 3: Adoption model: results of logistic regression per department – multivariate analyses

	H	Adoption by treasury departments (n=222)				Adoption by purchase departments (n=121)				Adoption by sales departments (n=98)			
Independent variables		b	**S.E.**	**Wald-statistic**	**Sign.**	b	**S.E.**	**Wald-statistic**	**Sign.**	b	**S.E.**	**Wald-statistic**	**Sign.**
Perceived innovation characteristics													
Perceived advantages	1a	.48	.22	4.67	**.03**	.32	.52	.37	.54	-.71	.54	1.77	.18
Perceived disadvantages	1b	-.01	.22	.00	.95	-1.16	.48	5.78	**.02**	-.60	.52	1.36	.24
Organization characteristics													
Centralization	2a	-.15	.16	.84	.36	-.03	.31	.01	.91	-.08	.44	.04	.85
Formalization	2b	-.42	.20	4.47	**.03**	-.51	.44	1.34	.25	-.60	.53	1.27	.26
European orientation	3	.05	.06	.55	.46	-.19	.15	1.71	.19	.11	.11	1.08	.30
Roles of networks													
Network externalities	4a,5	-.01	.01	.60	.44	-.31	.29	1.20	.27	-.05	.02	3.41	**.06**
Netw. Ext. expected	4b,5	-.04	.20	.05	.83	-.06	.34	.03	.86	-.00	.33	.00	.99
Intra-firm variables													
Communication between departments	6,7	-.26	.18	2.09	.15	1.03	.36	8.08	**.00**	.54	.37	2.08	.15
Conflict between dept's.	8,9	.09	.16	.29	.59	.15	.33	.21	.65	-1.45	.71	4.17	**.04**
Influence by top man.	10,11	1.35	.70	3.74	**.05**	4.92	4.53	1.18	.28	-.55	1.61	.12	.73
Social influence	12,13	.91	.45	3.25	**.07**	1.66	1.09	2.29	.13	-1.29	1.89	.46	.50
Constant		-.91	1.64	.31	.58	-.04	2.68	.00	.99	6.29	4.31	2.13	.14
		Model Chi-quare=25.77,d.f=11,p=.01 Classification accuracy=73.13% Pseudo R2=.15 Tau-statistic=.06				Model Chi-square=40.12,d.f.=11, p=.00 Classification accuracy=90.63% Pseudo R2=.45 Tau-statistic=.42				Model Chi-square=23.70, d.f=11, p=.01 Classification accuracy=90.54% Pseudo R2=.36 Tau-statistic=.37			

Table 4: Adoption model: results of logistic regression per department – univariate analyses

	H	Adoption by treasury departments (n=222)				Adoption by purchase departments (n=121)				Adoption by sales departments (n=98)			
Independent variables		b	**S.E.**	**Wald-statistic**	**Sign.**	b	**S.E.**	**Wald-statistic**	**Sign.**	b	**S.E.**	**Wald-statistic**	**Sign.**
Perceived innovation characteristics													
Perceived advantages	1a	.62	.19	11.12	**.00**	.37	.28	1.76	.18	.25	.31	.67	.41
Perceived disadvantages	1b	-.12	.18	.44	.51	-.58	.27	4.69	**.03**	-.67	.31	4.63	**.03**
Organization characteristics													
Centralization	2a	-.06	.13	.22	.64	-.34	.22	2.44	.12	-.16	.25	.42	.51
Formalization	2b	-.47	.17	8.14	**.00**	-.50	.27	3.52	**.06**	-.51	.29	3.14	**.08**
European orientation	3	.30	.15	4.00	**.05**	-.09	.26	.12	.73	.24	.23	1.10	.29
Role of networks													
Network externalities	4a,5	-.01	.01	2.18	.14	-.06	.02	5.91	**.02**	-.03	.01	4.87	**.03**
Netw. Ext. expected	4b,5	.13	.15	.72	.40	.10	.22	.21	.65	.31	.21	2.15	.14
Intra-firm variables													
Communication between departments	6,7	-.01	.14	.01	.94	.53	.18	8.72	**.00**	.48	.24	4.09	**.04**
Conflict between dept's	8,9	-.02	.13	.04	.85	-.36	.21	2.80	**.09**	-1.12	.33	11.47	**.00**
Influence by top man.	10,11	.91	.51	3.14	**.08**	.08	1.14	.00	.94	1.16	.81	2.03	.15
Social influence	12,13	.92	.34	7.52	**.01**	.62	.50	1.55	.21	.41	.73	.31	.58

Table 5: Summary of the results with respect to the hypotheses.

Independent variable	Hypothesis	Result
Perceived innovation characteristics	1	In the multivariate analysis, for the treasury there is a positive effect on adoption of the number of perceived advantages. For the purchasing department there is a negative effect of the number of disadvantages. The same effects show up in the univariate analysis, with an additional negative effect of the perceived disadvantages for the sales department. However there are no significant effects of the perceived advantages for purchasing and sales, neither of the disadvantages for the treasury. **H1 partly supported**
Organization characteristics	2	Formalization has a *negative* effect on adoption for the treasury department in the multivariate analysis. In the univariate analysis there are also negative effects of formalization for the purchasing and the sales department. **H2 not supported; evidence for the opposite effect**
	3	There is some evidence of a positive effect of a more European orientation on the likelihood of adoption for the treasury department (only significant in the univariate analysis). There are no such effects for the two other departments. For the purchasing department the sign of the effect is even negative. **Some support for H3, only for the treasury**
Role of networks	4 & 5	As the sales and purchasing departments apply a higher required number of adopting trading partners before they start using the Euro themselves, they have a lower probability of adopting the Euro. This effect is almost significant for the sales department in the multivariate analysis and significant for purchasing and sales in the univariate analysis. For the treasury department no effect of externalities was found **H4 partly supported** **H5 supported**

Table 5 – continued.

Independent variable	Hypothesis	Result
Intra-firm variables	6 & 7	The multivariate analysis shows that more communication between departments about the Euro, results in a higher probability of adopting the Euro for the purchasing department. For the sales department the effect of communication is only significant in the univariate analysis. For the treasury no such effect was found. **H6 partly supported** **H7 supported**
	8 & 9	A higher level of conflict between departments about the Euro has a significantly negative effect on the probability of adopting the Euro for the sales department. For the purchasing department there is a tendency in the same direction, but only in the univariate analysis. No effect of conflict was found for the treasury department **H8 partly supported** **H9 supported**
	10 & 11	The probability that the treasury department will adopt the Euro is higher if top management influences the department with respect to this decision. No effects of the influence of top management on the adoption of the purchasing and sales departments were found **H10 partly supported** **H11 supported**
	12 & 13	The influence of other departments has a positive effect on the adoption decision of the treasury department (almost significant in the multivariate analysis; significant in the univariate analysis).No effect was found of the influence of other department on the adoption decision of the purchasing and sales departments **H12 partly supported** **H13 not supported; evidence for the opposite effect**

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