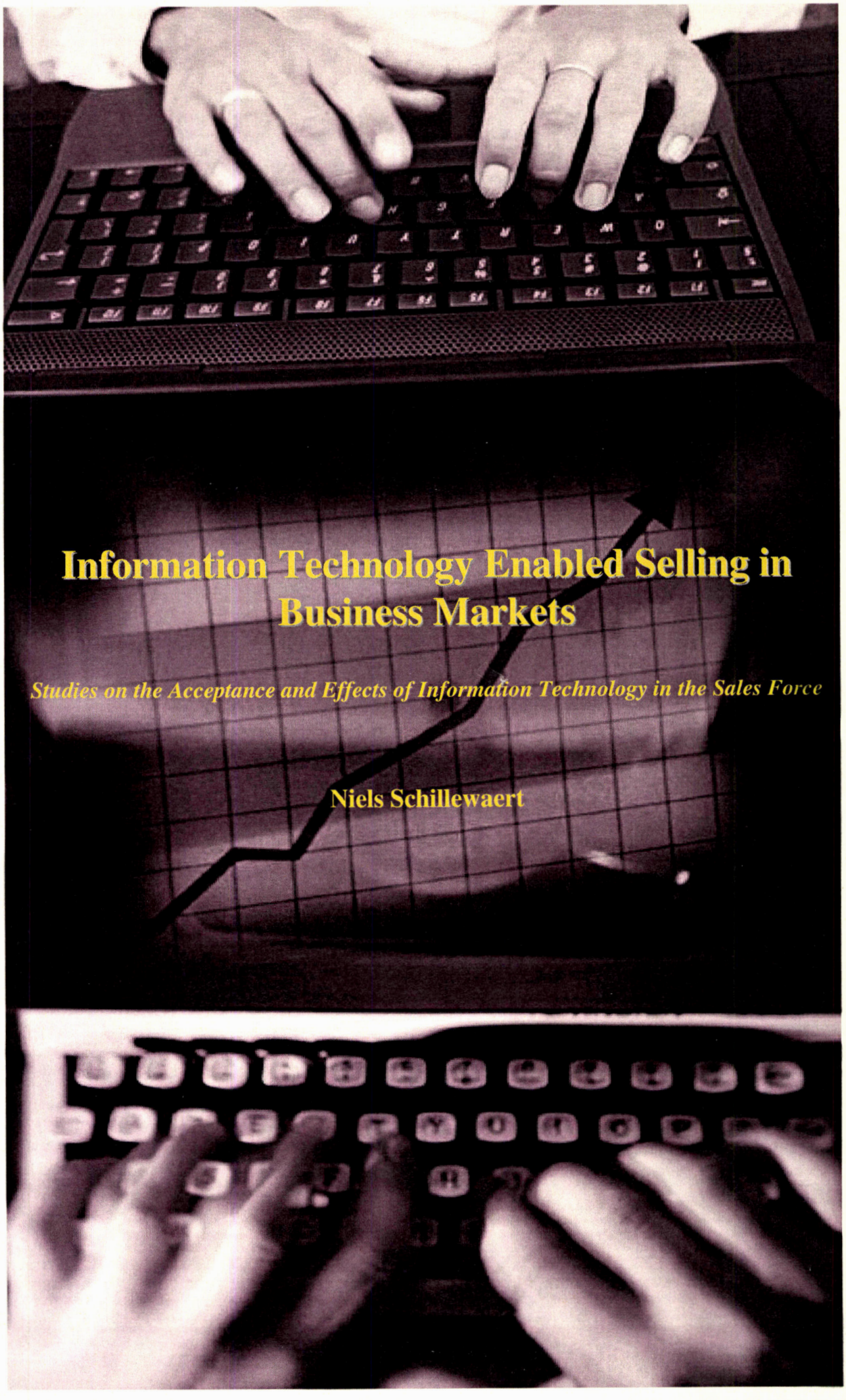

Information Technology Enabled Selling in Business Markets

Studies on the Acceptance and Effects of Information Technology in the Sales Force

Niels Schillewaert

Information Technology Enabled Selling in Business Markets

Studies on the Acceptance and Effects of Information Technology in the Sales Force

PROEFSCHRIFT

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-- To Sigrid --

Niels Schillewaert

ICM Doctoral Fellow

Antwerpen, 23 October 2000

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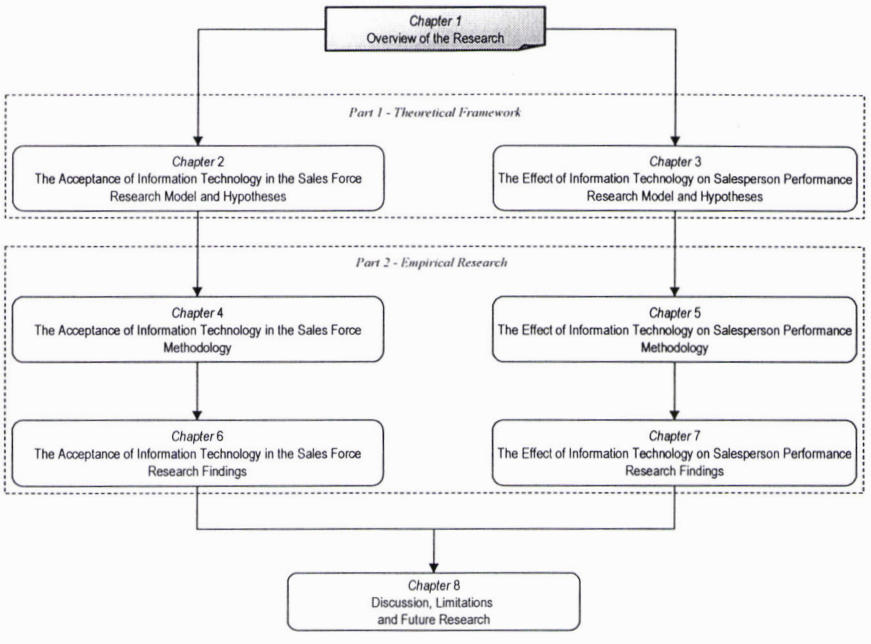
Chapter 1 Overview of the Research



1.1. Introduction

Advanced computer technologies have fundamentally transformed the everyday life of salespeople. Comparing the sales activities of the 1990's with those of the 1980's, Marshall et al. (1999) conclude that the technological change of the last decade was the principal reason for a significant change in sales activities. Nowadays, salespeople can take a virtual office on the road or build one at home. Technology facilitates sales activities related to communication, sales, relationship building, team and data management that were hardly imaginable ten to fifteen years ago. Consider the following scenario which depicts some of the professional activities of a pharmaceutical sales representative. In this scenario we spend a Monday morning with Cony Miller, who engages in different sales activities. We use this story to paint a picture of a sales rep who has gone "electronic". It is intended to be illustrative for the infusion of information technology in personal selling, rather than exhaustive and/or representative.

Monday morning. Cony Miller sips her early morning coffee, while she starts up her laptop and her hand-held personal organizer in her home office. On Monday mornings Cony always plans her week and reviews her schedule for the day.

Cony opens her sales automation software program and reviews her customer database. She runs several queries on her customer database. Using geodemographic, sociodemographic and purchasing history criteria she selects and targets the top doctors she needs to call on this week in the different corners of her territory. While browsing through these data she makes some notes per customer and determines her sales message and strategy for each customer.
After finishing her planning task, Cony reviews the two customers she visits this afternoon. She looks at her electronic notes she made during previous calls and analyzes the prescribing behavior of each doctor. By investigating these data she knows this customer is a high prescriber for one of the two products she details. However, the doctor mainly uses the competition's products. Over the last few months Cony has paid special attention to this doctor and she has convinced the doctor to try her company's product. The latest sales data and graphs in her sales information system show that the customer's market share for her product has picked up against that of the competition. Cony wants to thank the doctor for his confidence and builds her sales message around this specific issue. She also notices that it is his birthday and that this customer likes special deserts, which reminds her to wish him a happy birthday and stop at the bakery for a cream cake for the physician and his staff. With the second customer, Cony has built up a very good working relationship over the years. He is a high prescriber and user of both her products. Still, she prioritizes the product with the highest potential.

Next, Cony logs on to the internet and glances over her e-mails. One is from the first customer she visits this afternoon. He asks if she is able to help him find the latest article or other medical information on a specific disease state. Cony has a busy schedule and is not able to go to the medical library but she wants to delight her customer. She surfs on the Web to the medical site, MedLine. Cony specifies her query in the search engine by using specific key words (e.g. topic, publication date) and limits her search to full-text articles. The search results are ranked according to the relevance of the query. Cony selects the full text article that is highest in rank and downloads the article in pdf-format. In addition, Cony logs in to her firm's Lotus Notes databases (i.e. a fundamental part of the organizational memory) and pulls up the shared information on the specific disease state. A colleague sales representative has just submitted a summary of the results of a medical trial that was ended last week. Cony saves the document on her laptop computer. She replies to the customer's e-mail, adds a brief note and both attachments and wishes him a happy birthday.

Her electronic organizer reminds her of the fact that she needs to send her Powerpoint presentation to Joe Larson, her sales district manager, by the end of the day tomorrow. Cony is one of the company's sales reps who is known to be very computer literate. At next month's national sales meeting she has been asked to show her peers how she uses information technology and how it benefits her sales process activities. She fine-tunes the presentation she made last week and sends it to Joe via e-mail.

It is almost noon, but before she logs off and hits the road, Cony quickly books her flight and car for next month's national sales meeting, through the services of travelocity. She leaves her credit card number and composes her flight schedule at her convenience.
Quite satisfied with the work she got done, Cony grabs a bite and leaves for her first call of the day. She arrives at first doctor's practice. The waiting room is full and the doctor rushes out of his office. He notices Conny. He is visibly thrilled: "*Cony! Thank you for the wishes and fast response of this morning. The articles look interesting*". Despite his busy schedule he promises to free up some time for Cony and discuss the matter in detail.

In the next section of this chapter, we provide a managerial and academic justification for our study. In section 1.3. we highlight the objectives of this research project. Section 1.4. briefly explains the research methods used in this dissertation. Section 1.5. focuses on the unit of analysis of our study, while part 1.6. briefly overviews the different information technologies as facilitators for personal selling. Section 1.7. outlines the organization of this dissertation.

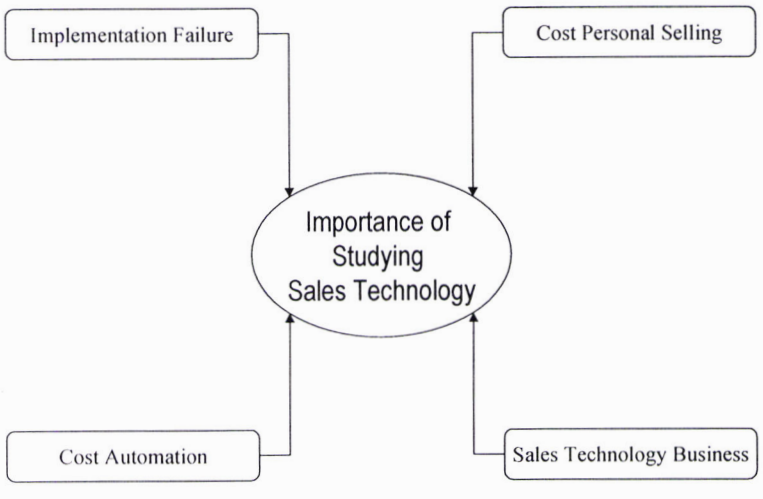
1.2. Justification of the Research

In justifying this research we clarify the practical importance of the research problem (1.2.1.) as well as the main shortcomings in the current academic research (1.2.2.).

1.2.1. Importance of the Research Problem

The importance of investigating the topic of personal selling and information technology is determined by four factors (see Figure 1-1): (1) the increasing cost of personal selling, (2) the cost for automation in sales, (3) the high technology implementation failure rates and (4) the importance of the sales technology business.

FIGURE 1-1 IMPORTANCE OF THE RESEARCH



(1) *Increasing Cost of Personal Selling.* It is a well-known fact that the average costs of supporting field salespeople and sales calls are considerable and have increased over the years (Moncrief et al. 1991). Consequently, management is searching for ways to decrease these expenses and make salespeople more efficient and effective. As a result, many companies decided to equip their sales force with information technology based on the belief that sales technology offers potential for increased productivity. In fact, information and computer systems have been suggested to enhance competitive advantage (e.g. Porter and Millar 1985; Revered et al. 1987; Collins 1987), customer oriented strategies (e.g. Day 1994; Narver and Slater 1990), improved communications, organizational decision making and marketing operations and strategies (Good and Stone 1995).

(2) *High Cost of Automation.* Siebel and Malone (1996) estimate that the cost of sales automation may rise as high as $12,000 per salesperson. Similarly, a study of 295 automation initiatives report an average investment per rep of over $10,000 (Dickie 1998). Khandpur and Wevers (1998) state that spending may be anywhere between $10,000 and $25,000 per user in direct start up cost and an additional $5,000 per user per year in operating cost. For a mid-sized implementation project with 250 sales reps, this implies that automating budgets may range from $2,5 to $6,25 million and a yearly operating budget of $1,25 million.

(3) *High Technology Implementation Failure Rates.* Practical evidence suggests that many sales force automation initiatives have serious shortcomings or can be considered as downright failures. Siebel and Malone (1996) report that at least 50% of the sales automation initiatives end in failure; other sources report that even 75% of all sales automation initiatives underachieve (Blodgett 1995; Lee 1998).

(4) *Importance of Sales Technology Business.* The market for sales automation software is considerable and fast growing. The information technology research company Frost & Sullivan estimated that the sales force automation software market reached $468 million and grew 62% in 1998 (Frost & Sullivan 1999). Similarly, according to International Data Corporation, the sales automation applications market grew 54% to $1.3 billion (Wardley and

Shiang 2000). In addition, it is estimated that in 1994 there were about 500 technology suppliers that focused on offering sales technology (Siebel and Malone 1996).

1.2.2. Shortcomings of Academic Research

Despite its practical significance, the academic literature lacks systematic studies of information technology in the sales force. Although some studies on information technology and sales exist, many questions remain unanswered. For a detailed discussion of the particular research contributions made in this Ph.D., we refer to chapter 2 and 3. In this paragraph, we briefly highlight the major gaps in academic research.

First, while the information systems literature has produced a lot of research on the individual acceptance of computer technologies (e.g. Davis et al's (1989) Technology Acceptance Model (TAM)), no academic research exists on the acceptance of computer technology by individual salespeople. In fact, the few studies that do relate to the topic of technology in a sales environment (Moriarty and Swartz 1991; Gatignon and Robertson 1989; Moncrief et al. 1991), explore adoption or usage of sales technology from an organizational/departmental perspective. Furthermore, research which extends the TAM to incorporate important external variables (e.g. personal innovativeness, specific social influences) and empirically tests integrated models, remains limited. In addition, current research has approached the concept of acceptance from a narrow perspective, namely as the mere frequency of use or as a dichotomous and single decision.

Furthermore, the impact of information technology has captivated the attention of researchers in economics (e.g. Brynjolfsson and Hitt 1993), information systems and decision making (e.g. DeLone and McLean 1992). The findings of these studies were inconclusive, however, and have led to an ongoing debate tagged as the "IT productivity paradox". In addition, given the importance of personal selling for organizational success and the considerable academic attention that has been devoted to studying the antecedents of salesperson performance (e.g. Churchill et al. 1985; Behrman and Perreault 1982; Cron and Levy 1987; Brown and Peterson 1994), it is

surprising to note that no studies have investigated the effects of information technology usage on salesperson performance. The following quotes illustrate this lack of empirical attention and the relevance of this research topic: "*very little research has been devoted to investigating the impact of technology on individual salesperson effectiveness*" and "*future research needs to be directed toward understanding the impact of technology in selling*" (Marshall et al. 1999, p. 98).

1.3. Research Objectives

Considering the discussion in the previous section, it has become clear that studying information technology in the context of personal selling is of particular interest to both academics and practitioners. The research problems investigated in this study, focuses on this particular area. In this research we wish to address two distinct, but related research questions.

The first research question pertains to **the acceptance of information technology by individual salespeople**. More specifically, we examine the following research problem: *What are the antecedents of a sales rep's technology acceptance and how do these determinants interrelate?* This general question is subdivided into:

(1) *What is the effect of the beliefs "perceived usefulness" and "perceived ease of use" on a salesperson's acceptance of information technology?*
(2) *What is the effect of salesperson characteristics (e.g. personal innovativeness and computer self-efficacy) on a sales representative's technology acceptance behavior?*
(3) *What is the effect of external and internal social influences on a salesperson's acceptance of information technology?*
(4) *What is the impact of organizational facilitators (e.g. training, user support) on the technology acceptance behavior of salespeople?*

Second, we wish to assess **the effects of information technology on salesperson performance.** The overall research problem investigated in this study is: *What is the relationship between a salesperson's information technology infusion and his/her performance and how can we explain this relationship?* This research question is subdivided into the following research questions:

(1) *What is the effect of information technology infusion on salesperson performance?*

(2) *What is the role of intermediate variables in explaining the relationship between information technology usage and salesperson performance?*

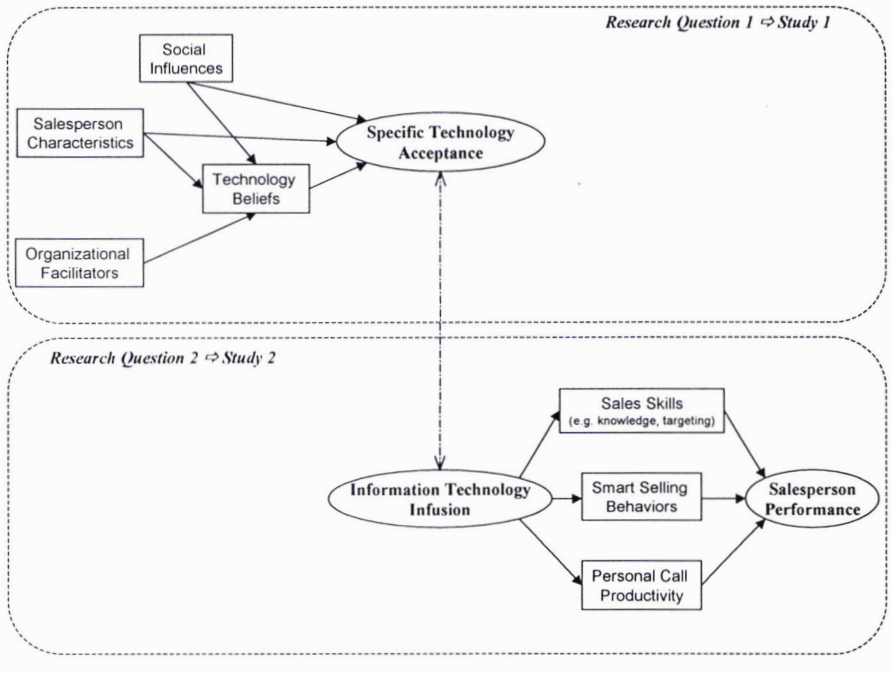
   (a) *What is the effect of information technology infusion on a sales rep's sales skills?* and *Do these sales skills affect salesperson performance?*

   (b) *What is the effect of information technology infusion on a sales rep's smart selling behavior?* and *Do these smart selling behavior influence salesperson performance?*

   (c) *What is the effect of information technology infusion on a sales rep's call productivity?* and *Does call productivity affect salesperson performance?*

These research questions form the central components of our study. In line with these research questions, Figure 1-2 depicts the conceptual framework that guides us through this dissertation. This dissertation consists of two studies each tackling one of the two research problems. Separate models and research designs (study 1 – study 2) were developed for each research objective.

FIGURE 1-2 GUIDING FRAMEWORK WITH MAJOR MODEL COMPONENTS



1.4. Research Methodology

In order to test the relationships within this guiding framework (Figure 1-2), two separate research studies were conducted. Considering both research objectives, it was deemed necessary to conceive two research designs. Figure 1-3 depicts the methodological designs used.

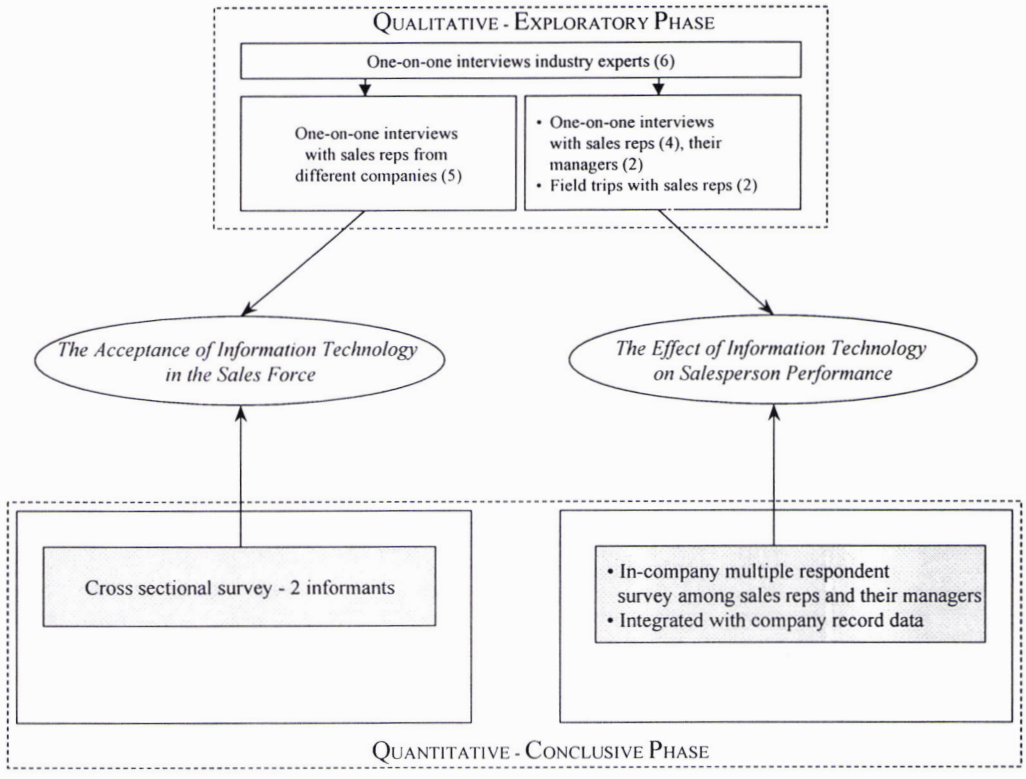
1.4.1. The Acceptance of Information Technology in the Sales Force: Study 1

Study 1 focuses on the question of *technology acceptance within the sales force*. The few studies that tackle the acceptance of sales technology (e.g. Moriarty and Swartz 1991; Gatignon and Robertson 1989; Moncrief et al. 1991) explore the adoption decision or usage of sales technology from an organizational/departmental perspective. Building on the Technology Acceptance Model (Davis et al. 1989), we develop a model of intra-organizational acceptance of information technological innovations among sales force members. We test our research model using multiple respondent data from a cross sectional sample of sales reps (N=168). A salesperson's technology acceptance is measured in a direct (i.e. with the sales rep) and an unobtrusive (i.e. with the salesperson's manager) manner. After showing adequate levels of interrater agreement, the direct and unobtrusive measures were aggregated. Hence, we reduce the effects of common method bias as an explanation for a sales rep's technology acceptance.

1.4.2. The Effects of Information Technology on Salesperson Performance: Study 2

Study 2 integrates a broad literature search with multiple qualitative interviews and observations to develop a solid theory on *information technology usage and salesperson performance*. Subsequently, the proposed model is empirically tested using a field study research design. To the best of our knowledge, this study is the first to investigate the relationship between information technology and salesperson performance. The study is conducted within one company and mixes multiple data sources (i.e. sales representative and sales manager survey data, company performance and call reporting data) related to 187 salespeople.

FIGURE 1-3 OVERVIEW OF RESEARCH METHODS



1.5. Unit and Level of Analysis

In order to understand the scope and limitations of this study, it is important to realize that both the level and unit of analysis in this research is situated at the level of the *individual* sales representative. The rationale for this unit of analysis is twofold.

First, our *research questions* are directly tied to the individual sales representative. For instance, the criterion variables in both studies are defined at the level of the individual salesperson (i.e. salesperson performance and individual technology acceptance). Similarly, the determinants of acceptance (study 1) and the levels of integrated information technology usage (study 2) relate to the single sales rep's perceptions of the focal constructs.

Next, information technologies can be seen as *contingent innovations* (Rogers 1995). This implies that the organizational adoption decision marks merely the beginning of the actual

implementation of the innovation. Once the organizational decision makers have decided to adopt a new technology, the focus shifts to the process of intra-firm adoption. Indeed, the success of the innovation process is ultimately assessed by the extent to which the innovation has been accepted and integrated into the organization (Rogers 1995; Gopalakrishnan and Damanpour 1997; Zaltman, Duncan and Holbek 1973). Organizational innovations which have to be incorporated in the work processes of organizational members (such as information technology in a personal selling context), are of little value if they are not used. A new technology must be accepted by its target "user" group in order to achieve the objectives and reap the benefits the organization intends to realize (e.g. Leonard-Barton and Deschamps 1988; Srinivasan 1985; Bhattacherjee 1998). Hence, it is important to study the consequences and antecedents of information technology usage and acceptance at the level of the individual sales executive, because (1) if an organization cannot achieve extensive acceptance of e.g. the new IT among the targeted users (e.g. sales reps), (2) the desired (corporate) consequences can not possibly be achieved, and (3) the organization might eventually reject the innovation and thus discontinue the innovation process.

The sales rep as level and unit of analysis implies that this study *only* assesses *relationships* and effects that relate to the *individual* salesperson. For instance, the potential effects of information technology on sales teams or the impacts of automation for sales management are beyond the level and unit of analysis in this study.

1.6. Information Technology for the Sales Force: A Brief Overview

In this section we provide an overview of the information technology tools that serve salespeople throughout their job. Technological developments are taking place so rapidly that any discussion of information technologies runs the risk of being outdated very quickly. Still, we want to

describe the major information technologies in order to provide a common understanding for this study.

For the purpose of this study, information technology covers an array of computer enabled applications either or not based on a telecommunications network. We do not focus on the technological hardware devices as such, but on *a set of software applications*. Hence, we approach information technology tools from the perspective of their functionality and what they can do for a sales rep's selling and non-selling activities. A number of information technologies that can serve sales executives in their sales job, are illustrated in Table 1-1 below.

TABLE 1-1 INFORMATION TECHNOLOGIES FOR THE SALES FORCE

IT SOFTWARE	*SALES PURPOSE*	*CHARACTERISTIC*
1. Laptop Office Software - Word processing - Spreadsheet - PC-based presentation tools - CD-based presentation tools - Graphic tools - Multi-media (e.g. film, photo, sound) programs - Time and calendar management [1]	General Support and Personal Productivity	I. Off-line
2. Sales Force Automation system[2] - Contact management (e.g. track contacts and history) - Account management (e.g. track customers and related information) - Time management (e.g. calendar and scheduling) - Prospecting (e.g. lead tracking/qualifying) - Price/product configurator - Sales analysis and market information - Order management (e.g. order entry, status and history)	Sales Strategic Support	II. Networked and Data-based
3. Open WWW access 4. Intranet 5. Extranet ⇒ web sites ⇒ search engines	Informational and Communicational Support	III. Networked and Data-based
6. E-mail - Messaging - E-mail lists - E-zines 7. Groupware databases		IV. Interpersonal Interaction

[1] Can also be integrated into a sales force automation system
[2] A SFA system can also be web based. Because this is a technological infrastructure issue, we do not consider this matter.

As mentioned earlier, these information technology applications can support salespeople throughout their sales activities. Walker et al. (1979) refer to (sales) behaviors as the tasks salespeople accomplish in the course of their work. The sales literature provides an extensive list of sales process activities (see Moncrief (1986) and Ingram and LaForge (1997) for a detailed

overview). Based on this list of sales behaviors it is possible to select generic subsets of sales behaviors, for which it is sensible to assume that sales reps may apply information technology in support of these activities. This classification of sales activities comprises both customer-interaction and non-customer-interaction behaviors (Plank and Reid 1994) and are illustrated below:

No interpersonal customer interaction

(1) *preparing for a sales call*: in planning a sales call, a sales rep locates and screens prospects and gathers information about the prospect or customer, which he will use in a later sales presentation.
(2) *communicating with colleagues and the home office*: refers to providing feedback and information to superiors, look for people, etc.
(3) *monitoring the business* (e.g. customers, competitors, products ...): involves looking up specific information, studying market trends, review company products, etc.

Interpersonal customer interaction

(1) *sales presentation and call*: is the core of the entire sales process in which the rep makes a presentation and replies to customer questions and works with orders.
(2) *communicating and staying in touch with customers*: pertains to communication activities outside of the sales call which facilitate the relationship, such as developing goodwill and resolving customer problems.

Table 1-2 confronts the information technologies represented in Table 1-1 with the general sales activities discussed here. As this table shows, several information technology tools have a contribution to make throughout all sales process activities (see also Ingram and LaForge 1997; Fletcher 1990). In the following paragraphs we provide some examples of how information technology can support the salesperson.

In **monitoring** the business and **pre-call planning** activities, the salesperson gathers information about the industry, prospects and/or customers which will be used to formulate a future sales message. Before making a contact the salesperson wants to learn as much as possible about the account. Various information sources may be used in this undertaking. Visiting a customer's web site, for example, or searching for customer and industry information on web portals and search engines may be valuable resources. Similarly, the use of customer databases is a way for identifying those customer that have potential and are most likely to buy. In **planning** his/her

overall sales effort (e.g. on a weekly basis), the sales rep also prioritizes different tasks and sets up his/her route and makes appointments. Calendar software or electronic organizers are useful tools in support of these activities. A well-known interactive call-planning model is CALLPLAN (Lodish 1971). CALLPLAN helps salespeople to make their time allocation decisions in such a way that salespeople can maximize their returns. The system has shown to be effective in an experimental setting where CALLPLAN-users realized an 8.1% higher level of sales compared to the non-users (see Lilien et al. 1992; Lilien and Rangaswamy 1997).

During the sales call computer applications can be used for enhancing presentations or responding to customer questions. Presentation software tools such as PowerPoint, for example, can integrate visuals and multimedia to complete a sales presentation. Also, some sales automation packages contain modules which allow to check order status or product availability on the spot, in front of the customer.

Information technology can also serve the sales rep in terms of **communicating with customers** and the **home office**. E-mail or fax software, for instance, allows the salesperson to send relevant documents to a specific selection of his/her customer base or closely follow up on a sales call. Similarly, electronic communication tools can be used by the sales rep to share information with colleagues or prepare future meetings.

TABLE 1-2 INFORMATION TECHNOLOGY IN SUPPORT FOR SALES ACTIVITIES

	INFORMATION TECHNOLOGY			
ACTIVITIES	LAPTOP OFFICE SOFTWARE	SFA	E-MAIL	WWW
Customer interaction				
• During sales call	**	**	--	*
• Outside sales call	**	--	**	--
Non-customer interaction				
• Pre & post call actions and sales planning	*	**	*	**
• Monitoring	--	**	*	**
• Home office communication	**	**	**	*

--: not applicable
*: suitability of IT application for specific activity

1.7. Organization of Dissertation

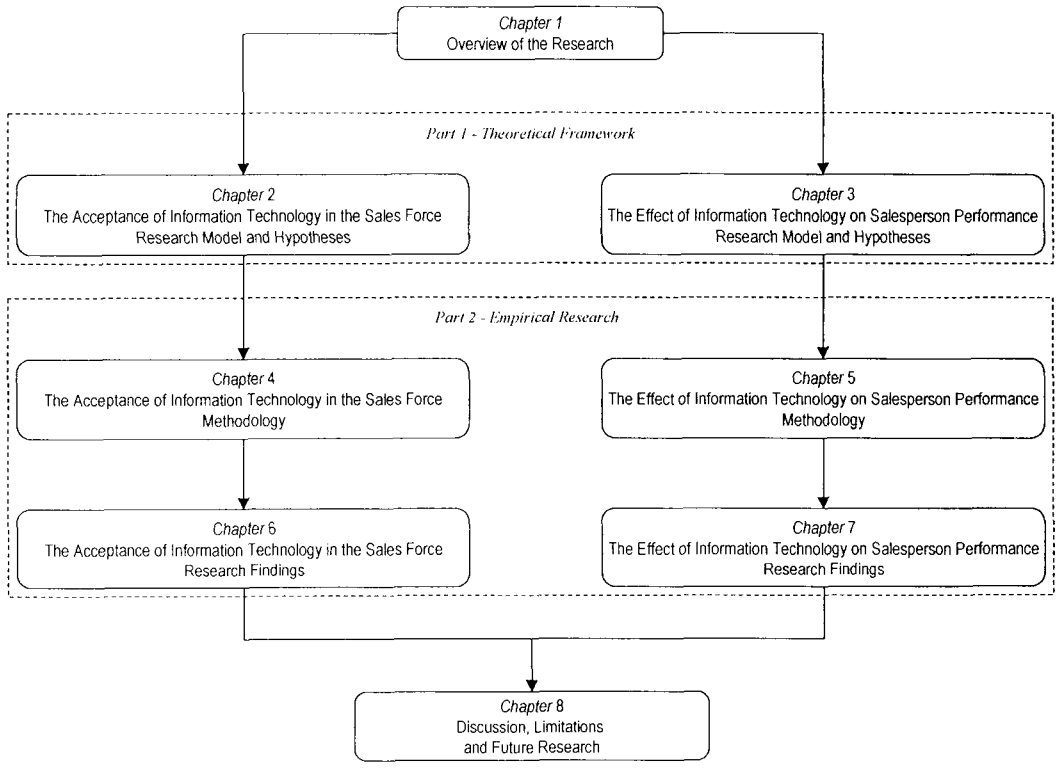
Following this introductory chapter, this dissertation consists of two parts.

Part one is the theoretical framework and consist of chapters two and three. The chapters discuss the contributions, the theoretical underpinnings and research hypotheses of study 1 and 2 respectively.

Part two presents the empirical results of both studies. Chapters four and five report the methodological details of the research designs. Chapter six shows the results of the empirical model testing of study 1. Chapter seven does the same for study 2. Finally, chapter eight discusses the research findings, underscores the limitations and provides suggestions for future research.

Figure 1-4 depicts the structure of this dissertation.

FIGURE 1-4 DISSERTATION STRUCTURE

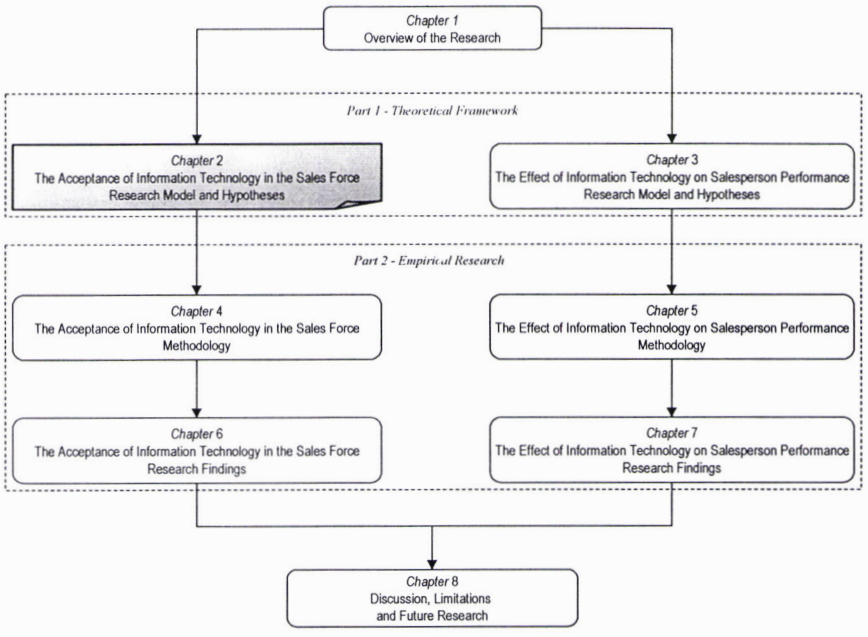


PART I

Theoretical Framework

CHAPTER STRUCTURE

Chapter 2 The Acceptance of Information Technology in the Sales Force Research Model and Hypotheses



2.1. Introduction

If companies wish to reap the benefits from implementing information technology in their sales organization (e.g. enhanced productivity, customer communication and better market information), these technologies need to be embraced by individual target users (Bhattacherjee 1998; Srinivasan 1985; Davis et al. 1989; Leonard-Barton and Deschamps 1988). Hence, once the organization has decided to adopt a technological innovation, the process of intra-firm adoption becomes important. Still, in sales force contexts the acceptance of technological innovations at the individual level (i.e. the field salespeople), has not been investigated previously. Moreover, the marketing literature on innovation adoption has primarily focused either on consumer markets (e.g. Ozanne and Churchill 1971; Gatignon and Robertson 1985; Steenkamp et al. 1999) or on

adoption at the organizational/departmental level (e.g. Robertson and Gatignon 1986; Gatignon and Robertson 1989; Frambach et al. 1998; Moriarty and Swartz 1991).

In the sections that follow, we begin with a discussion of the current research, its shortcomings and the contributions of this study. In section 2.3 we sketch the theoretical background, explain the focal constructs and develop the research hypotheses.

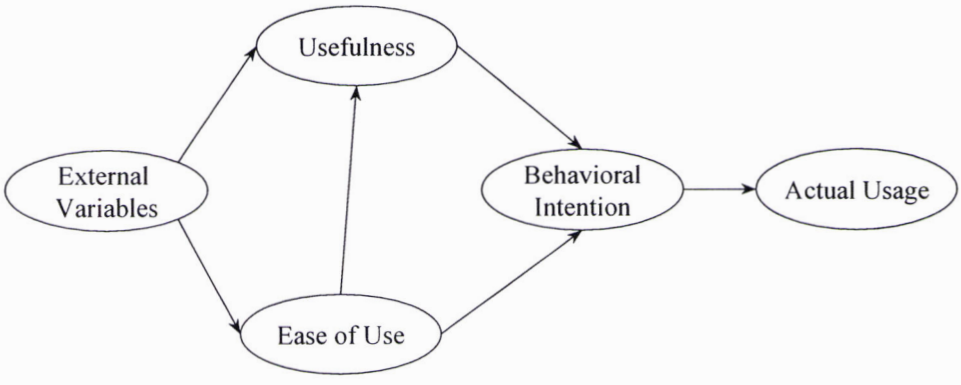
2.2. Current Research Status and Contributions

In contrast to the marketing literature, the information systems literature contains an extensive and long standing tradition of research that focuses on explaining the acceptance of information technology from the user's (i.e. individual's) perspective (e.g. DeLone and McLean 1992; Zmud 1979; Ives and Olson 1984; Davis et al. 1989; Doll and Torkzadeh 1988; Trevino and Webster 1992). The best contributions in predicting and explaining user acceptance of computer technology in organizational contexts have been made by the Technology Acceptance Model (TAM) (e.g. Davis et al. 1989; Venkatesh and Davis 2000) (see Figure 2-1). The central thesis of the TAM is that individual computer acceptance is determined by two instrumental beliefs: *perceived usefulness* (i.e. the extent to which a person believes that using the system will improve his/her job performance) and *perceived ease of use* (i.e. the extent to which a person considers that using the system will be free of effort). Over the years, strong empirical support has accumulated in favor of TAM (e.g. Igbaria et al. 1996; Davis 1989; Trevino and Webster 1992; Igbaria 1993; Adams et al. 1992; Doll et al. 1998). Therefore, this model represents the current thinking in the field of information systems about user acceptance of computer technology.

Still, whereas some research has been done to model the effects of different external variables, TAM needs to be broadened to encompass other important theoretical constructs (e.g. personal characteristics, organizational facilitators) which need to be tested within an integrated

nomological network of variables. Such integrated models depart from prior research on innovation adoption and computer acceptance, which has focused primarily on either first order effects of acceptance determinants (e.g. Rogers 1995; Thompson et al.1991) or antecedents of perceived usefulness or ease of use separately (e.g. Venkatesh and Davis 2000; Venkatesh and Davis 1996; Karahanna and Straub 1999). Against this background, a major contribution of our study is that it develops and tests a theoretically integrated model which explains salespeople's computer acceptance behavior.

FIGURE 2-1 THE TECHNOLOGY ACCEPTANCE MODEL



Moreover, observations in practice suggest implementation failure rates of sales technology as high as 75% (Petersen 1997; Siebel and Malone 1996; Blodgett 1995; Lee 1998) and indicate that a major reason may be that salespeople are among the most technophobic and resistant of all white collar workers (e.g. Parthasarathy and Sohi 1997; Bresnahan 1998; Mills 1995). Harris and Pike (1996), for example, report that almost 1 out of 5 sales reps in the agribusiness never use a computer in their work. Given this situation, we propose that a sales rep's *personal innovativeness in the domain of information technology* is key in understanding and explaining the acceptance of technology in the context of personal selling. Counter to the assertions of the TAM, we develop hypotheses maintaining that *innovative salespeople* will not only hold different belief structures in terms of using sales technology, but also that *highly innovative salespeople will accept technology over and above these held beliefs*. Hence, we asses whether organizations should actively identify

and target those salespeople, within their sales organization, that are high in personal innovativeness during the implemention of sales technology (Agarwal and Prasad 1998).

Despite the extensive study of TAM, the impact of *social influences and norms* on acceptance remains one of the poorly understood aspects of technology acceptance (Davis et al. 1989; Venkatesh and Davis 2000). The prior studies on TAM investigate the role of social influences from a general standpoint, namely the "influence of important others". Consequently, these social influences are not adapted to a personal selling context. In this study, we adapt and disentangle these influences to a sales setting as we hypothesize that these effects are differential depending on the source (e.g. customers, competitors, supervisors and colleagues).

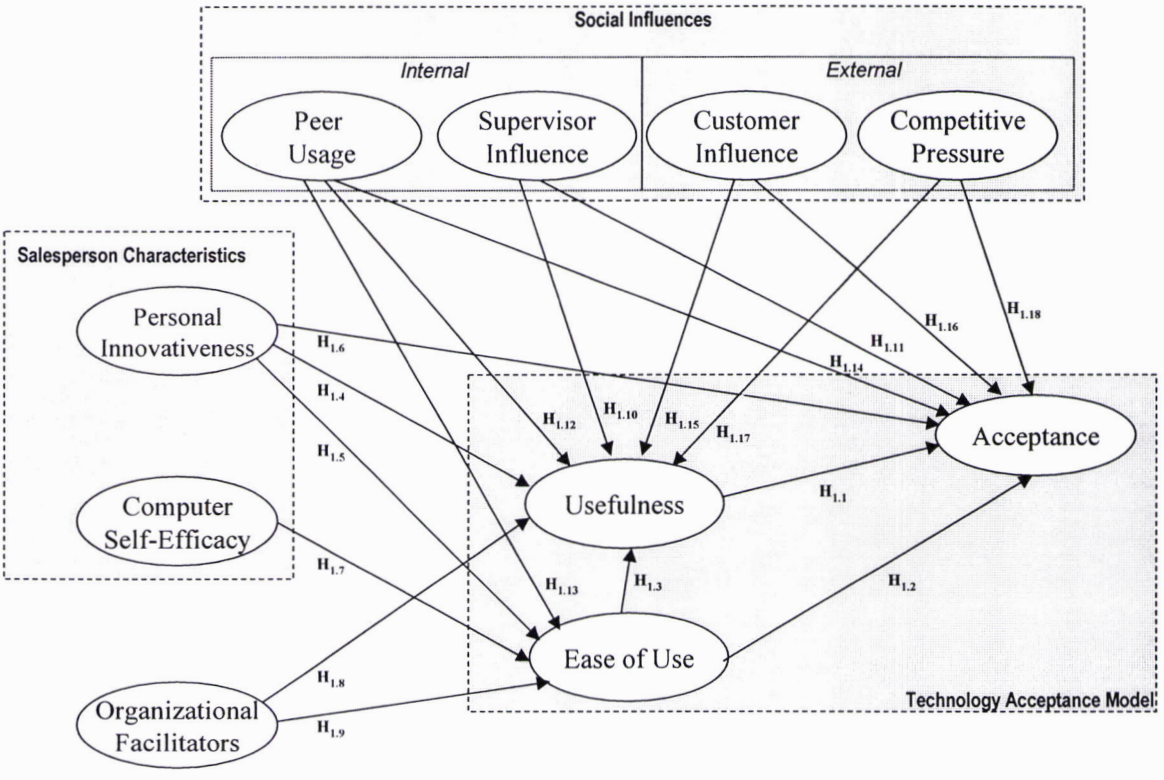
An additional limitation of current research is that both the TAM and the traditional innovation adoption literature take a *narrow view on acceptance*. This criterion variable is traditionally conceptualized as the mere "frequency of use" (e.g. Davis et al. 1989) or as a "dichotomous (single) adoption decision" (e.g. Frambach et al 1998; Gatignon and Robertson 1985). Virtually no studies have measured and examined "acceptance" as the "extent of adoption" where the innovating unit goes through an implementation and confirmation stage (Rogers 1995; Westphal et al. 1997). Hence, a supplementary objective of this study is to conceptualize and measure 'individual technology acceptance'.

2.3. Theoretical Background and Hypotheses

The model used to study the acceptance of sales technology is depicted in Figure 2-2. Our model is based on TAM and includes the effects of external variables covering (1) organizational factors such as '*user training*', '*technical user support*' and '*organizational implementation*', (2) the individual characteristic '*personal innovativeness of a sales person with respect to information technology*' and '*computer self-efficacy*' and (3) social influence variables such as '*supervisor*

influence', '*peer usage*', '*customer influence*', and '*competitive pressure*'. Below we describe each of these constructs and build a theoretical justification for the interrelationships within the model.

FIGURE 2-2 A CONCEPTUAL MODEL FOR INFORMATION TECHNOLOGY ACCEPTANCE BY SALESPEOPLE



2.3.1. Acceptance

"Adoption" can be defined in several ways. In the innovation literature, adoption is typically considered as a single discrete or dichotomous phenomenon (Gatignon and Robertson 1985; Westphal et al. 1997). However, such an approach neglects the variation that inevitably exists in terms of the degree of adoption by the target population. Studies in the field of information systems, on the other hand, assess "user acceptance" by means of (1) the frequency or the number of times a computer system is used or (2) the duration of user sessions (e.g. Venkatesh and Davis 2000). Still, these studies always employ these measures of "user acceptance" in isolation and as

single indicators. In either case, this view of adoption or acceptance is too narrow and does not cover the entire domain and meaning of "*acceptance*" as a construct. Actually, Rogers (1995, p. 190) proposes that after the stages of the adoption decision and trial use, the innovating unit goes through an implementation and confirmation stage. "Using the innovation on a regular bases", "continued use of the innovation" and "integration of the innovation into one's ongoing routine", are characteristic for these stages. Similarly, Rogers (1995, p. 21) defines adoption as '... *the decision to make full use of an innovation as the best course of action available*'. The innovative information technology we focus on in this research is Sales Automation (SA)[1].

Consistent with this broader view on "actual" adoption, we define individual acceptance as *the extent to which a sales individual uses his/her company's SA-system frequently, to the fullest of its capacities and in a way that it is deeply integrated in his/her sales process activities.*

2.3.2. Technology Acceptance Model: Perceived Usefulness and Ease of Use

As was noted earlier, our research model is based on the Technology Acceptance Model (TAM). The TAM is theoretically derived from Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA), and attempts to explain the determinants of computer use across a broad range of end-user computing technologies and populations (Davis et al. 1989). TAM explains an individual's acceptance of computer technology based on two specific beliefs: *perceived usefulness* (i.e. the degree to which a person thinks that using a system will enhance his/her performance) and *perceived ease of use* (i.e. the extent to which an individual believes that using the technology will require little effort). TAM theorizes that both beliefs determine acceptance behavior directly. The theory also suggests that perceived ease of use influences perceived usefulness, because, ceteris paribus, technologies that are easy to use can be more useful (Davis et al. 1989; Davis 1989; Venkatesh 1999; Venkatesh and Davis 2000).

[1] SA-applications are defined as *an umbrella term describing computerized systems which are specifically designed to support individual field sales representatives* (see 4.3.1., p. 60).

The original conceptualization of TAM, based on the Theory of Reasoned Action (Fishbein and Ajzen 1975), also includes affects (attitudes) and suggests that affects would completely mediate the effects of perceived usefulness and perceived ease of use on behavioral intention. However, the earliest test of TAM (Davis et al. 1989), as well as subsequent research (see Venkatesh and Davis 1996; Venkatesh 1999), has shown that affects intervene far less than initially expected. In fact, Davis et al. (1989, p. 999) state "*the attitude construct did little to help elucidate the causal linkages between beliefs and intentions in the present study, at best, it only partially mediated these relationships*". The explanation provided by Davis et al. (1989) for this finding is that organizational members may (not) use computer systems no matter what (positive or) negative feelings may be induced when using the system. Therefore, the affective component was excluded from the final TAM.

The adoption literature typically used more general innovation characteristics for explaining adoption rates (e.g. Rogers 1995; Moore and Benbasat 1991; Frambach et al. 1998). Based on a meta-analysis of innovation characteristics, Tornatzky and Klein (1982) found that three innovation characteristics – 'perceived relative advantage', 'compatibility' and 'complexity' – were consistently related to adoption behavior. Similarly, Robinson (1990) has shown that relative advantage is one of the best predictors of the extent of adoption. The beliefs from TAM are conceptually very similar to these innovation characteristics, however. 'Complexity' can be considered the inverse of 'ease of use' as it indicates the degree to which an innovation is perceived as difficult to use and understand. 'Relative advantage' reflects the benefits of the innovation and is closely related to the conception of 'usefulness' in TAM (Moore and Benbasat 1991). Additionally, Moore and Benbasat (1991) could not distinguish between 'compatibility' and 'relative advantage' as separate factors. Because TAM was developed to specifically explain the acceptance of computer technologies and considering our research objectives, we chose to rely on TAM for developing our model.

Strong empirical support has accumulated in favor of TAM (e.g. Igbaria et al. 1996; Davis 1989; Trevino and Webster 1992; Igbaria 1993; Adams et al. 1992; Doll et al. 1998). Hence, conform this "robust" theory and findings we formulate the following basic hypotheses:

HYPOTHESIS 1.1: **Perceived usefulness has a positive effect on a sales person's acceptance of SA**

HYPOTHESIS 1.2: **Perceived ease of use has a positive effect on a sales person's acceptance of SA**

HYPOTHESIS 1.3: **Perceived ease of use has an indirect effect on a sales person's SA-acceptance through Perceived Usefulness**

In line with the assertions of TRA, TAM assigns a key role to both beliefs in that it theorizes that these beliefs mediate the effects of all "external variables" (e.g. factors other than cognitive and normative beliefs) on acceptance behavior (Davis et al. 1989; Venkatesh 1999; Venkatesh and Davis 2000; Karahanna and Straub 1999). According to both theories, the effect of any such variable on user acceptance operates through the central beliefs. Hence, the influence of any uncontrollable environmental factor (e.g. user characteristics, task characteristics) or controllable intervention (e.g. implementation and educational programs, user support) on acceptance behavior, is supposed to be indirect. Consequently, we hypothesize that salespeople's beliefs (at least partially) mediate the effects of organizational, social and individual variables.

2.3.3. The effect of individual salesperson characteristics

2.3.3.1. The personal innovativeness of a salesperson in terms of information technology

Personal innovativeness has a long standing tradition in the fields of marketing and innovation adoption. The term innovativeness has been used to operationalize different notions, however. Rogers (1995) defines innovativeness as *the degree to which a person's observed time of adoption occurs relatively earlier* than that of other people in his/her social system. Although useful for purposes of ex post description and classification of individuals in terms of *actualized* innovative behavior (e.g. early versus late adopter), this behavioral measure of innovativeness generates a tautology: individuals are considered to be innovative, if, and only if, they actually innovate (Midgley and Dowling 1978; Steenkamp et al. 1999). In contrast, innovativeness has also been conceptualized at a higher level of abstraction, as a *persisting personal predisposition to innovate*.

This perspective recognizes that complex influences and communication processes (e.g. marketing and interpersonal contact) within a social system may intervene and determine a unit's final adoption behavior. In other words, people high in innovativeness might not always be among the first to actually adopt an innovation because of these intervening factors. This notion of personal innovativeness has gained wide acceptance in consumer marketing research in terms of explaining the adoption of innovations (e.g. Hirschman 1980; Venkatraman and Price 1990; Steenkamp et al. 1999; Gatignon and Robertson 1985; Midgley and Dowling 1978 and 1993; Hurt et al. 1977). Because this conception of personal innovativeness is more appropriate for our research purposes (i.e. explaining actual acceptance behavior), we also adhere to the latter definition of innovativeness.

Based on the reasoning that general attitudes are often poor predictors of specific behavior (Bem 1970), a distinction is made between global and domain (or product category)-specific innovativeness. Domain-specific innovativeness should explain acceptance more accurately within a precise set of products, as opposed to global innovativeness which has low predictive power when applied to a specific innovation (Goldsmith and Hofacker 1991; Flynn and Goldsmith 1993). Leonard-Barton and Deschamps (1988) and Agarwal and Prasad (1998) adopted a similar perspective and used personal innovativeness for explaining individual acceptance in a business setting. Also, organizational members' "receptivity towards change" has shown to be an important determinant of innovation success (Zmud 1984; Zaltman et al. 1973). Building on these conceptualizations and studies, we define the personal innovativeness of a salesperson with respect to information technology as *a salesperson's attitude which reflects his/her tendency to experiment with and adopt new information technologies, independently of the communicated experience of others*. Midgley and Dowling (1978) refer to innovativeness as an unobservable and *innate trait* of an individual, without implying that it is genetic. Although we agree with the fact that personal innovativeness is a relatively persistent characteristic, we believe that the label "innate trait" is *too strong* in the context of our research. Therefore, we define personal innovativeness as an attitude describing a salesperson's learned and enduring cognitive evaluations, emotional feelings and action tendencies towards a set of objects (here: adopting

information technology) (e.g. Fishbein and Ajzen 1975; Rosenberg and Hovland 1960; Triandis 1971; Kotler 1994). In summary, the innovativeness of a sales person should be seen as an individual characteristic which (s)he "brings along in the job" and that is invariant across different types of information technologies.

Although very valuable for acceptance models in organizational settings, neither Leonard-Barton and Deschamps (1988) nor Agarwal and Prasad (1998) have investigated the role of dispositional innovativeness in the context of the TAM and personal selling. Additionally, we believe that in both cases the items do not reflect the entire domain of the personal innovativeness concept. Both authors conceptualize "innovativeness" as an individual's predisposition and willingness to try a certain class of innovations (here: information technology). Hence, we believe that their measure is mostly concerned with experimentation. Also, the psychometric qualities of the focal construct in their studies need improvement. In the first study, the measure of innovativeness has a Cronbach's α of .66, which can be considered low. In the second study, the authors acknowledge that their scale is in need for refinement and validation (p. 213-214): their measure uses identical phraseology for multiple items and the measurement model correlates error variances without any theoretical reason.

We attribute a key role to innovativeness in a sales setting. Actually, there is practical evidence to believe that many salespeople have a natural prejudice or resistance towards information technology (Rivers and Dart 1999; Colombo 1994; Goldenberg 1996; Campbell 1998) and have little experience in using computer technology (Petersen 1997). Similarly, Harris and Pike (1996) report "personal resistance to new technology" as one of the major barriers to use SA. As a result, being compelled to use information technology by the company and having to keep up with technological changes, may increase the already considerable levels of job stress or role complexity of salespeople (Roberts et al. 1997; Boles et al. 1997) and increase the resistance towards information technology innovations. We hypothesize that a sales rep's personal innovativeness will have indirect as well as a direct effect on acceptance. First, it can be expected

that sales reps who are highly innovative in the area of information technology, will exhibit more positive beliefs towards using the SA technology. These technologically oriented reps will have more computer related experience, be more handy in using them and better realize the usefulness of these systems for sales activities. This kind of reasoning is in line with the TAM in that the central beliefs mediate the impact of external variables on acceptance.

Counter to the assertions from TAM, however, we also propose a direct relationship from personal innovativeness to acceptance because highly innovative individuals will use computer applications as a natural reflex and 'out of habit'. This is consistent with Triandis (1971) who asserts that behavior is also influenced by habits, over and above attitudes. On the other hand, less innovative salespeople will be much more resistant in terms of investing time in using technology for performing tasks that distract them from selling. Thus,

HYPOTHESIS 1.4:	**There is a positive relationship between a sales executive's personal innovativeness for information technology and the perceived usefulness of using SA throughout the sales process**
HYPOTHESIS 1.5:	**There is a positive relationship between a sales executive's personal innovativeness for information technology and the perceived ease of use of using SA throughout the sales process**
HYPOTHESIS 1.6:	**There is a direct positive relationship between a sales executive's personal innovativeness for information technology and his/her acceptance of SA**

2.3.3.2. Computer Self-Efficacy

The concept of computer self-efficacy is based on the extant literature by Bandura (1986) on general self-efficacy. Bandura (1982, 1986) defined self-efficacy as "*the judgments of how well one can execute a course of action required to deal with prospective situations*". Bandura (1982) proposed that measures of self-efficacy should be adapted to the specific behavior and psychological functioning under consideration. Several studies have found empirical evidence for the fact that self-efficacy in the domain of computer technology is significantly related to the perceptions users hold about these technologies (e.g. Burckhardt and Brass 1990; Gist et al. 1989; Hill et al. 1987 – for detailed overview of studies on computer self-efficacy see Marakas et al. 1998). In a recent study, Compeau and Higgins (1995) build on these findings. The authors define

the construct of computer self-efficacy as "*an individual's perceptions of his/her ability to use computer (software) in the accomplishment of a task*" (Compeau and Higgins 1995, p. 191) and develop a reliable and valid measure for it. In light of the TAM, Venkatesh and Davis (1996) used Compeau and Higgins' (1995) scale and modeled computer self-efficacy as an antecedent of perceived ease of use. The rationale being that a person uses his/her sense of his/her overall computer abilities as an anchor to judge the usability of a computer system, even if a user has little or no knowledge about the ease of use of a specific system. Hence,

HYPOTHESIS 1.7: **There is a positive relationship between a sales person's computer self-efficacy and his/her perceived ease of use of using the SA-system**

2.3.4. Organizational Facilitators

Several studies indicate that individual usage of innovations not only depends upon beliefs and perceptions but also on management strategies, policies and actions (Lucas 1978; Ives and Olson 1984; Leonard-Barton and Deschamps 1988). Organizational facilitators can be considered the flip side of supplier marketing activities, defined in some adoption models at the organizational level (Frambach et al. 1998).

We refer to organizational facilitators as the internal marketing and service efforts targeted to the end-users (i.e. internal customers - salespeople) of the SA-system. These organizational facilitators are multi-dimensional and in the case of computer technologies they consist of user training, technical user support and implementation effort. *Training* users how they can effectively apply information technology for specific work problems is a major prerequisite for its usage. Several authors have proposed and provided evidence for the fact that the level of training a user gets, positively influences the beliefs about a system as well as subsequent usage behavior (e.g. Igbaria 1993; Igbaria et al. 1989; Igbaria 1990; Igbaria 1993; Clegg et al. 1997; Venkatesh 1999; Thompson et al. 1991). *Technical user support* assesses a sales rep's perceptions about the extent to which the organization has invested in objective resources which facilitate the usage of information technology. It includes the availability of information center support for user assistance and guidance. Technical user support has been proposed as an important facilitator for

user attitudes and subsequent acceptance (e.g. Conger 1992; Igbaria and Chakrabarti 1990; Thompson et al. 1991; Trevino and Webster 1992; Igbaria 1990 and 1993; Clegg et al. 1997). The organizational *implementation* efforts refer to user perceptions about the internal marketing campaign and implementation approach (next to training and technical support) on behalf of the organization as a change agent (Rogers 1995). Encouragement and commitment from senior management and active promotion activities for the SA-technology are examples of such implementation efforts. Top management support has been proposed as an important factor for successful implementation of information systems in general (e.g. Igbaria 1990; 1993). In the case of SA top management support, training, pilot testing, project championing and field support have been suggested as important aspects for successful implementation (Colombo 1994; Petersen 1997; Siebel and Malone 1996).

In line with the theoretical assumptions made in TAM (Davis et al. 1989), we propose that organizational facilitators will indirectly influence the acceptance of SA through a sales rep's beliefs about the SA-technology. The rationale is that training salespeople on how to apply an SA-system in their job, providing them adequate technical support in sync with an adequate implementation program will enhance their awareness of the system operations and it's usefulness in the sales job. Hence,

HYPOTHESIS 1.8: **There is a positive relationship between the organizational facilitators and perceived usefulness of the SA-system**

HYPOTHESIS 1.9: **There is a positive relationship between the organizational facilitators and perceived ease of use of the SA-system**

2.3.5. Social Influences

Although many theorists have suggested that acceptance behavior does not occur in a vacuum (e.g. Kraut et al. 1998; Burkhardt 1994), the original TAM does not include social influence processes as determinants for acceptance behavior (Davis et al. 1989). In order to understand the relationship between social influence variables and acceptance behavior we need to turn to studies from the innovation literature and Fishbein and Ajzen's (1975) TRA, the fundamental theoretical

underpinning for TAM. Social influence variables create an impelling force to use an innovation, originating from the social system, which incites a focal individual to conform with these pressures. The social influence on the individual adoption and use of innovations has two underlying rationales (Kraut et al. 1998). First, the social effects may come from the fact that the intrinsic utility of an innovation increases with the number of users within a focal salesperson's social environment. Second, social influence may be normative in nature and stem from persuasive communication by other members in a salesperson's social system (i.e. social persuasion). The increased *social utility* in relation to the number of users, has traditionally been labeled as the phenomenon of (network) externalities (Markus 1990; Katz, Shapiro 1994; Rogers 1995; Rice 1990). Markus (1990) and Rogers (1995) have theorized that a critical mass of users is necessary for an interactive communication system to succeed. However, the technology usage of others is also important for the technologies which do not posses a form of personal interactivity. For example, a sales rep may find e-mail more useful the more his supervisors and peers communicate through the medium. But also, if a sales rep's customers rely heavily on the WWW as an information source, the rep may be motivated to do the same in order to keep pace with his customer base. The usage level of "important others" not only signals its usefulness and importance, but may also be so compelling that the opportunity cost or risk for a sales rep of not complying with their usage becomes too high. Thus, the information technology and SA usage of a sales rep's communication partners, influences both the beliefs about using SA in the selling process and its acceptance over and above the beliefs. *Social persuasion* concentrates on the interpersonal communication processes through which recipients learn about innovations and develop attitudes towards them (Kraut et al. 1998; Burkhardt 1994). Research from different fields provides support for the fact that interpersonal communication and persuasion is an important source of influence (Grossbart et al. 1978; Midgley 1983; Katz and Lazarsfeld 1955; Kiel and Layton 1981; Price and Fieck 1984; Arndt 1967) and a crucial factor in the decision to adopt (Mahajan et al. 1984; Rogers 1995; Price and Fieck 1984; Udell 1966). Social persuasion results in behavioral and normative rules that guide actions which are perceived to be appropriate for and approved by other members of the social system. Hence, social persuasion refers to the

use of information technology by salespeople as the result of normative statements of "important others".

These assertions about social influences are similar to the effects of subjective norms in attitude theories (e.g. Triandis 1971; Fishbein and Ajzen 1975). Subjective norms are a "*person's perceptions that most people who are important to him think he should or should not perform the behavior in question*" (Fishbein and Ajzen 1975). Such perceptions are indicative of others' beliefs and allows the focal individual to learn about technology and adapt his/her own belief structure. However, subjective norms may also exert a direct effect on a person's acceptance behavior if the person is motivated to comply. Both mechanisms are referred to as (1) internalization and/or identification and (2) compliance, respectively (Kelman 1958; Warshaw 1980; Davis et al. 1989).

In TAM, social subjective norms are assessed in a general sense. In a sales setting, we believe it is important to disentangle the potential effect of different sources of social influence. Since salespeople are boundary spanners, salespeople associate with their supervisors, peers, customers and competitors. Hence, the social influences may stem from within the organization (i.e. usage and encouragement of supervisors and peers) as well as from the outside market (i.e. customers' usage and encouragement and competitor's use -- institutional pressures). We wish to separate the organizational social influences from the market influences because it is important from a theoretical point of view in explaining a sales rep's acceptance of SA. Furthermore, we suppose that the impact of the various influences upon attitudes and acceptance is different depending upon the source of social influence. Consequently, we have defined four social influence variables: *supervisor influence*, *peer usage*, *customer influence* and *competitive pressure*.

Supervisor influence refers to the extent to which sales reps' immediate supervisors directly encourage and stimulate their subordinates to use the SA-tools (Leonard-Barton and Deschamps 1988). Several research studies lend support for the supposition that supervisors influence individual acceptance, both in terms of usage (Igbaria et al. 1996; Karahanna and Straub 1999) and in terms of persuasive communication (Salancik and Pfeffer 1978; Zmud 1984; Leonard-

Barton and Deschamps 1988). Supervisors are an important source of power and a means for salespeople to obtain extrinsic rewards and recognition. Indeed, supervisory feedback has shown to shape salespeople's work orientation and performance (Kohli et al. 1998). So, through the process of internalization and compliance we hypothesize that the actions and statements of a sales rep's supervisor will play a crucial role in the acceptance of SA-technology. Consequently,

HYPOTHESIS 1.10: **Supervisor influence has a positive effect on a sales rep's beliefs about usefulness of using SA throughout the sales process**

HYPOTHESIS 1.11: **There is a direct positive relationship between supervisor influence and a sales rep's acceptance of SA**

Co-workers influence an individual's beliefs and behaviors by supplying information about an object or situation (Salancik and Pfeffer 1978; Burkhardt 1994). Hence, the adoption behavior of potential users can be influenced by advice of peers and how many others use the innovation (Igbaria et al. 1996; Thompson et al. 1991; Rogers 1995; Leonard-Barton 1985). Similarly, Leonard-Barton and Deschamps (1988) control for the effect of "acquaintance with users" on acceptance behavior. The influence of peers' usage can also take the form of "vicarious learning" from observing others use the system (Bandura 1977). In summary, the observation of the widespread use of sales automation by co-workers could demonstrate its usefulness and ease of use. Hence, we suggest the following:

HYPOTHESIS 1.12: **Peer Usage has a positive effect on a sales rep's beliefs about the usefulness of using SA throughout the sales process**

HYPOTHESIS 1.13: **Peer Usage has a positive effect on a sales rep's beliefs about the ease of use of using SA throughout the sales process**

HYPOTHESIS 1.14: **There is a direct positive relationship between peer usage and a sales rep's acceptance of SA**

Organization studies suggest that companies adopt innovative technology due to institutional pressures from the external environment (DiMaggio and Powell 1991; Salancik and Pfeffer 1978). The theoretical argument is that by adhering to these forces, companies gain legitimacy among stakeholders. Recently, Srinivasan et al. (1999) found support for the fact that institutional pressures had an impact on organizational technology adoption. The two external social

influences comprised in our model (i.e. customer influence and competitive pressure) are institutional pressures that may be relevant at the level of the individual salesperson.

Customer influence refers to the extent to which a sales rep's customer base demonstrates interest and gratification with information technology usage of the focal sales executive. In other words, it is the impression a sales rep has that his customer base encourages him/her to use any form of information technology. This buyer influence is not specific for the focal SA application but refers to customers' general level of information technology proficiency, e.g. in terms of usage, expectations, liking of information technology usage by salespeople.

Competitive pressure relates to the extent to which the focal sales rep perceives that his competitors' sales executives actively apply similar SA-applications in their sales and customer approach. We hypothesize that the usage of information technology by competing salespeople will spur acceptance through imitation (O'Callaghan et al. 1992), the threat of losing competitive advantage (Abrahamson and Rosenkopf 1993) and signaling (Gatignon and Robertson 1989).

Hence, we suggest the following hypotheses:

HYPOTHESIS 1.15: **Customer Influence has a positive effect on a sales rep's beliefs about usefulness of using SA throughout the sales process**

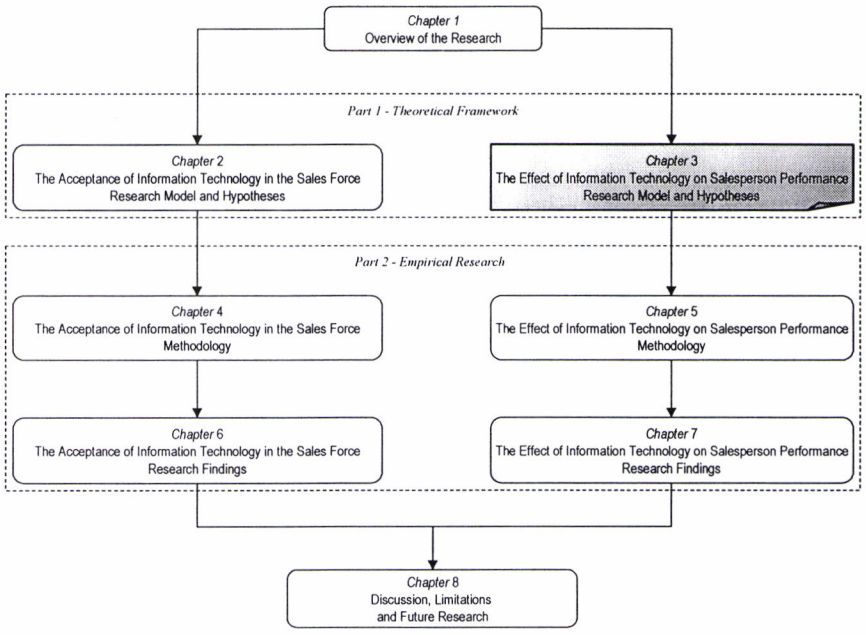
HYPOTHESIS 1.16: **There is a direct positive relationship between customer influence and a sales rep's acceptance of SA**

HYPOTHESIS 1.17: **Competitive pressure has a positive effect on a sales rep's beliefs about usefulness of using SA throughout the sales process**

HYPOTHESIS 1.18: **There is a direct positive relationship between competitive pressure and a sales rep's acceptance of SA**

CHAPTER STRUCTURE

Chapter 3 The Effect of Information Technology on Salesperson Performance: Research Model and Hypotheses



3.1. Introduction

The rapid growth and advances in computerized technologies in the last decade have significantly changed the everyday life of the modern sales representative. Sales managers have experienced increased expenditures and competition in recent years, and try to find ways to counter this evolution. Thereby, managers generally believe the assumption that supplying information technology to their salespeople, will contribute to enhanced productivity, customer communication and relationships (e.g. Colombo 1994; Goldenberg 1996; Conlon 1998, 1999; Campbell 1998; Moncrief et al. 1991). Although the relationship between information technology and sales performance remains primarily unsubstantiated, many organizations spend considerable human and financial resources in equipping their sales force with information technology. Yet,

organizations need justification for these substantial investments and can not afford to continue to invest in sales technology as a matter of blind faith alone. Moncrief et al.'s (1991) study confirms this thought. The study revealed that the "up-front investments in technology" and the "expected performance increases" were the most cited reasons for companies not to invest in laptops for the sales force. Hence, it is surprising that academic research on the effects of IT on sales person performance is lacking.

In section 3.2. of this chapter we discuss the status of current research, its shortcomings and the contributions of this study. The next section (3.3.) explains the theory development process necessary to build our research model and hypotheses. The latter are outlined in section 3.4.

3.2. Research Status and Contributions

The effect of information technology has captivated the attention of many academics and several studies of information technology and performance/productivity have appeared. Most of these studies assess *the effects of information technology investments on productivity at the economy/industry-level* (e.g. Roach 1987, 1989, 1991; Bresnahan 1986; Osterman 1986; Baily and Chakrabarti 1988, Morrisson and Berndt 1990) or *firm-level* (Loveman 1994; Strassman 1990; Brynjolfsson and Hitt 1993; Lichtenberg 1993). However, the findings from these studies are mixed. Some studies report insignificant or negative impacts of information technology, while others find significant and positive returns from information technology. These contradictory findings have led to an ongoing discussion in the information systems area, labeled as the "IT productivity paradox" (see Brynjolfsson and Yang 1996; Brynjolfsson 1993; Mooney et al. 1996 for a detailed overview). Many explanations have been suggested in an attempt to explain this paradox. In summary, some of the main conclusions are that (1) these studies do not account for the many intermediate and intangible benefits associated with information technology and, consequently, provide little insight into how information technology can add value and (2) most studies suffer from methodological flaws in that they assess the relationship between technology investments and performance using cross sectional data, regardless of firm or industry context

(Brynjolfsson and Yang 1996; Mooney et al. 1996; Ragowski et al. 1996; Pinsonneault and Rivard 1998).

Another stream of research has investigated the impact of information (systems) on *individual (decision) performance* in laboratory settings (see DeLone and McLean 1992 and Sharda et al. 1988 for a detailed overview) or on *white collar workers in general* (Millman and Hartwick 1987; Pinsonneault and Kraemer 1993; Sulek and Maruchek 1992). Nevertheless, few empirical attempts were made to investigate the effects of information technology on individuals and their work (Palmquist 1992; Torkzadeh and Doll 1999). Furthermore, this stream of research also generated mixed results (see DeLone and McLean 1992 and Sharda et al. 1988 for a review and study) or the survey based field studies used self-report perceptions in assessing individual performance impacts (Igbaria 1990; Igbaria and Tan 1997).

These findings combined with the fact that in the field of marketing and sales, we remain ignorant about the specific consequences of information technology for individual sales representatives, makes the relationship between information technology usage and sales performance of particular interest. In sales some studies on information technology or sales automation exist. However, most studies focus on the organizational adoption of sales technology (Gatignon and Robertson 1989; Moriarty and Schwartz 1991). A couple of authors tackle the issue of sales technology and sales performance, but either these studies lack solid empirical data (Moriarty and Swartz 1989; Collins 1984, 1985, 1989; Collins et al. 1987; Collins and Schribowsky 1990; Wedell and Hempeck 1987) or examine this relationship merely based on perceptions from sales managers (Moncrief et al. 1991) or salespeople (Keillor et al. 1997).

Despite the insightful knowledge the information systems research and sales literature has generated, no studies have thoroughly examined the effect of information technology usage on sales person performance. In fact, Marshall et al. (1999, p.98) state that "*very little research has been devoted to investigating the impact of technology on individual salesperson effectiveness*" and "*future research needs to be directed toward understanding the impact of technology in selling*".

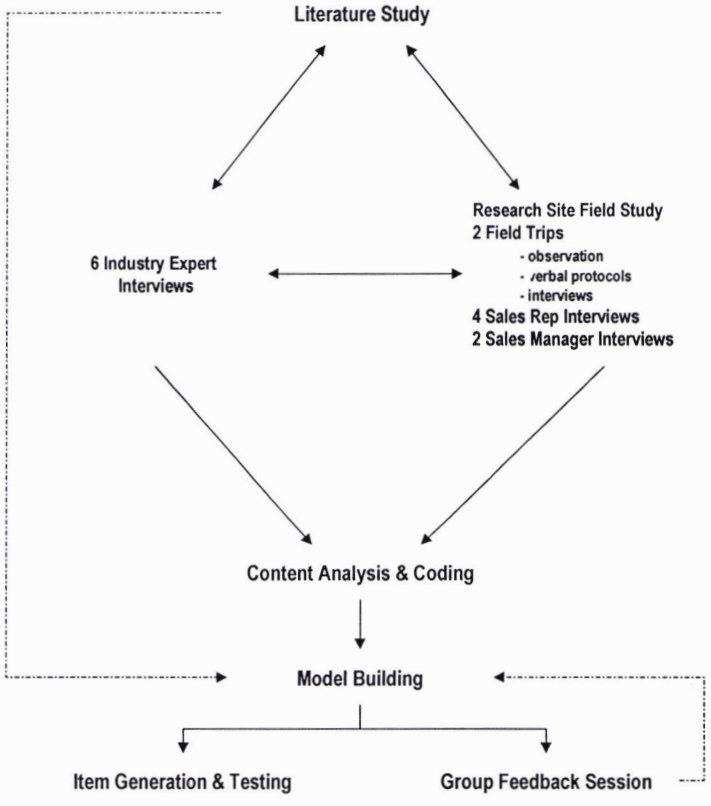
The purpose of this study is to investigate "if" and understand "how" information technology helps sales reps to better perform. This process integrates a broad literature search with multiple *qualitative* interviews to develop a solid theory. Subsequently, the proposed model is *tested* using a field study methodology that combines *multiple data sources* (i.e. sales representative and sales manager survey data, company performance and call reporting data). Hence, this study overcomes the major limitations that studies in sales management have faced: this study takes place within one company and mixes multiple data sources (i.e. combined use of multi-source survey data and company records) rather than mere self-reported perceptions. We first hypothesize a *direct effect* of information technology on salesperson performance. In order to further our *understanding* of the value adding mechanisms of information technology for sales performance, we build a model with six *intervening* variables. Our model incorporates the fact that salespeople benefit from information technology through its impacts on intermediate sales skills (e.g. knowledge assets, sales presentation and targeting skills), smart selling behaviors (e.g. adaptive selling and sales planning) and call productivity (e.g. total number of calls made).

3.3. Theory Development Process

In this study we undertake an extensive model development process to construct a managerial model that explains the effects of information technology use on a sales person's performance (Figure 3-1). This approach integrates a detailed literature search, both within and outside marketing and sales, combined with multiple rounds of qualitative information gathering (i.e. interviews and field observations) to deductively and inductively construct a theoretical model. More specifically, the theory development process consisted of *two stages*. First, we conducted six one-on-one interviews with industry experts (i.e. sales automation experts) to explore the usage of different information technology tools by salespeople and how it could affect their work processes and performance. Next, we conducted a *qualitative* field study in a *mid-sized*

pharmaceutical company. Data were collected by means of two *field sales trips* with sales representatives and four one-on-one *interviews* with sales reps.

FIGURE 3-1 OUTLINE OF THEORY DEVELOPMENT PROCESS



Subsequently, two sales managers, which supervised the reps that participated earlier, were interviewed. The semi-structured interviews lasted 75 minutes on average. After a brief introduction, the interviews began with a discussion of the sales task characteristics and a sales person's best practices. We then asked participants to describe in detail how various information technology tools fitted into their work processes. Participants described which technologies they used for specific sales tasks, how and when technology was most valuable and how the usage of information technology enhanced their performance. Concerning this last topic, participants were asked to provide detailed information about the effects of information technology on their productivity, their skills and customer interaction (Table 3-1 and Table 3-2 report the topic guides used in this study; Appendix 1 (p. 183) reports the final code list used).

TABLE 3-1 DISCUSSION TOPICS ONE-ON-ONE INTERVIEWS AND FIELD TRIPS – SALES REPS

1. Sales Rep and Market Characteristics

(a) Experience in sales? Company? Territory?

(b) Who are the typical customers you serve in terms of specialty? How does their practice look like? What are their typical needs and wants in terms of the products you detail/sell?

(c) How many physicians do you call on? How frequently do you call on physicians, in general?

(d) What makes you decide how frequently to call on a doctor and which ones to call on?

2. Sales Task Characteristics

(a) Tell me about a typical day at work. What are the typical activities you perform in your sales job? What is your typical sales approach serving these customers?

(b) Let's talk about several sales activities in more detail. I would like to know how you go about each of them in detail and what you think is crucial in performing them effectively.

[i] How do you prepare a sales call?

[ii] How do you gather information about customers, the market, competitor (monitor the business).

[iii] How do you communicate with your manager, colleagues (the home office)?

[iv] How do you make a sales presentation and call? What does a typical sales call with doctors/client contacts look like? Do you have different types of sales calls?

[v] How do you communicate and stay in touch with your customers?

(c) In general, how do you think doctors feel about pharmaceutical sales reps? What services that you provide them are most important to your physicians? What are the minimum expectations physicians have of sales reps? What are their likes and dislikes towards sales reps?

(d) In executing your job that you have just described, how are you evaluated? What are the dimensions of your job appraisal? Both in terms of end-sales productivity as in terms of behavioral dimensions?

3. Characteristics and best practices of a good sales rep

(a) In your mind, what makes the difference between a top Berlex sales consultant and a bottom consultant? (What are the best practices of top performing sales representatives?)

(b) What characteristics determine a sales rep's performance in your company?

- personal factors: e.g. experience
- skill: e.g. knowledge
- effort: e.g. number of calls

4. Let's think about IT in your sales job:

(a) Which kinds of information technologies do you apply in your job?

(b) For how long have you had these IT available for your use?

(c) Which of these technologies are essential/most valuable? Why?

(d) What do you use each of these technologies for?

- Think back about the activities you perform. For which tasks in your sales job do you use these technologies?
- Could you illustrate how you use these information technologies for each of these tasks?

(e) How intensively do you use these technologies? To what extent have you implemented these technologies in your sales activities?

5. Let's think about the consequences of the IT that you use the most frequently and are the most valuable for your sales job:

(a) Do these technologies really help your performance? How? Could you perform as well without it? Why? Please be very specific and detailed on which aspects the specific information technologies help you perform better.

- In terms of efficiency
- In terms of sales effectiveness and productivity
- In terms of customer value, establishing customer relationships

If you did not have these technologies, how would you do your job differently?

(b) How do these information technologies enhance your skills? Which ones? Specify and provide examples?

(c) How can IT help you in your interaction with customers?

(d) Are there any downsides to using these IT?

TABLE 3-2 DISCUSSION TOPICS ONE-ON-ONE INTERVIEWS SALES MANAGERS

1. Introduction

2. Sales performance assessment

(a) How does the performance or job assessment of sales consultants work?
(b) What are the dimensions used?
(c) Objective versus hard versus behavioral ("soft")?
(d) Are there any records tracked of their performance?
(e) What is the unit of time in which sales consultants' performance is assessed?
(f) To what extent are you involved in evaluating the sales consultants?

3. Characteristics and best practices of a good sales rep.

(a) In your mind, what makes the difference between a top sales consultant and a bottom consultant? (What are the best practices of top performing sales representatives?)
(b) What characteristics determine a sales consultant's performance in your company?
- personal factors: e.g. experience
- skill: e.g. knowledge
- effort: e.g. number of calls

Think about your most valuable versus the worst sales reps you supervise.

(c) If you think about their performance, how are they better/worse performers compared to others?

4. Let's think about IT for sales consultants:

(a) What are the most important IT for sales consultants? Which ones are the most valuable? Why?
(b) Do you have an idea about how your sales consultants use these IT in their job activities?
(c) Is there a lot of difference/variation in the extent of usage of these IT among the sales consultants you supervise? How can/do you distinguish the ones that are IT-savvy versus the ones that are not?

5. Let's think about these IT and a sales consultant's sales performance:

(a) Do IT-savvy sales consultants perform better than their counterparts? Do you notice any difference in performance between the sales consultants that use the technology extensively and the ones that do not?
(b) How do these technologies help their performance? Please be very specific and detailed on which aspects the specific information technologies help them perform better.
- In terms of efficiency
- In terms of sales effectiveness and productivity
- In terms of customer value, establishing customer relationships

(c) Could sales consultants perform as well without it? Why?
(d) How do these information technologies enhance their skills? Which ones? Specify and provide examples?
(e) How can IT help in the interaction with customers?
How can IT:
(f) Do IT help the internal performance of sales consultants, e.g. administrative duties, communicating information? How?
(g) Are there any downsides to using these IT? Have you seen examples where IT had a negative effect? Can technology be overused? How? Please provide examples.

The field sales trips lasted an entire day and represented a "regular day in the life of each sales rep". These "ride alongs" generated the same information by means of in-depth interviewing during unobtrusive moments (e.g. travel and lunch time). In addition to the interviews, the field trips also generated information by means of short verbal protocols (Russo et al. 1989; Todd and

Benbasat 1987; Ericcson and Simon 1980). In verbal protocols participants are asked to 'think out loud' and verbalize their thoughts during the performance of a task (Hayes 1982). During each day, time was reserved to ask the sales rep to demonstrate the functionality and professional use of the different information technologies (i.e. the task to be performed) while thinking aloud and reporting the usefulness, benefits and impacts of the systems. As a supplement to other qualitative data collection methods, verbal protocols have proven to be useful for exploratory purposes, theory development and hypotheses formation concerning the use of specific information technology (Todd and Benbasat 1987; Russo et al. 1989). The demos lasted approximately one hour.

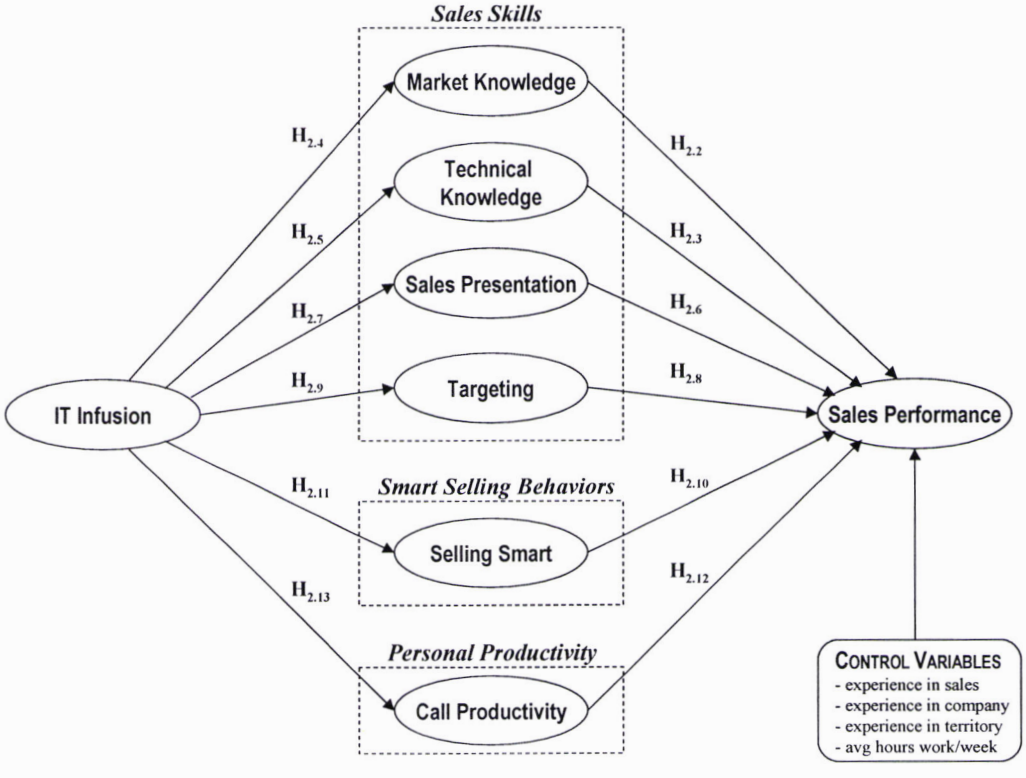
All interviews and discussions were recorded, transcribed and subjected to a thematic content analysis using established qualitative coding techniques prescribed in qualitative research methodology (Strauss and Corbin 1990; Miles and Huberman 1994). The coding process was conducted independently by two researchers (see Appendix 1 for the final code list used during the analysis). The preliminary results were corroborated and disagreements resolved through mutual agreement. After the researchers identified the key variables and relationships, the overall model was presented within the company. The variables and linkages were discussed with company executives (i.e. VP Sales, Sales Automation Manager). The inputs from this group feedback session served as a validity check and were used to evaluate the working version of the model. The research model was confirmed by the company executives. Hence, no major adjustments were made to the model as a result of this group feedback session.

3.4. Conceptual Framework

The conceptual model links key constructs explaining if and how a salesperson's usage of information technology affects his/her job performance. The basic premise of the model is that integrating information technology into the sales job, contributes positively to end-results sales

effectiveness (Figure 3-2). Because these gains in effectiveness are supposed to run through information and knowledge based outcomes (Huber 1990; Grover et al. 1998), we propose that information technology infusion affects salesperson performance indirectly through its positive impact on a salesperson's *sales skills* (i.e. market and technical knowledge assets, sales presentation and targeting skills), *smart selling behaviors* and sales *call productivity*. In the following paragraphs, we explain the focal constructs of our model and develop the research hypotheses for each of them.

FIGURE 3-2 CONCEPTUAL MODEL OF THE EFFECTS OF IT ON SALES PERFORMANCE



3.4.1. Information Technology Infusion and Salesperson Performance

In this study we looked at information technology as a set of software applications in support of salesperson activities (see also Chapter 1, 1.6., p. 11). This implies that we assess the impact of information technology across a breadth of applications, beyond specific hardware technologies. It is our contention that the applications, as well as the underlying sales tasks the technology is

able to facilitate, are important, rather than the naked "hardware" technology. In addition, the use of sales technology gains strength when salespeople use different tools in an integrated way. Thus, we define *information technology infusion* as the *degree to which a salesperson integrates different information technology tools into his/her sales activities*. More specifically, information technology infusion pertains to the frequency of technology usage, the full use of the applications' capabilities, the level of integrated use and the usage of technology for analysis purposes. Note that this definition of information technology infusion is conceptually closely related to the notion of individual technology acceptance defined in chapter 2. However, there are some important nuances to be made. The major conceptual difference is that technology infusion relates to the extent to which a sales rep blends *different* information technologies into his/her sales processes and uses these technologies in a *complementary* way. The notion of acceptance, however, is focussed on a specific technology rather than an array of technologies. Conceptually, technology infusion is the "aggregate" resultant of separate acceptance processes relating to specific technology tools as well as the additional benefits of combined information technology usage. Hence, technology infusion should be seen as an incremental extension of specific technology acceptance[1].

Compared to traditional information and communication methods (e.g. face-to-face, telephone, written documents and reports), the electronic tools possess a number of new capabilities. Inspired by several authors (Rice and Bair 1984; Culnan and Markus 1987; Sproull and Kiesler 1986) Huber (1990, p. 50) claims that the communication capabilities of advanced information technologies enable individuals "*(a) to communicate more easily and less expensively across time and geographic location, (b) to communicate more rapidly and with greater precision to targeted groups, (c) to record and index more reliably and inexpensively the content and nature of communication events, and (d) to more selectively control access and participation in a communication event or network.* Furthermore, the author states that information technology can

[1] In an operational sense this conceptual distinction results in the fact that the acceptance measure is extended to form the technology infusion construct (see chapter 5 for details).

aid decisions because they facilitate the individual *(a) to store and retrieve large amounts of information more quickly ..., (b) to more rapidly and selectively access information ..., (c) to more rapidly and accurately combine and reconfigure information so as to create new information ... (e) to more reliably and inexpensively record and retrieve information about the content and nature of organizational transactions.* Moreover, the advances in mobile technologies in recent years, allows executives (here: sales reps) to use and access these electronic media almost at anytime, from any place and communicate information under almost any form (e.g. text, sound, image) (Jarvenpaa and Ives 1994; Bock and Applegate 1995). In summary, information technology increases the richness, the complexity and the mobility of knowledge and information, because of increased (a) communication speed, (b) information availability, (c) bandwidth, (d) connectivity, (e) remote accessibility and (f) computer memory (Fulk and DeSanctis 1995; Jarvenpaa and Ives 1994). Information has been suggested to be a crucial asset in today's market place (Higgins et al. 1991; Menon and Varadarajan 1992) as it allows improved decision making and problem solving (Cravens 1991; Good and Stone 1995; DeLone and McLean 1992). Similarly, theories and empirical studies suggest that information technology increased personal effectiveness (Millman and Hartwick 1987; Igbaria 1990; Igbaria and Tan 1997), improved middle managers' decision making (Buchanan and McCalman 1988), enhances communication processes and, subsequently, the work performed (Huber 1990; Good and Stone 1995).

Hence, these technologies should smooth sales executives' information and communication processes and their performance. In fact, we have indications that information technology savvy sales reps have the ability to build stronger customer relationships, provide better customer service and enhance their productivity and sales effectiveness (e.g. Duncan and Moriarty 1998; Keillor et al. 1997; Colombo 1994; Agency Sales Magazine 1997). Similarly, Moncrief et al. (1991) state that potential advantages of providing computers to salespeople can be found in e.g. information access, enhanced problem solving capabilities and better presentations, communication and service towards customers. The results of their study further indicate that the top reasons for companies to equip their sales force with laptops were to: improve sales

presentations, better manage customer files, increase communication between the home office and the sales force and increase productivity.

As the majority of these articles in the sales area provide no empirical test of the effect of sales technology on salesperson performance, the common notion that it does, is left open to question. In addition, the studies that attempt to test the impact of sales technology empirically, have measured mere perceptions of technology usage and productivity at the same source. Therefore, the first issue is to examine if a salesperson's information technology infusion influences salesperson performance. Thus,

HYPOTHESIS 2.1: **A salesperson's information technology infusion has a positive effect on salesperson performance**

3.4.2. Intermediate and Intangible Benefits as Mediating Variables

Rather than merely studying the direct relationship between technology usage and sales performance, however, it is also of great managerial and research interest to provide insights into how salespeople realize these productivity gains. In an effort to identify and understand the value adding mechanisms of the relationship between information technology and productivity, several authors have suggested that studies should include intermediate benefits of information technology (Mooney et al. 1996: Brynjolfsson and Yang 1996; Ragowski et al. 1996).

Huber's (1990) theory about the effects of advanced information technologies asserts that the gains in individual and organizational effectiveness occur (indirectly) through the positive impact technology has on information and communication processes (see also Grover et al. 1998). In fact, information technologies may have *automational* or *efficiency* effects (e.g. doing things more quickly and cheaply), and *informational* and *transformational* outcomes which go beyond the automation of existing tasks (e.g. doing things more effectively, execute tasks that previously were not possible at all and develop new capabilities and skills) (Mooney et al. 1996; Day 1994).

In applying these theoretical assertions to our research model, the underlying notion becomes that if salespeople use information technology and improve their performance, this happens through sales processes, behaviors and skills which are affected by the enhanced information processing

capabilities of advanced information technologies. Therefore, we include mediating variables which are potentially enhanced by the properties of information technologies (i.e. in terms of automation or information processing) and which have shown to be important determinants of individual salesperson performance in previous sales research (Churchill et al. 1985; Behrman and Perreault 1981; Sujan et al. 1994; Brown and Peterson 1994). We propose six variables that may mediate the relationship between information technology and salesperson performance. With respect to a sales rep's sales skills we include a sales rep's *market knowledge, technical knowledge*, *sales presentation skills* and *targeting skills*. For sales behaviors and processes we include *smart selling behaviors* and the personal productivity variable *call productivity* (i.e. an automational effect of information technology). Complemented with the findings from our interviews, the existing literature and anecdotal evidence, we hypothesize that these variables are affected by information technology infusion and, in turn, impact salesperson performance.

3.4.2.1. Sales Skills

Market and Technical Knowledge Assets

Technical knowledge pertains to the development and use of technical expertise such as product applications, specifications and customer use situations (Behrman and Perreault 1982). Market knowledge reflects a sales rep's knowledge about the industry (e.g. competition, trends) in general. Thus, both knowledge assets refer to the level of understanding a sales person has about the business in which he operates. An extensive knowledge base is important for sales people, since it allows them to cope with the complex market environment. Several authors indicated that the ability to apply knowledge is a prerequisite for effective selling (Weitz et al. 1986; Weitz 1978; Leigh and McGraw 1989; Sujan et al. 1986; Behrman and Perreault 1982). Indeed, information processing and enhanced knowledge may prevent the sales rep from making blunders based upon false or rather incomplete information, and it may enhance his/her self-confidence. Hence,

HYPOTHESIS 2.2: **A sales rep's market knowledge levels have a positive effect on salesperson performance**

HYPOTHESIS 2.3: **A sales rep's technical knowledge levels have a positive effect on salesperson performance**

To effectively use their knowledge, salespeople need to be able to acquire information about sales and market situations (Weitz et al. 1986). The importance of information gathering skills and activities is well recognized in the personal selling literature (e.g. Ingram and La Forge 1997; Moncrief 1986). Similarly, Sujan et al. (1988) suggest that a salesperson's effectiveness and knowledge can be enhanced by providing salespeople with market research information and encouraging them to unitize information. Due to its storage, retrieval and network capacities, information technology has the potential to enable and facilitate these processes of information acquisition, dissemination and utilization (Huber 1991; Glazer 1991; Fletcher 1990). Hence, salespeople may learn and enhance their knowledge levels, both more efficiently and effectively, by using information technology. In fact, information technology allows sales reps to draw upon an expansive (computerized) organizational memory of people and databases, and as such to update their beliefs and knowledge about business relationships (Sinkula 1994; Huber 1991; Day 1994). For instance, electronic communication media can link a salesperson to other professionals within and across organizational boundaries. Furthermore, when faced with an information need, sales reps can search and tap into vast amounts of information readily available in computer databases (e.g. in sales force automation systems). This implies that sales reps who exhibit high levels of information technology infusion, have access to an expansive base of external and organizational information sources, knowledge and people, which are likely to be underused by their less technology savvy counterparts. In their updated review of sales activities, Marshall et al. (1999) support this reasoning in stating that intelligence gathering and dissemination processes happen more and more through the use of computers.

Two comments of sales reps illustrate this:

> I use the computer to find out what topics a customer is interested in. I pull a lot from the internet (e.g. articles) and sometimes put together binders for my customers. It gives me ammunition to support my arguments.

> Information technology has brought information to use a lot quicker. Information can be shared on specifics of products and there is more communication in the field between managers and reps. Our Lotus Notes applications allow better communication of what is happening in the field. All this has increased the knowledge of people.

This suggests the following:

HYPOTHESIS 2.4: **A sales rep's information technology infusion has a positive effect on his/her market knowledge levels**

HYPOTHESIS 2.5: **A sales rep's information technology infusion has a positive effect on his/her technical knowledge levels**

Sales Presentation Skills

Sales presentation skills embrace factors that relate to the communication interactions between the customer and sales representative. Behrman and Perreault (1982) identified "giving high quality sales presentations and working well with customers" as an important behavioral dimension of salesperson performance. The factor concerns the role of the salesperson as an external representative of the firm and includes dimensions such as giving clear, well thought out presentations, responding to questions, and the like. The authors demonstrated that the factor was significantly correlated with a salesperson's overall performance. Thus,

HYPOTHESIS 2.6: **A sales rep's sales presentation skills have a positive effect on salesperson performance**

Given the fact that information technology relates to the acquisition, processing and dissemination of information, it is not surprising that its usage is expected to have an impact on the process of customer communication (Fletcher 1990; Duncan and Moriarty 1998). There are many ways in which information technology tools can contribute to the format and quality of the information a sales rep transfers to the customer. Today's computer technologies allow for multi-media communications that combine text, graphics and audio-visual materials. These tools facilitate that sales presentations are easily adapted to specific customers, enhanced product demonstrations and graphical visualizations. Furthermore, drawing upon the information that is available under

computerized form improves the content of the information communicated (both during and outside of the sales call). For example a sales rep can search on-line databases or the open WWW for customer and business related information and use that information in customer interactions. This enables a sales rep to be pro-active and provide customers with context specific information that answers their needs. Similarly, Marshall et al. (1999) mention that sales reps attribute a key role to computerized technologies in terms of the level and quality of information they are able to provide during sales calls. In addition, several authors (i.e., Duncan and Moriarty 1998; Keillor et al. 1997; Colombo 1994; Moncrief et al. 1991; Agency Sales Magazine 1997) have suggested that sales technology may lead to (1) quicker access to better information, (2) faster response and answers to customers, (3) enhanced quality of customer interactions, (4) increased personalization and customization of presentations and responses, etc. Due to the possibilities offered by remote and easy access and the speed of data transmission, sales reps can instantaneously retrieve information in order to reply to customer requests or objections. With sales force automation systems and database applications salespeople have the necessary information at their fingertips and should be able to provide real-time information to customers and assist them in their decision making. By the same token, interpersonal communication technologies (e.g. e-mail) allow the sales rep to respond to customers more promptly and eventually transfer specific information, while (s)he is at another location than the customer's site. Also, calendar and time management software allows sales representatives to be more responsive since these technologies provide modules for keeping track of previous meetings and engagements. Furthermore, due to the fact that database and networked applications provide access to vast information repositories and nodes, the odds of finding the solution to a customer's requests or problems are enhanced. Hence,

HYPOTHESIS 2.7: **A sales rep's information technology infusion has a positive effect on his/her sales presentation skills**

Targeting Skills

Targeting skills are defined as a salesperson's ability to identify, select and call on profitable customers. Targeting skills have not been included in previous theoretical models of salesperson performance, but it is a basic part of marketing strategy (Kotler 1994) and thus intuitively logic to

assume its positive impact on sales performance. Applying the old Pareto-principle (i.e. the 80-20 rule) on a salesperson's customer base it is clear that focusing on the right customers is much more important than simply making calls. Furthermore, the importance of effective prospecting for a salesperson's success is widely recognized in selling textbooks (e.g. Stanton and Spiro 1999). So,

HYPOTHESIS 2.8: **A sales rep's targeting skills have a positive effect on salesperson performance**

The database possibilities laptops and sales automation systems offer allows a sales rep to adequately target those customers that have the highest potential at the right time. Actually, by running specific data queries, sales reps can list and sort customers and determine call priorities. Hence, these computerized customer and prospect files enable salespeople to analyze purchase patterns, identify customer needs in a timely manner, classify the most profitable customers and efficiently put sales effort into those products and customers that are most lucrative. A sales manager described the importance of information technology for targeting and performance as follows:

> The technology tools make it easier for them to understand where the business is. A salesperson who knows how to use the systems can use our databases, export it to Excel and then sort and analyze the data differently. You have to be a little computer savvy to do this kind of thing, but the salespeople who pick it up quickly can move much quicker, it helps them target key customers. There is a clear difference between these people and the ones who use their gut feeling or a shotgun approach. If you target the right customers, you get the highest chances of meeting your quota.

This suggests:

HYPOTHESIS 2.9: **A sales rep's information technology infusion has a positive effect on his/her targeting skills**

3.4.2.2. Smart Selling Behaviors

Salespeople's smart selling behaviors are characterized by altering sales approaches across and during customer contacts (Weitz et al. 1986; Spiro and Weitz 1990; Sujan 1986; Sujan et al. 1988)

and engaging in sales (call) planning (Sujan et al. 1994). Through the practice of adaptive selling, salespeople exploit the unique opportunities of personal selling. Salespeople have the possibility to research the customer and implement a sales presentation that is tailored to that customer, as opposed to a canned presentation across all customers. In addition, they can sense customer reactions during the call and make instant adjustments (Weitz et al. 1986; Spiro and Weitz 1990). Similarly, by engaging in planning behavior salespeople can judge the suitability of specific sales behaviors and alter their approach depending upon situational considerations (Sujan et al. 1994). Although the theoretical underpinnings of the effect of smart selling on performance are strong, empirical support is still scarce and inconclusive. For example, salespeople's self-assessed performance and adaptiveness were found to be significantly related (Spiro and Weitz 1990; Boorom et al. 1998) and working smart (i.e. adaptiveness and sales planning behavior) positively affects self-reported sales performance (Sujan et al. 1994). However, in Spiro and Weitz' (1990) study, adaptive selling was unrelated to manager rated performance. In light of these findings we propose:

HYPOTHESIS 2.10: **A sales rep's smart selling activities have a positive effect on salesperson performance**

Salespeople report that sales technology helps in the professionalism by which sales calls are prepared (Marshall et al. 1999). Because of its comparative advantage in gathering and processing market and sales information, sales technology can smoothen the process of a salesperson's planning behavior. Sales automation and database applications, for example, often have capabilities that allow sales reps to keep records about clients and calls. Calendar and routing tools allow a sales rep to effectively manage time, set up appointments accurately and do weekly planning. Our interviews also indicated that using information technology impelled salespeople to engage more in planning behaviors by itself. The salespeople were using sales technology for planning because it provided better and more detailed information and, in turn, prompted them to think about their sales strategy and approach even more. Reviewing the account history in the sales databases right before the actual sales call, for instance, enhances salespeople's ability to

think over the steps necessary to close a deal and plan the sales strategy up-front. One of the salespeople provided a good illustration of this phenomenon:

> Information technology does increase our effectiveness because it helps in planning so much. It is funny, I know there is a part you miss when using traditional paper versions. With the computer it is different, because it is so easy to access. You really need to bring everything up and analyze it to see if you are where you need to be.

Additionally, with vast amounts of information at their fingertips as well as search and analysis capabilities at the click of a button, sales reps can tailor their sales messages to a specific customer. For example, based on a customer's buying history, the sales rep can determine which products to prioritize in the sales call. Such background information can also enhance a salesperson's empathy with a customer's situation and flexibility to adapt to opportunities that arise during the sales call. Another example is using the web. Salespeople can thoroughly research clients and prospects and script their sales presentations in such a way that it is adapted to each individual customer (Marshall et al. 1999). In other words, sales technology enhances a sales rep's ability, and reduces the effort needed to fine-tune a sales message instead of delivering the same generic sales talk. A salesperson illustrated this in the following way:

> If you know a lot about the buying behavior of your customers before you go in, you have an edge. I assemble each customer's prescribing behavior, look at the application where I have my call notes and determine what message I want to focus on this time. In stead of having a generic message with my customer, I can go in and focus on their needs and wants. It is up to each individual to gather all that information and mold it into a good presentation. Also, if a customer has question, I do a search on the web, for instance, and provide them a personalized answer.

In addition, the literature on smart selling proposes that adaptive selling can be improved by providing salespeople with the necessary market information and resources such that they can link insights from other sales situations to the customer contacts in which they are currently engaged (Weitz et al. 1986; Sujan et al. 1994; Sujan et al. 1988). Thus, we expect the following:

HYPOTHESIS 2.11: **There is a positive relationship between a sales rep's information technology infusion and his/her smart selling activities**

3.4.2.3. Call Productivity

Call productivity is defined here as the number of sales calls (or visits) (=output) a sales rep makes over the course of the year (=input) (Brinkerhoff and Dressler 1990). In the sales literature, the number of calls made is considered as an aspect of a salesperson's effort. Several empirical studies in sales provided clear evidence for the logical relationship that effort (e.g. the number of sales calls made) is a significant determinant of salesperson performance (Churchill et al. 1985; Brown and Peterson, 1994). Hence,

HYPOTHESIS 2.12: **Call productivity has a positive effect on salesperson performance**

An important reason why companies supply their salespeople with information technology is to increase the efficiency of the sales staff. Advocates of sales technology propose that technology reduces the time salespeople spend on repetitive support and non-selling tasks (e.g. administrative tasks) and consequently allows salespeople to make more sales calls (Moncrief et al. 1991; Moriarty and Swartz 1989; Goldenberg 1996). Similarly, it has been proposed that the use of decision support systems shortens decision making time of managers (Sharda et al. 1988). Also, Good and Stone (1995) assert that information processing and communication are improved and facilitated by computer technology and, by consequence, increases work productivity in terms of the quantity of work performed. Hence, freeing up time for salespeople to make more sales calls might be an important gain from information technology. A sales manager illustrated this in the following way:

> Technology helps their productivity and efficiency. Based on their computer analyses, what they know about the customer and determining when is the best time to see a specific customer, they can make eight calls a day.

Thus,

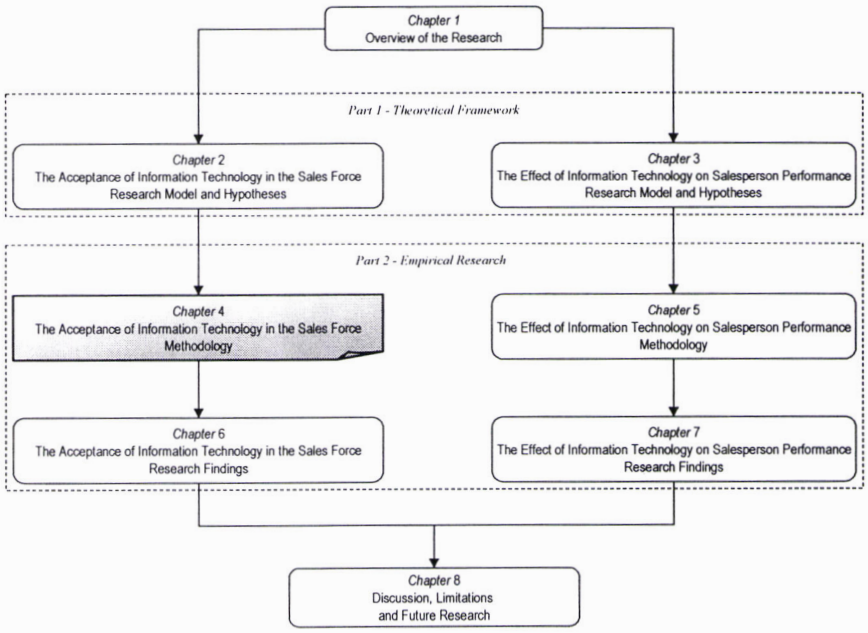
HYPOTHESIS 2.13: **There is a positive relationship between a sales rep's information technology infusion and his/her call productivity**

PART II

Empirical Results

CHAPTER STRUCTURE

Chapter 4 The Acceptance of Information Technology in the Sales Force: Methodology



4.1. Introduction

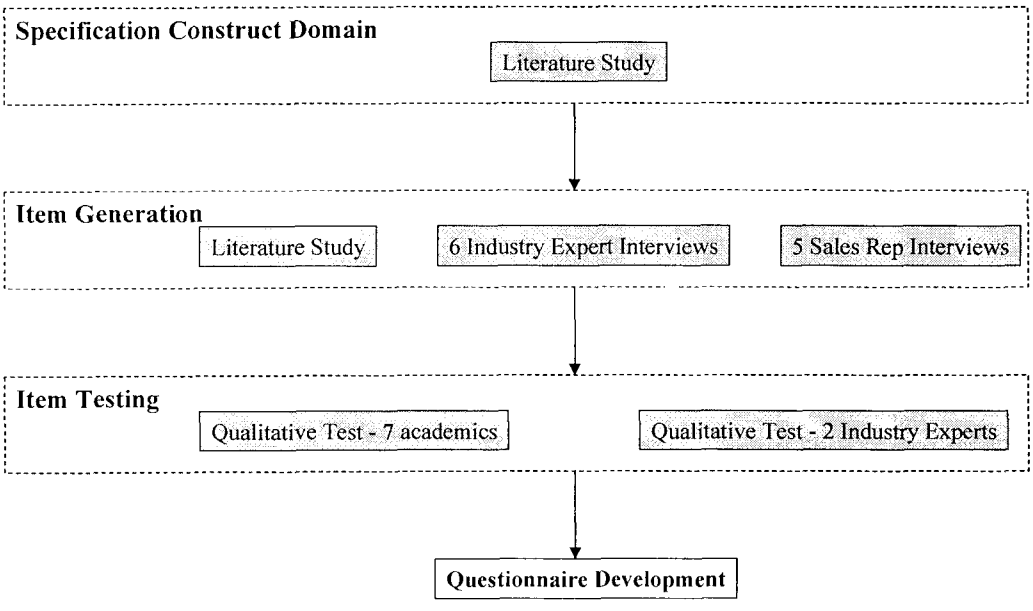
We used a cross sectional survey design to test our research hypotheses 1.1. through 1.18. A mail survey combines self-reported perceptions from sales reps combined with second source telephone survey data obtained from their sales managers. This survey method was preceded by a qualitative research stage.

This chapter begins with an overview of the exploratory qualitative study. Next, section 4.3. outlines the conclusive quantitative study. In this section the data acquisition process and sample, the scale development and construct measures are discussed. Section 4.4. discusses the interrater agreement between our separate acceptance measures. The chapter ends with an assessment of non-response bias in section 4.5..

4.2. Exploratory Qualitative Study

The encompassing objective of the qualitative, exploratory phase was to specify construct domains, generate sample items for new constructs, check the face validity of existing measures in a sales setting and assess the nomological 'soundness' of our conceptual model (Churchill 1979). More specifically, we intended to examine whether existing frameworks, concepts and measures from the literature effectively made sense in a sales setting. In addition, we wanted to develop and adapt measures where necessary. In order to accomplish these objectives we used different methods based on the established procedures in scientific research (Churchill 1979; DeVellis 1991). Figure 4.1. outlines this approach.

FIGURE 4-1 OUTLINE OF QUALITATIVE RESEARCH



First, we relied on an extensive review of the literature, combined with qualitative interviews with 5 sales reps from different industries and companies as well as 6 industry experts (i.e. sales automation experts). The interviews lasted between 45 minutes and 1 ½ hour, were tape recorded and fully transcribed. The general topics discussed during these interviews are listed in Table 5.1. below.

Subsequently, the verbalizations were content analyzed using a priori coding schemes. These coding schemes were derived from the theoretical models and constructs found in the literature. Such established coding methods enable a more rigorous research approach and facilitate qualitative data analysis (Miles and Huberman 1994). For the constructs that were less embedded in existing research (e.g. social influences, organizational facilitators), a more inductive open coding technique was applied (Strauss and Corbin 1990). Although the primary objective of this research phase was of an exploratory nature (i.e. the aim was to make an inventory, not to quantify concepts and relationships), the researchers made sure the topics fitted the conceptual framework and recurred with sufficient regularity (Miles and Huberman 1994). The applied code list is provided in appendix 2 (p. 185).

TABLE 4-1 DISCUSSION TOPICS QUALITATIVE ACCEPTANCE STUDY

SALES REPS	INDUSTRY EXPERTS
1. Sales Rep Characteristics 2. The kind of IT used 3. The degree of acceptance of IT 4. The reasons why they use the IT in the sales job, related to ◆ system characteristics ◆ implementation efforts ◆ mandatoriness of usage ◆ the influence of others on their usage 5. Their receptiveness and attitude towards introducing innovative IT in the sales job 6. The IT-proficiency and usage of their social environment 7. The consequences of using IT, in terms of their ◆ performance ◆ skills ◆ interaction with customers	1. The most important IT in sales 2. The drivers for the acceptance of IT and SA-tools by salespeople ◆ system characteristics ◆ individual differences ◆ organizational facilitators ◆ social influences ◆ selling task characteristics 3. The consequences of using IT, in terms of their ◆ performance ◆ skills ◆ interaction with customers 4. The interrelations between these concepts

The "pilot" model based on the literature review was largely confirmed by the respondents. Due to the solid theoretical background, the model was found to be very comprehensive. Hence, no major changes (i.e. other than graphical) were made. Based on the literature study and the verbalizations from the qualitative study, a pool of items was constructed. The generated sample items were pre-tested with 7 academic researchers and 2 industry experts. During this process,

one of the academic researchers suggested to include the variable assessing computer self-efficacy.

4.3. Conclusive Quantitative Study

4.3.1. Study context

As a context for our research, we focus on Sales Automation (SA) technology. SA-applications are defined as *an umbrella term describing computerized systems which are specifically designed to support individual field sales representatives*. Hence, SA-programs do not comprise general office automation tools (e.g. Office-suite software such as word processing and presentation) or separate e-mail and WWW applications by it self. Some of these separate applications may however be integrated into or linked with SA-software programs. SA-applications often include functions such as: contact management, account management, time management, prospecting, product and price configuring, sales analysis, order management, communication tools. The rationale for focussing on a specific technology instead of a set of technologies, lies in the fact that the antecedents for explaining acceptance behavior refer to a specific and clearly identifiable technology. In other words, several of our antecedents (e.g. internal social influences, organizational facilitators) are difficult to define in a global sense because of the variety in the nature of information technology tools. For example, the actual organizational efforts or utility of a SA-system versus the World Wide Web, may be completely different and incomparable. Hence, generalizing the determinants of acceptance across an array of technologies would create a meaningless artifact and reduce the accuracy in explaining technology acceptance behavior.

The reason for choosing the group of SA software is that these technologies are most in line with and relevant to our research objectives. More specifically, our motivation for this focus was threefold. First, SA is a group of technologies specifically designed for personal selling. Second, SA technologies are important to sales and marketing organizations (see chapter 1, p. 4). Finally, SA is an innovation that is purely organizational and contingent. This implies that the acceptance

of an innovation by "end-users" (e.g. sales representatives) is entirely contingent upon a former organizational adoption decision (Rogers 1995). Pure contingency innovations fit our research objective best as we wish to develop and test a model for intra-firm acceptance of sales technology. Other technologies (e.g. internet access) can be used by salespeople on a volitional basis and in non-professional settings, which would impose the inclusion of research variables that are not relevant in an organizational context.

4.3.2. Data Acquisition and Sample

Quantitative data for this study were gathered by means of a cross-sectional survey on sales reps' individual usage of Sales Automation systems. During the qualitative research study, the industry and academic experts were asked to provide leads on national lists/databases of field salespeople. Following our initial contacts with several experts and sales organizations, it was apparent that (1) few cross-sectional lists containing sales representatives were available and (2) none of the organizations with existing lists were willing to co-operate in our study (due to strict privacy policies).

An interesting alternative was found in the subscription list of the *Sales and Field Force Automation*-magazine (CurtCo Freedom Group--NY/CA[1]), a leading periodical in the field of sales automation. Unfortunately, the subscribers to this magazine mostly occupy managerial functions and must not be viewed as sales representatives. Thus, we constructed our own sampling frame of salespeople by means of a careful recruitment process using the list of subscribers. Our final sample frame had to comprise a diversity of sales jobs in order to maximize the differences in salesperson and organizational characteristics. Further, the selected sales organizations had to have sales automation technology in place. Hence, an accurate screening and selection procedure was necessary in order to be able to adequately test our research hypotheses.

[1] See http:\\www.sffaonline.com

A selection of executives in sales (field) management functions from *Sales and Field Force Automation*-magazine's subscription list was contacted by telephone. A convenience sampling procedure was used to contact these sales field managers. Sales managers, who were willing to participate, were screened by asking whether or not there was a SA-system in place in their sales organization[2]. This screening question made our sampling procedure more efficient because the chance of including sales reps in our final sample that would not classify for our research (i.e. not have the opportunity to use the technology) was minimized (Fowler 1993). In addition, the contact persons were informed about the purpose of the research and asked to participate in the study by identifying 4 of their subordinate sales representatives. For the selection of sales representatives the contact person was asked to identify 2 heavy and 2 light users of his company's SA-system. A similar procedure was followed by Igbaria (1993). Subsequently, a first questionnaire was sent directly to the identified participants. Considering the fact that organizational mail surveys may generate fairly low response rates, a number of specific efforts in terms of technique (e.g. survey length, sponsorship) and timing (e.g. follow-up efforts) were made to increase the response rate (Dillman 1978; Lanuk and Berenson 1975; Fowler 1993). The mailing included (1) a personalized and hand-signed letter on official ISBM[3] letterhead, explaining the purpose of the study and ensuring confidentiality, (2) the questionnaire (with special care taken for a user friendly lay out), (3) a $1 bill[4] and (4) a pre-paid reply envelope addressed to the researchers. After one week, a reminder letter was sent to non-respondents and after two and a half weeks a second reminder, was sent out, containing a replacement survey. 233 sales management executives from as many companies, classified for our research and agreed to participate. Using this procedure our sample frame consisted of 787 sales representatives[5]. Of the 787 mailings sent out, 7 returned because of insufficient addresses and 257 as completed surveys,

[2] Note that this screening question was a necessary condition for studying the acceptance of SA technology at the individual level. As noted previously, the implementation of SA in organizations is a contingent innovation process (Rogers 1995).

[3] Institute for the Study of Business Markets, Smeal College of Business Administration, The Pennsylvania State University, U.S.A.

generating a response rate of 33%[6]. 33 cases were eliminated from our analysis because of either misclassification or incomplete data, which resulted in 224 usable data points (a usable response rate of 28.7%)[7]. Figure 4-2 summarizes the data acquisition procedure followed.

FIGURE 4-2 DATA ACQUISITION PROCEDURE

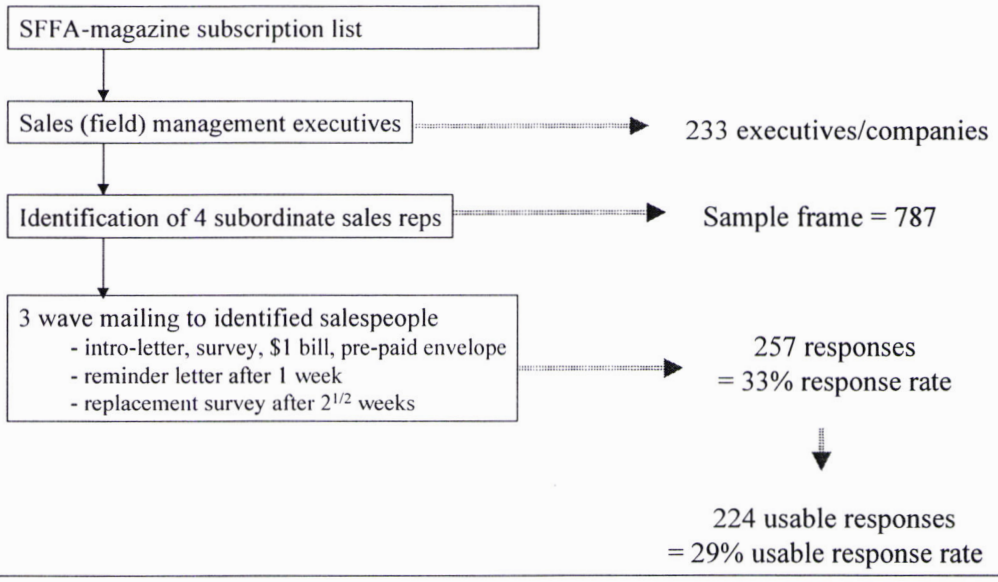


Table 4-2 summarizes the descriptive characteristics of the sample. This table shows that the salespeople sample included in our study relates to a broad range of industries, age categories and experience levels.

[4] Small monetary rewards have shown to yield substantial increases in response. These incentives seem to be the most effective and least biasing, the easiest to obtain and mail, and the most useful to all respondents (Lanuk and Berenson 1975; Fowler 1993).
[5] On the average, our sample frame contained 3.38 sales reps per company, slightly less than asked for.
[6] For an analysis of non-response bias see section 4.5. (p. 77), at the end of this chapter.

TABLE 4-2 DESCRIPTIVE STATISTICS OF SAMPLE (N=224)

Industry (in %)[1]	
Agriculture, Mining and Construction	3
Computer and Electronic Manufacturing	10
General Manufacturing	35
Wholesale and Retail Trade	12
Transportation and Warehousing	6
Services	12
Finance and Insurance	7
Information	15
Age (in %)	
25 or less	2
26-35	34
36-45	29
46-55	25
55+	10
Gender (in %)	
Female	24
Male	76
Average experience in sales job	13 years and 5 months (measured in n° of months: mean = 161.14, st. dev. = 108.89)
Average experience in current company	6 years and 10 months (measured in n° of months: mean = 81.52, st. dev. = 87.95)

[1]Classification based on U.S. Census Bureau NAICS sectors (see www.census.gov/epcd/naics).

4.3.3. Scale Construction and Analysis Procedures

The scale development procedure advanced in several stages: (1) an examination of the existing technology acceptance, innovation adoption and relevant sales literature, (2) the verbalizations of the one-on-one interviews with sales reps were used in complement to create a pool of items and (3) construct definitions, preliminary measurement items and the overall conceptual model were discussed with academic and industry experts in order to confirm their applicability to a sales setting. Where necessary the multi-item scales were modified and tailored to accommodate for the idiosyncrasies of the personal selling context.

The actual psychometric properties of our final measures were assessed by means of confirmatory factor analysis procedures in Lisrel8.30 (Jöreskog and Sörbom, 1996). The results of these analysis are reported in detail in Chapter 6.

[7] 8 participants did not qualify for our research purpose (i.e. they either occupied a sales management position or did not have a SA-system in place as defined in our study) and 25 had incomplete data.

4.3.4. Construct Measures

In the following paragraphs we discuss the measurement issues of these constructs and report the items used to measure each construct.

4.3.4.1. Acceptance

Consistent with our broader view on "actual" adoption, individual acceptance was defined as *the extent to which a sales individual uses his/her company's SA-system frequently, to the fullest of its capacities and in a way that it is deeply integrated in his/her sales process activities.* Hence, the items are an extension of the traditional computer acceptance measures which mainly assess frequency of use (e.g. Davis et al. 1989) or measure adoption as a single decision (e.g. Gatignon and Robertson 1985). Based on Rogers' (1995) conceptions of actual adoption (see also Chapter 2 p. 22) a pool of six items was developed reflecting the construct. A seven-point rating scale was used as a response format (anchored 1 = Strongly Disagree and 7 = Strongly Agree). The items used to measure acceptance can be found in Table 4-3.

We measured salesperson technology acceptance using both a *direct* and an *unobtrusive* measure of acceptance. The direct measure of acceptance consists of using the sales rep's self-reports of acceptance. The unobtrusive measure of acceptance is represented in the perceptions of the sales rep's (field) sales manager. Rather than using both measures separately, we combine both measures for the acceptance construct (see section 4.4. below for details).

The most straightforward and commonly used approach in the adoption and information systems literature, is to ask respondents to report about their own acceptance behavior. The arguments in favor of using self-reported acceptance are that salespeople best know the details of their daily sales activities and that some of their efforts may not be directly observable by their manager. A possible concern with self-ratings, however, is that salespeople may describe their behavior in an overly positive manner and/or socially desirable way (Behrman and Perreault 1982). Furthermore, measuring self-reported acceptance and its determinants on a single questionnaire may introduce

common method variance as an explanation of the relationships discovered (Venkatesh and Davis 2000; Anderson and Robertson 1995).

Therefore, we collected additional data about a sales rep's acceptance by assessing the criterion variable with the focal rep's (field) sales manager[8]. There are several reasons why such an unobtrusive measure of acceptance may be valuable *in complement* to the direct acceptance measure. Despite the fact that the managerial assessment may confront us with the problem of perceptual disagreements and "informant" bias (see section 4.4. of this chapter), sales managers are knowledgeable and competent informants to report on salespeople's acceptance behavior (Kumar et al. 1993). In fact, because of their organizational role, sales managers evaluate the behavior and performance of the salesperson (Behrman and Perreault 1982). Furthermore, many sales automation systems also contain management applications that can not work "stand-alone" from the applications used by field salespeople (Moriarty and Swartz 1991). Moreover, the acceptance of sales technology is a contingent innovation[9], which implies that the organization-wide acceptance of sales technology in the field can be considered as a company objective as well as an indication of successful implementation (e.g. Rogers 1995; DeLone and McLean 1992). Considering their organizational position, executives in sales (field) management functions share this organizational responsibility for – or are involved with – successfully implementing technology into their sales force. Further, the unobtrusive managerial assessment may convey additional perspectives on the same phenomenon. In fact, the manager's appraisal also taps into the comparative aspects of a salesperson's technology acceptance. Such an assessment of an individual's acceptance compared to his/her peers is a dimension that is supposedly more difficult

[8] The acceptance with managers was measured at the same point in time where managers were solicited to identify 4 of their subordinate sales reps.

[9] Once the organizational decision makers have decided to adopt a new technology, the focus shifts to putting the innovation into use. Hence, the success of the innovation process is assessed by the extent to which the innovation is used and integrated into the organization (Rogers 1995; Gopalakrishnan and Damanpour 1997; Zaltman, Duncan and Holbek 1973). Indeed, organizational innovations which have to be incorporated in the work processes of organizational members, are of little value if they are not used. A new technology must be accepted by its target "user" group in order to achieve the objectives and reap the benefits the organization intends to realize (e.g. Leonard-Barton and Deschamps 1988; Srinivasan 1985; Bhattacherjee 1998).

to capture for the boundary spanning salesperson. Finally, the unobtrusive measure reduces the common method bias and, thus, adds confidence to the robustness of our findings.

4.3.4.2. Perceived Usefulness and Perceived Ease of Use

For both central beliefs of the TAM, we used the scales developed by Davis et al. (1989). Both scales have shown to possess very good psychometric properties in numerous studies (e.g. Davis 1989; Davis and Venkatesh, 1996; Adams et al. 1992; Mathieson 1991; Venkatesh and Davis 1996; Venkatesh and Davis 2000; Doll et al. 1998). Each scale was measured by four items using a seven-point response format (anchored 1 = Strongly Disagree and 7 = Strongly Agree). The measures of perceived usefulness and ease of use are reported in Table 4-3.

TABLE 4-3 MEASURES OF ACCEPTANCE, PERCEIVED USEFULNESS AND EASE OF USE

INDIVIDUAL ACCEPTANCE
• Compared to other sales reps ... is a frequent user of our SA-system [a] + I consider myself a frequent user of my company's SA tool [b]
• Compared to other sales reps ... has completely integrated our SA-applications into sales processes + I have completely integrated our SA applications into my sales process
• Compared to other sales reps... fully uses the capabilities of our SA-system + I fully use the capabilities of our SA program
[a] Sales manager as judge [b] Salesperson as judge
USEFULNESS
• Using our SA-system improves my job performance
• Using our SA-program in my job increases my productivity
• Using our SA-applications enhances my effectiveness in my job
• I find our SA-system useful in my job
PERCEIVED EASE OF USE
• I find our SA-system easy to use
• I find it easy to get the SA-system to do what I want it to do
• My interaction with our SA-system is clear and understandable
• Using our SA-system does not require a lot of my mental effort

4.3.4.3. Personal Innovativeness

In developing our measure of salesperson innovativeness, the initial items were selected from existing scales originating in the consumer and sales information literature. In particular, we relied on the work of Agarwal and Prasad (1998), Hurt et al. (1977) and Leonard-Barton and

Deschamps (1988). While each of these measures has its limitations, they offer very good starting points. A draft item list was reviewed during the expert tests conducted with academics and practitioners. A list of nine items emerged from this process and were included in the survey. The following instruction was provided in the survey: "*The following set of statements relates to your thoughts about information technology (IT) in general. The statements refer to your attitudes towards all "new IT and computer applications" you may possibly encounter in and outside your job.*" A seven-point rating scale was used (anchored 1 = Strongly Disagree and 7 = Strongly Agree). The items used to measure personal innovativeness are listed in Table 4-4.

TABLE 4-4 MEASURES OF PERSONAL INNOVATIVENESS AND COMPUTER SELF-EFFICACY

PERSONAL INNOVATIVENESS

Instruction

The following set of statements relates to your thoughts about information technology (IT) in general. The statements refer to your attitudes towards all "new IT and computer applications" you may possibly encounter in and outside your job.

- In general, I am hesitant to try out new IT
- If I heard about a new IT, I would look for ways to experiment with it
- I tend to be among the first to use new IT
- I must see other people using IT innovations before I will use them
- Among my peers, I am usually among the first to explore new IT
- I am receptive to new IT
- I often find myself skeptical of new IT
- I rarely trust new IT until I can see the vast majority of people around me accept them
- I like to experiment with new IT

COMPUTER SELF-EFFICACY

Instruction

Imagine that you were given a new software package for some aspect of your work. It does not matter specifically what this software package does, only that it is intended to make your job easier and that you have never used it before. The following questions ask you to indicate whether you could use this unfamiliar software package under a variety of conditions. Please rate the extent to which you are confident that you would be able to complete the job using the software package (1 being Not at all Confident and 7 Extremely Confident).

I could complete the job using the software package ...

... if there was no one around to tell me what to do as I go
... if I had never used a package like it before
... if I had only the software manuals for reference
... if I had seen someone else using it before trying it myself
... if I could call someone for help if I got stuck
... if someone else had helped me get started
... if I had a lot of time to complete the job for which the software was provided
... if I had just the built-in help facility for assistance
... if someone showed me how to do it first
... if I had used similar packages before this one to do the same job

4.3.4.4. Computer Self-Efficacy

Despite the considerable amount of research in the area of computer self-efficacy, many studies used self-developed and inconsistent measures. Considering the fact that Compeau and Higgins' (1995) measure showed adequate psychometric properties and that it was successfully used in the context of TAM before (Venkatesh and Davis 1996), we used the same scale for measuring the sales reps' judgments of their capability to use computers. The following specific instruction was provided in the survey: "*Imagine that you were given a new software package for some aspect of your work. It does not matter specifically what this software package does, only that it is intended to make your job easier and that you have never used it before. The following questions ask you to indicate whether you could use this unfamiliar software package under a variety of conditions. Please rate the extent to which you are confident that you would be able to complete the job using the software package (1 being Not at all Confident and 7 Extremely Confident)*". Table 4-4 reports the items used to reflect computer self-efficacy.

4.3.4.5. Competitive Pressure and Customer Influence

No existing scales were available in the literature to measure both constructs. Thus, we developed two four item scales based on the findings of our qualitative research. Gatignon and Robertson (1989) assess general levels of competitive intensity in the marketplace, to explain competitive effects on an organization's adoption behavior. Considering the fact that the individual sales rep is our unit of analysis, such general measures are less relevant in explaining individual acceptance. Rather, we contended that competitive and customer influences will have a more direct effect if there is an immediate link to information technology. The response format used was a seven-point rating scale (anchored 1 = Strongly Disagree and 7 = Strongly Agree). The measures of competitive pressure and customer influence are listed in Table 4-5.

TABLE 4-5 MEASURES OF SOCIAL INFLUENCES AND ORGANIZATIONAL FACILITATORS

COMPETITIVE PRESSURE
• Our competitors' sales reps use information technology extensively
• Our competitors' sales forces are equipped with up-to-date information technology
• Competing sales executives use a lot of sales technology
• Our competitors' salespeople rely on information technology in dealing with their customers
CUSTOMER INFLUENCE
• My customers show great interest when I use information technologies
• My customers encourage me to use information technology
• Many of my customers like it when I rely upon any form of information technology
• The fact that I use information technologies is very appealing to my customers
• My customers expect me to use information technology
PEER USAGE
• The majority of my sales colleagues in my department use our SA-tool
• In my sales organization, our SA-program is heavily employed by everyone
• I do not know of many others in my department using our SA-system
• A lot of my sales colleagues rely on our SA-technology
SUPERVISOR INFLUENCE
• I am continuously encouraged by my immediate supervisor to use our SA-tool in my job
• My immediate supervisor explicitly supports my using of our SA-system
• My immediate supervisor repeatedly refers to the importance of using our SA-system during my sales job
• My immediate supervisor truly believes in the benefits of our SA system
ORGANIZATIONAL FACILITATORS
Training
• My company has extensively trained me in the use of our SA-tool
• My company provided me complete instructions and practice in using our SA-tool
• There is not enough training for me on how to understand and use our SA-system (r)
• I am getting the training I need to be able to use our SA-tool effectively
Technical User Support
• I know where to turn to when I need any assistance with our SA-technology
• In my company a specific person or group is always available for assistance in resolving difficulties with our SA-system
• In my company we get good technical support for our SA-system
• We have extensive support to help with problems related to our SA-system
Organizational Implementation Effort
• From a top management level there is strong interest in our SA-system
• The usage of the SA–tool is strongly championed and advocated by our organization
• Extensive internal communication campaigns have promoted our SA-system
• My company spared no efforts in terms of internal marketing to promote our SA-tool
• Top management shows clear and visible commitment towards our SA-tool

4.3.4.6. Peer Usage

Since a multi-item scale for organizational usage was not available we developed a new measure based on the conceptualizations of Igbaria et al. (1996). Igbaria et al.'s (1996) construct was operationalized by means of a single item: *the extent to which colleagues use the computer* – rated

from *very low* to *very high usage*. Our measure consisted of four items with a seven-point scale response format (anchored 1 = Strongly Disagree and 7 = Strongly Agree). The measures of peer usage are tabulated in Table 4-5.

4.3.4.7. Supervisor Influence

We adapted and added items to the measures of Igbaria et al. (1996) and Leonard-Barton and Deschamps (1988) in such a way that they adequately represented the domain of our construct. The face validity of the new items was confirmed in our qualitative research and pre-test procedure. Two sample items for this construct are: *I am continuously supported and encouraged by my supervisors to use our SA-tools in my job* (based on Igbaria et al. 1996) and *My immediate supervisor explicitly supports my using of our SA-system* (based on Leonard-Barton and Deschamps 1988). The response format used was a seven-point rating scale (anchored 1 = Strongly Disagree and 7 = Strongly Agree). The measures of supervisor influence are outlined in Table 4-5.

4.3.4.8. Organizational Facilitators

We operationalized organizational facilitators by means of indicators that represented *user training*, *technical user support* and *organizational implementation effort*. The four items for user training were based on Goodhue and Thompson (1995) and the conceptualizations of Bailey and Pearson (1983), Igbaria (1990) and Igbaria (1993). Technical user support was measured using five items adapted from Thompson et al. (1991), Trevino and Webster (1992) and Igbaria (1990). For the dimension *organizational implementation effort* we developed a new five-item scale based on the conceptualizations of Rogers (1995) and our findings from the qualitative research. All response formats for these scales were seven-point rating scales (anchored 1 = Strongly Disagree and 7 = Strongly Agree). The overall construct of *organizational facilitators* was modeled as a

second order factor using composite scores of training, user support and organizational implementation effort. Table 4-5 lists the items used to assess organizational facilitators.

4.3.4.9. Control Factor

In order to test the determinants of information technology acceptance in the presence of other variables, we assessed the effect of a covariate which may also affect acceptance. The covariate included is *sales task complexity*. Investigating the effect sales task complexity on technology acceptance is in line with empirical studies from the innovation adoption and information systems literature. In fact, Gatignon and Robertson (1989, p. 38) stated that "*complex selling tasks provide greater incentives and payoffs for the adoption of task-simplifying innovations*". Hence, the more complicated the selling task, the greater the potential usefulness for salespeople to use information technology innovations. Because these benefits can differ across industries and the fact that our research design is cross-sectional, these sales task characteristics might explain the variability of acceptance patterns according to the industry and sales situation. The impact of task characteristics on information (technology) usage have been studied extensively in the area of information systems (Goodhue and Thompson 1995; Ghani 1992). In order to measure sales task complexity, we used four measures based on Goodhue and Thompson (1995). Although the four measures were adapted to accommodate for the idiosyncrasies of the personal selling context, they are in line with Goodhue and Thompson's definition of task characteristics reflecting task equivocality and interdependence. The items used are listed in Table 4-6.

TABLE 4-6 MEASURES FOR THE COVARIATE SALES TASK COMPLEXITY

SALES TASK COMPLEXITY
• I frequently deal with ill-defined customer problems and requests
• I frequently deal with ad-hoc, non-routine customer problems
• Frequently, the customer problems I work on involve answering questions that have never been asked in quite that form before
• During the sales process I need to coordinate between many different people

4.4. The Direct versus the Unobtrusive Measure of Acceptance: An Assessment of Inter-Rater Agreement

As explained earlier in this chapter (section 4.3.4.1., p. 64), the ultimate criterion variable acceptance was assessed using two judges. One respondent was the sales representative who reported on his/her usage of the sales automation system. The other informant was the focal rep's sales manager who rated the level of acceptance for each of the subordinate sales reps (s)he identified for participation in the study. Both judges rated the three facets of acceptance, reflecting our conceptual definition explained earlier. Because it is the aim of these 6 perceptions (= 2 sources x 3 facets) to form the acceptance construct when testing our research hypotheses, it is desirable to check for consensus among both respondents.

In fact, studies using multiple respondents have often showed considerable levels perceptual of disagreement. These dissimilarities may originate from differences in both knowledge and perceptions. If insufficient knowledge is the basis for the disagreement between informers, than such reports should be omitted. But, different raters may also disagree because of their specific managerial positions and view on the same phenomenon (Kumar et al. 1993). For example, as explained earlier, a sales manager supervises different salespeople within a district and can benchmark the acceptance levels among his/her sales reps, while sales reps best know the details of their daily sales activities. One of the approaches, frequently used in past research, for dealing with inevitable discrepant responses is *aggregation* (Kumar et al. 1993). The aggregation procedure pools the reports of multiple respondents to create indicators of the phenomenon under investigation. Prior to aggregating responses, however, some level of perceptual agreement must exist. Observations with high levels of disagreement can be deemed unreliable because the odds are considerable that these discrepancies reflect some lack of knowledge: either because one of the respondents is not knowledgeable or both reflect on a different phenomenon. On the other hand, some degree of difference may be desirable, if the overall measure is to account for somewhat different viewpoints in order to cover as much of the construct domain as possible. In

other words, although agreement is desirable, there needs to be some room for partial or incomplete agreement.

Hence, before aggregating the acceptance data obtained from the sales reps and their managers, we assessed the level of agreement between both judgements. James et al. (1984) provide a procedure to estimate such interrater reliability. In a mathematical sense, interrater reliability is defined as "*the proportion of systematic variance in a set of judgments in relation to the total variance in the judgments*" (James et al. 1984, p.86). Our index of interrater reliability ($r_{WG(J)}$) was based on the ratings of both judges on each of the three indicators of the acceptance. The following formula was used to calculate $r_{WG(J)}$:

$$r_{WG(J)} = \frac{J(1-(\overline{s_{xj}^2}/\sigma_{EU}^2))}{J(1-(\overline{s_{xj}^2}/\sigma_{EU}^2))+(\overline{s_{xj}^2}/\sigma_{EU}^2)} = \frac{truevariance}{truevariance + errorvariance}$$

where:

$r_{WG(J)}$ = interrater reliability for K judges and J parallel items

J = number of items, here $J = 3$

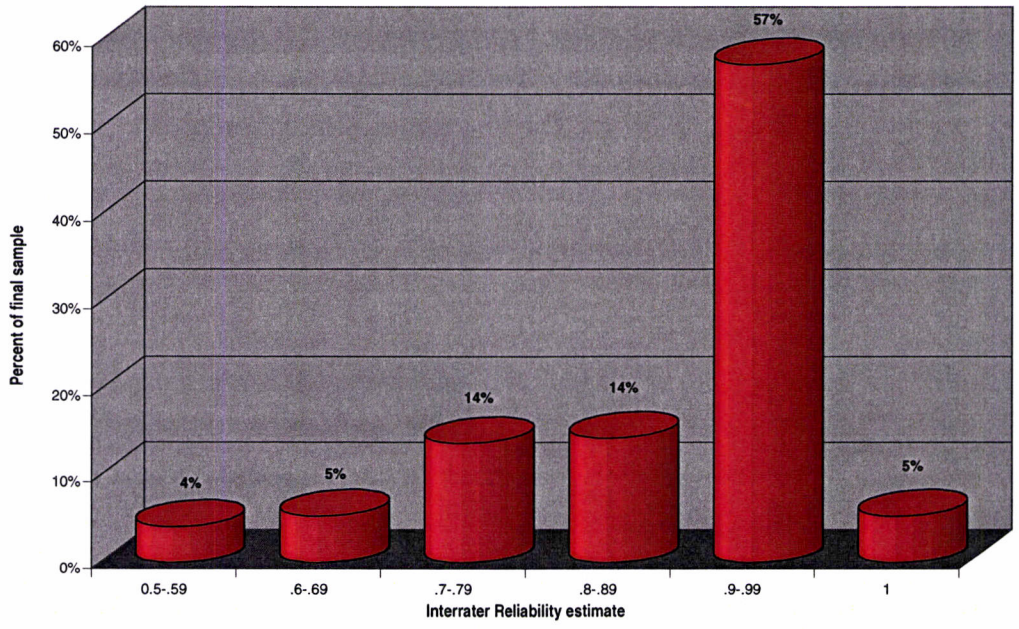
$\overline{s_{xj}^2}$ = observed variances in the K (=2) judges' reports, averaged across the J items

σ_{EU}^2 = variance on item X_j expected in case judgments are due to random measurement error only

In calculating these estimates for our entire data set, 57 cases were identified with unacceptable degrees of disagreement (i.e. $r_{WG(J)} < 0$ or $r_{WG(J)} > 1$) and 4 observations with an interrater reliability lower than the modest value .5 (James et al. 1984). Similar to Chatterjee et al.'s (1992) and Kumar et al.'s (1993) procedure for dealing with the perceptual agreement problem, we discarded those observations with substantial levels of disagreement from our further analyses. This reduced the final sample from 229 to 168 records with multiple observations of acceptance which showed

high levels of agreement among the sales reps and their managers. The measures of interrater reliability averaged .87, had a median of .92 and ranged from .5 to 1. Figure 4.3. shows the frequency distribution of the interrater agreement estimates using the retained 168 data records. As can be seen from this graph, 76% of the cases in our final sample have interrater reliabilities higher than .80.

FIGURE 4-3 DISTRIBUTION OF INTERRATER AGREEMENT ESTIMATES



An alternate statistical assessment of perceptual agreement was provided by the correlations between the reports of the two raters on each item of acceptance (Jones et al. 1983; Kumar et al. 1993). As can be seen from Table 4-7, the correlations between the same measures of acceptance were significant and substantial ranging between .53 and .58, while the other inter-item correlations were minimum .38.

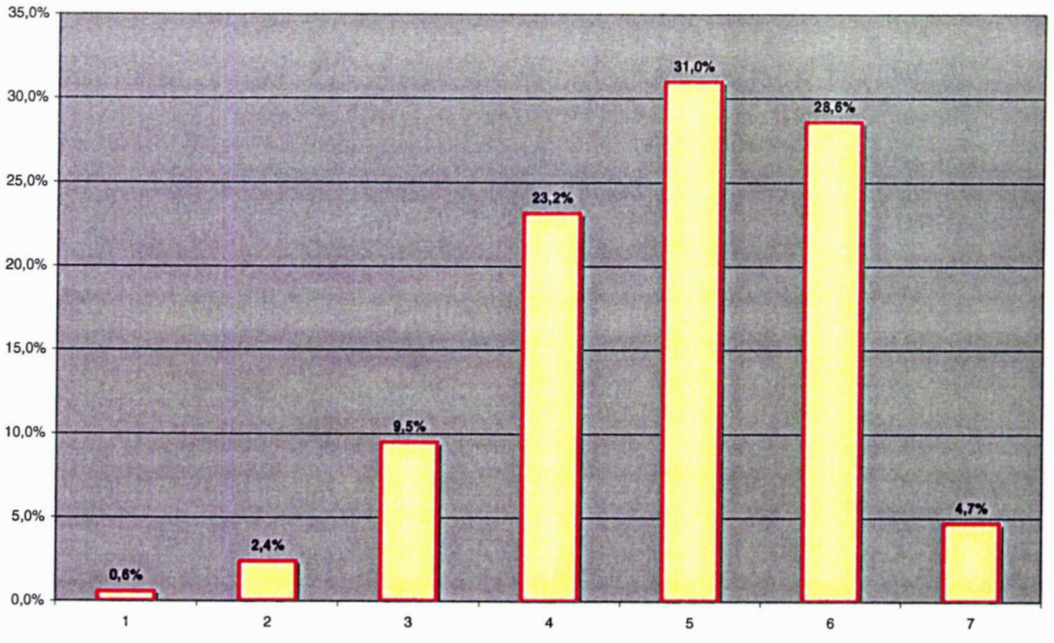
TABLE 4-7 CORRELATION MATRIX OF MULTI-SOURCE ACCEPTANCE MEASURES

	1	2	3	4	5	6
1. Compared to other sales reps ... is a frequent user of our SA-system						
2. ... has completely integrated our SA-applications into sales processes	.58					
3. ... fully uses the capabilities of our SA-system	.48	.74				
4. I consider myself a frequent user of my company's SA tool	**.58**	.42	.38			
5. I have completely integrated our SA applications into my sales process	.42	**.53**	.41	.58		
6. I fully use the capabilities of our SA program	.42	.47	**.53**	.55	.62	

Hence, the above analyses provide evidence for acceptable interrater agreement and the basics are present to form a reliable measure of acceptance (Hair et al. 1998). In preparation of our further analyses and consistent with empirical studies using multiple respondents (Chatterjee et al. 1992; Kumar et al. 1993; James et al. 1984), the items on which the two raters did not fundamentally disagree were averaged to form three scores, one per facet of acceptance. These three indicators will be used as indicators of the criterion variable acceptance in our subsequent structural equation modeling procedure (see chapter 6).

Figure 4-4 below, shows the distribution of the technology acceptance variable in our final sample (n=168). It depicts acceptance as a composite averaged score across the three indicators obtained by means of the aggregation procedure explained above. It is clear that our goal of achieving variance in terms acceptance levels was accomplished. The mean composite score for acceptance was 4.97, with a standard deviation of 1.16. The median was 5.08. Our sample contains 36% "light" users and 33 % "heavy" users. Note that determining "light" and "heavy" users is not our primary objective here. It is intended to provide exploratory insights only. The decision rule for categorization used is as follows: the cumulative percentage of the cases below (above) the median category (=5) are labeled "light" ("heavy") users. The cases within the median category are excluded.

FIGURE 4-4 DISTRIBUTION OF ACCEPTANCE LEVELS



4.5. Non-response bias Analysis

Mail surveys may generate biased results due to the effect of non-response if response rates are low and if the people who do respond are significantly different from those who do not. This implies that, if people with a particular interest in the subject matter are more likely to return mail surveys, the research results may be distorted in ways that are directly related to the purposes of the research (Fowler 1993). Because of this potential threat, a non-response bias analysis was conducted. Following a procedure proposed by Lanuk and Berenson (1975) we compared the participants who responded in the first wave of the survey (i.e. early respondents) against participants who responded in the second wave after receiving a replacement survey (i.e. late respondents)[10]. Although we are unable to test actual non-response bias, this procedure provides an effort to extrapolate trends between survey waves in order to predict non-response bias. The

[10] An accurate comparison of the participants in terms of their speed of response *within* a mailing wave was not feasible due to the university mailing system and the fact that on many envelopes the mailing date was unreadable.

key assumption here is that subjects who respond less readily (e.g. respond in later waves) are more similar to non-respondents, than to those people who respond promptly. By making this assumption that last wave participants are representative of all non-respondents, an indication of non-response bias can be obtained. The results of this analysis are reported in Table 4-4 below.

TABLE 4-8 COMPARISON OF MEANS BETWEEN EARLY AND LATE RESPONDENTS

	Mean Early Respondents[1]	Mean Late Respondents[2]	Two-Sample t [3]	p-values (2-tailed)
Acceptance[4]	4.90	5.07	-.97	.33
Personal Innovativeness[4]	4.00	3.98	.40	.69
Computer Self-Efficacy[4]	5.77	5.61	1.10	.27
Usefulness[4]	5.60	5.57	.18	.86
Ease of Use[4]	4.67	4.52	.76	.45

1: n=104

2: n=64

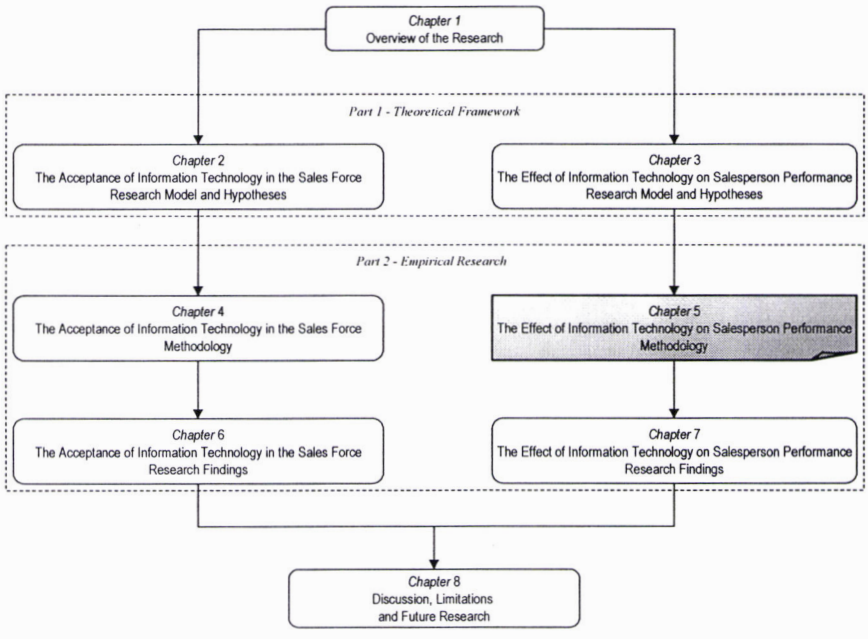
3: Levene's test for equality of variances indicated that the null hypotheses of equal variances can be accepted for all variables

4: Mean composite score of items used in empirical test of the research model (see Chapter 6)

As can be seen from Table 4-8, we found no evidence of response bias in our sample. The null-hypotheses that the means of both groups (i.e. early versus late respondents) are the same for the key variables used in this study, can not be rejected.

CHAPTER STRUCTURE

Chapter 5 The Effects of Information Technology on Salesperson Performance: Methodology



5.1. Introduction

Multiple respondent survey data as well as data from company records were used to test the conceptual model of the effects of information technology usage on salesperson performance, (see Figure 3-2, p. 43). The study was conducted with sales representatives and their sales managers working for a mid-sized pharmaceutical company. Mail surveys were administered to sales reps for measuring information technology usage data and gathering information on smart selling behaviors. Simultaneously, mail surveys were sent out to each district manager in order to collect

data about each sales rep's sales skills. In addition, data on salesperson performance and the number of calls made, were obtained from company records at year's end.

This chapter begins with a discussion of the overall research design. Next, section 5.3. discusses the data acquisition procedure and the research sample. Section 5.4. outlines the scale construction and analyses procedure. Section 5.5. outlines all construct measures. In preparation of chapter 7 we highlight the overall modeling procedure for the formal hypotheses testing.

5.2. Research Design

The research approach used for testing the effects of information technology usage on salesperson performance involved a field study design (Stone 1978). The field study design consisted of an in-depth study within one company research site, with survey data collected from multiple respondents combined with data from company records. The choice for a field study design within a *single* company was inspired by our concern *to control for confounding and external effects* due to the variability in market contexts (e.g. competitive situations) and organizational factors (e.g. information systems and sales management practices). Although this choice limits the *generalizability* of the research findings, it offers important controls to the *internal validity* of the research. For example, the same information technology tools are available to all sales representatives, they receive similar compensation and training and market the same product. Single site research designs are widely used in studying the performance of salespeople (Brown and Peterson 1994; Brown et al. 1998; MacKenzie et al. 1998; Ahearne 1998) or frontline service employees (Singh 2000). The alternative of using a cross sectional research design would not allow to control for these external contextual effects. Furthermore, a design across industries and companies would practically exclude the possibility of gathering multiple source data. This would oblige researchers to work with single source data which could have inflated the explained variances due to common method/source variance.

Our study participants were salespeople who worked for a mid-sized pharmaceutical company in the U.S.. The salespeople were responsible for marketing and selling (in the industry referred to as "detailing") two product lines directly to physicians. Pharmaceutical salespeople can be classified as "missionary" salespeople (Moncrief 1986) who influence and encourage physicians to prescribe their company's drugs. Missionary sales representatives are different from "traditional" salespeople in that they do not actually close sales, work with orders or manage technical support. Rather, their primary responsibility is to increase company sales among existing customers (i.e. medical doctors) by providing personal selling assistance such as providing new medical information. According to Moncrief's (1986) overview, the category of missionary salespeople is quite important and accounts for 19% up to 29% of all salespeople. Especially the number of pharmaceutical sales reps in the U.S. has escalated to unprecedented highs. According to IMS Health data the number of pharmaceutical field sales reps has reached 57,500 in 1998. Since 1996 this number grew with a rate of 39%. These figures indicate that the context of our study in terms of the nature of the sales job is important (Pharmaceutical Representative 1998).

This pharmaceutical company provided a good sample frame for testing our empirical model for several reasons. First, a careful selection of a research site based on conceptual and theoretical premises (Eisenhardt 1989) was mandatory for our research purposes to succeed. Considering our research objectives and the unit of analysis, the research company had to fulfill three major conditions in order to qualify for our research: (1) a broad array of information technology applications had to be available to the sales force, (2) the usage of technologies had to be volitional to some extent such that variance in terms of information technology usage among sales reps existed and (3) the company's sales force had to be significant in size in order to allow for advanced statistical analyses (e.g. min. 200 salespeople). During our recruitment and screening process, we made sure that the participating field research site corresponded to these requirements.

Second, the pharmaceutical selling context is highly information and data intensive (Ahearne et al. 1999) which allows sales reps to manipulate and analyze sales and market data by using

information technology (e.g. database applications). Further, in the pharmaceutical industry many Web-initiatives have been set up to provide information that is important to the industry. Also, missionary selling is highly characterized by information management tasks (e.g. communication with colleagues and the home office) (Moncrief 1986). Thus, information technology tools such as e-mail or groupware may facilitate the communication process between the sales rep, his colleagues and the home office. In other words, the usage of different information technology systems can serve the pharmaceutical sales rep throughout his/her sales activities. By the same token, however, the nature of this selling context (e.g. working less with orders) may also limit the generalizability of our research findings (see chapter 8).

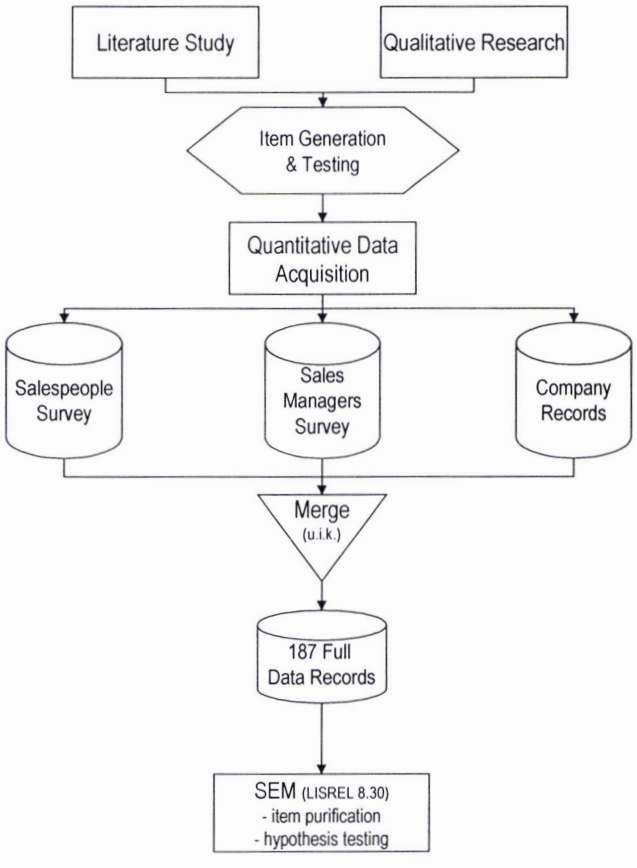
The approval for access to the sample originated from the company's responsible for sales automation and the vice-president of sales, after detailed discussions about the research design and process. Extensive levels of company support were obtained. At the very beginning of the study, the research project was announced throughout the company which facilitated the execution of the research design greatly. Our field research design consisted mainly of two research phases, namely a qualitative and a quantitative part. As explained in chapter 3, section 3.3., the qualitative research was exploratory in nature and served the objective of theory development. We refer to chapter 3 for an explanation of the data gathering and analyses procedure used in the qualitative phase of this study. In the remainder of this chapter we outline the quantitative study which tested the hypotheses developed in chapter 3 above. The entire research process is depicted in Figure 5-1.

5.3. Data Acquisition and Sample

The sales force used as our sample frame consisted of 238 sales representatives and 29 sales district managers. Each manager supervised from 5 to 12 sales representatives. Salespeople's compensation consisted of a fixed salary and an additional bonus. This bonus is based on sales

levels (80%) and a subjective component (20%), labeled as "professional, business and customer development".

FIGURE 5-1 OVERVIEW OF RESEARCH PROCESS



Mail surveys were sent out to all 238 sales representatives including (1) a letter from the vice-president of sales supporting this research and (2) a postage paid business reply envelope addressed to the researchers. The sales reps were asked to accurately and completely fill out the survey. As each survey was labeled with the sales reps individual territory number, the letter explicitly instructed the sales reps to return the surveys directly to the researcher using the enclosed envelope. Further, the letter explicated that individual responses would not be divulged and that only aggregate results would be reported. Consequently, all participants were assured complete confidentiality. After one and a half week a voice mail message was forwarded to all

non-respondents asking for their participation. After another two weeks non-respondents received a replacement survey with a new cover letter and business reply envelope. A similar data collection procedure was followed to collect data from the sales district managers. The 29 sales managers received a survey packet including a letter of the vice-president of sales and a business reply envelope. The managers were instructed to rate the sales skills of all of the sales reps under their supervision. The questionnaire was tailored to each sales district manager by means of a mail merge and contained all the names and territory numbers of the salespeople in their district. After one and a half week each non respondent sales manager received a voice mail message from the vice-president of sales reminding the request for participation. Also, district managers were asked to strongly encourage their subordinates to participate in the study. The territory numbers on both questionnaires were used as a unique identification key (u.i.k.) to match all survey and company record data per sales representative.

This data acquisition procedure yielded a response of 203 sales reps or a 87.5% response rate[1]. In addition, all 29 sales district managers returned their surveys (i.e. a 100% response rate). Merging both survey data sets with the company records (i.e. bonus and call data), using the unique identification key, resulted in a data set containing 187 full data records (relating to the same number of sales reps). This is a usable response rate of approximately 83%[2]. These response rates are in the same line with other studies in a sales management context, even though our study combines data from two different survey respondents (e.g. Ahearne 1998; Challagalla and Shervani 1996). In the sample, 50% were males and the median age was between 26 and 35 years old. The average experience in a sales job was 9.5 years (st.dev.=7.4), their tenure within the company was 6.8 years (st.dev.=7.2) and the salespeople worked in their territory an average of 4.7 years (st.dev.=5.9) . The average year end bonus level was $10,362 (st.dev. = 3.901).

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[1] During the period of data collection 6 sales reps resigned. Hence, the response rate can be calculated as $206/(232-6) = 87.5\%$

[2] 10 sales reps were eliminated because of incomplete manager responses (e.g. managers indicated that the rep was a new hire), 4 records were eliminated because of incomplete data from the sales reps and for 2 sales reps bonus data were missing from the company records.

5.4. Scale Construction and Analysis Procedures

Our scales were developed in several stages. First, the relevant literature was reviewed for existing scales. Existing scales were adapted and extended to ensure that they were applicable to a pharmaceutical setting and relevant to our research model. A preliminary list of items was pre-tested by asking 2 district sales managers, 2 salespeople and 1 company executive to comment on the items' wording and their appropriateness. Based on these comments, minor adaptations were made. In general, the pre-test indicated that the items were clear and unambiguous as well as appropriate to the context. Using this input a second draft of the questionnaire was developed and feedback was obtained from 3 academic experts.

Item purification and the assessment of the actual psychometric properties of the final measures was assessed by means of confirmatory factor analyses using Lisrel 8.30 (Jöreskog and Sörbom 1996). The results of these analysis are reported in detail in Chapter 7.

5.5. Construct Measures

The measures used in this study were obtained from three different sources: (1) the sales reps (i.e. Information Technology Usage levels, Smart Selling), (2) their first line sales district managers (i.e. Market and Technical Knowledge Assets, Sales Presentation Skills and Targeting Skills) and (3) company records (i.e. Call Productivity and Sales Performance). The list of all the measures used in this study is tabulated in Table 5-1.

The first four constructs relate to a salesperson's sales skills. During the one-on-one interviews sales district managers were asked to elicit the selling skills they believed to be most important for achieving high salesperson performance. Also, managers were asked to identify those sales skills that were possibly related to a salesperson's technology usage. The most prominent were included in our study, namely (1) a sales rep's market knowledge, (2) his/her technical knowledge, (3)

his/her sales presentation or dealing with customers and (4) the salesperson's proficiency to target top customers. Several of these variables have also been identified as components of behavioral sales performance in previous sales studies (e.g. sales presentations, knowledge) (Ingram and LaForge 1998; Behrman and Perreault 1982). Since the sales manager evaluates the end-performance of a subordinate sales representative and this evaluation can relate to different facets of performance, we found it appropriate to measure these variables at the level of the focal sales rep's manager (Behrman and Perreault 1982).

TABLE 5-1 LIST OF ALL ORIGINAL MEASURES

MARKET KNOWLEDGE
• Is an excellent resource of competitive information
• Has a lot of information on industry trends
• Is well-informed about important events in our industry
• Is knowledgeable about our competitors' activities
• Keeps abreast of the marketing strategies of our competitors
TECHNICAL KNOWLEDGE
• Knows all the specifications and applications of our products
• Is an excellent source of information about pharmaceuticals
• Is very knowledgeable about our products, their indications, usage, and adverse reactions
• Knows the competition's products as well as our own
• Keeps abreast of technical developments
• Knows and understands very well what a physician's patients are going through
• Is knowledgeable about the diagnosis and treatment of the condition(s) our products treat
• Can be considered an expert in the field of the disease state(s) his products treat
• Always knows which drugs are covered under various managed care plans
• Knows and understands the patient population each of his/her doctors serves
• Understands the personal issues of each of his doctor's practice very well
• Is aware of the real concerns doctors and patients have with our products
• Is well aware of the composition of his/her doctors' patients and the diseases they treat
SALES PRESENTATION – DEALING WITH CUSTOMERS
• Presents information to customers in a clear and concise manner
• Is very responsive in handling customer questions
• Always follows up on issues discussed in previous interactions with customers
• Provides a lot of new information to customers
• Communicates his/her sales message with a lot of confidence
• Is aware of the personal interests and hobbies of his/her doctors and talks about them
• Always asks physicians the appropriate questions
• Demonstrates the product value well
• Addresses doctors' objections and issues adequately
• Gains customers' commitment

TABLE 5-1 LIST OF ALL ORIGINAL MEASURES

(Continued)

TARGETING
• Always targets the right doctors in his/her sales approach
• Always calls on those physicians that have potential
• Constantly works on the highest priority customers first
• Is very good at identifying, selecting and calling on profitable physicians
• Consistently calls on doctors that provide the most business
• Always knows who his/her top prescribing doctors are that she/he should call on
INFORMATION TECHNOLOGY INFUSION
• I consider myself a frequent user of IT
• I fully use the capabilities of our IT
• I have completely integrated our IT-applications into my sales process
• I often use different IT to duplicate my efforts and see my findings confirmed
• I frequently use IT to sort, visualize and analyze market data
• I utilize different IT in an integrated way so that they work well together
SMART SELLING
Adaptive Selling
• Basically, I use the same approach with most physicians
• I vary my sales style from situation to situation
• I like to experiment with different sales approaches
• I use a set sales approach
• I can easily use a wide variety of selling approaches
• I find it difficult to adapt my presentation style to certain doctors
• When I find that my sales approach is not working, I can easily change to another approach
• It is easy for me to modify my sales presentation if the situation calls for it
• I am very flexible in the selling approach I use
• I feel confident that I can change my planned presentation when necessary
• I do not change my approach from one doctor to another
• I treat all of the physicians pretty much the same
Sales Planning Behavior
• I think over the steps necessary for getting a physician to prescribe our products
• I keep good records about my accounts
• I set personal goals for each sales call
• I make a detailed weekly plan for what I need to do
• I develop a strategy for getting a doctor to prescribe
• I manage my time effectively
• I plan and organize my overall sales efforts effectively
• I think about strategies I will fall back on if problems in a sales interaction arise

The next construct pertains to the smart selling behaviors of each individual sales rep. This construct implies the practice of adaptive selling as well as engaging in sales planning behaviors.

The construct was measured at the level of the salesperson for two reasons. First, these individual sales behaviors have traditionally been measured at the level of the salesperson in previous studies in the sales literature (Sujan et al. 1994; Spiro and Weitz 1990). Next, the definitions and items of adaptive selling and sales planning contain a strong behavioral component and are closely related to personality traits (e.g. empathy, self-monitoring, openers) (Spiro and Weitz 1990). In other words, smart selling behaviors are closely related to the salesperson as an individual and his/her daily sales activities and processes. Thus, we preferred the focal salesperson as the best judge for assessing the daily smart selling practices rather than their managers. In fact, managers may have little firsthand insights about all specific smart selling facets.

5.5.1. Information Technology Infusion

The measure for information technology infusion or usage was developed in this study. The measure of individual acceptance was extended including measures which reflected the *integrated usage of different information technology tools* and the *use of information technology for sales analysis* purposes. The qualitative interviews, the observations in the field and the qualitative pre-tests revealed that sales reps used other information technology in complement to their sales automation tools. Several reps and managers indicated hereby that this usage was also valuable for the performance of their sales job. In addition, the qualitative study revealed that information technology was valuable if sales reps actually used it for analysis purposes in their sales activities. A pool of 6 items was developed and tested to measure the concept. Items were worded according to our definition. Hence, the measure reflects the extent to which sales reps frequently use the technology, use it to the fullest of its capacities, use technologies in an integrated manner and use information technology for analysis purposes. A seven-point rating scale (anchored 1 = Strongly Disagree and 7 = Strongly Agree) was used as a response format.

5.5.2. Market Knowledge

Market knowledge reflects a sales rep's knowledge about the industry (e.g. competition, trends) in general. The scale was developed in this study. We created a pool containing five-items of market

knowledge based on the findings of our qualitative research. The items asked the sales district manager to rate each of his/her salespeople in terms of their knowledge about the industry and competitive actions. A seven-point response format (ranging from 1 = "Strongly Disagree" to 7 = "Strongly Agree") was used to measures these items.

5.5.3. Technical Knowledge

Technical knowledge pertains to the development and use of technical expertise such as product applications, specifications and customer use situations (Behrman and Perreault 1982). The measures of Behrman and Perreault (1982) and Ahearne et al. (2000) were used as a basis for assessing salespeople in terms of their technical knowledge. The original items of Behrman and Perreault (1982) were developed for industrial salespeople and did not relate well to a pharmaceutical selling context (e.g. being able to detect causes of operating failure of company products). The items that were applicable, were reworded and included in the scale (e.g. knows all the specifications and applications of our products). Because after this process too few items remained, the set of items was complemented with measures from Ahearne et al. (2000) which have been used previously in a pharmaceutical sales setting. The final item pool consisted of 13 items. The scoring format consisted of seven-point ratings (anchored 1 = "Strongly Disagree" – 7 = "Strongly Agree") where managers had to indicate the technical knowledge level of each salesperson.

5.5.4. Sales Presentation Skills

Similarly, as the measures of Behrman and Perreault (1982) were developed in an industrial setting, we used their concepts and items as a basis for developing our measures of sales presentation. In their original item development procedure, Behrman and Perreault (1982) identified a dimension related to customer interaction, i.e. "giving high-quality sales presentations and working well with customers". This dimensions was defined as the role of the salesperson as an external representative of the firm and includes dimensions such as giving clear, well thought out presentations and responding to questions. These conceptualizations were used in combination

with verbatims from our qualitative research to construct an item pool of 10 measures. The scoring format consisted of seven-point ratings (anchored "Strongly Disagree" – "Strongly Agree") where managers had to indicate the extent to which each salesperson performed according to the statement.

5.5.5. Targeting Skills

The scale measuring targeting skills is new. A pool of 6 items was developed based on the verbatims from our qualitative study. The scales reflected the extent to which a sales rep adequately targets and calls on those customers with the highest sales potential. A seven-point response format (ranging from 1 = "Strongly Disagree" to 2 = "Strongly Agree") was used to measures these items.

5.5.6. Smart Selling Behaviors

Adaptive selling was measured using a shortened version of the scale developed by Spiro and Weitz (1990). Practicing adaptive selling can be defined as "*the altering of sales behaviors during a customer interaction or across customer interactions*" (Weitz et al. 1986). According to Spiro and Weitz (1990) adaptive selling consists of different aspects, namely (1) the motivation and confidence to practice adaptive selling, (2) their capabilities needed to practice adaptive selling effectively and (3) the actual adaptive behavior of salespeople. From their original 16 item scale we selected those items that were applicable to our research model based on the findings from our qualitative research. The objective of this item reduction procedure was to ensure that only items were included for which the hypothesized relationships would make sense. There is no reason to believe, for instance, that items such as "each customer requires a unique approach" or "I am very sensitive to the needs of my customers" would be influenced by a salesperson's information technology usage. Hence, it is sensible to assume that the twelve items of the adaptive selling measure that were retained, might be facilitated by means of technology usage. The items in our shortened scale are still fairly consistent with the original conceptualizations of Spiro and Weitz

(1990). In fact, the items pertain to the sales rep's confidence to practice adaptive selling, his/her adaptive selling abilities and their actual adaptive behavior.

Engaging in planning behaviors was measured using a shortened version of the scale used by Sujan et al. (1994). Again those items were retained that were applicable to our research model. More specifically, those items relating to the energy devoted to planning and the degree to which a sales rep develops plans were retained. In fact, our qualitative insights showed that using information technology "automatically" stimulates these salesperson behaviors (see chapter 3, p.53).

In both instances, the two researchers involved in the coding process of the theory development stage (see above, section 3.3. p.42), discussed the deletion of these items and decided on using the reduced scale versions based on mutual agreement.

5.5.7. Call Productivity

Call productivity was obtained from company records, namely the sales reporting system. The measure reflects the total number of calls each sales rep has made over the entire year. Productivity measures are traditionally expressed as ratios of output divided by input. Here, the productivity measure is expressed as "the number calls made" (=output) divided by "one year" (=input) (Brinkerhoff and Dressler 1990). Goldenberg (1996) suggests using the same measure for assessing a tangible benefit of sales automation, namely the fact that salespeople can spend more time selling in the field and calling on customers. This measure was obtained at the end of the year.

5.5.8. Sales Performance

The ultimate dependent variable (i.e. sales person performance) was obtained from company records. Sales performance was operationalized using the total year bonus per sales rep. Sales boni are based on (1) achieved sales levels (80% of bonus) and (2) behavioral sales performance criteria (e.g. professional development and customer focus) assessed by the focal sales rep's

immediate supervisor (20% of bonus). This measure was assembled approximately two months after the final survey data collection was completed.

5.5.9. Control Factors

Control factors were added to our model to test the effects of information technology usage, and the related information based benefits on sales performance, in the presence of other important variables which may also affect sales performance. The purpose of examining covariates is to help *rule out rival explanations* for our findings as well as to look for the boundaries of the hypothesized effects (Draper and Smith 1980). The covariates we used were: (1) the length of time a sales rep has been with the company, (2) the length of time a sales rep has been working in his/her territory, (3) total sales experience, (4) the average number of hours a sales rep works in a week. Including these control factors is consistent with many other studies from the sales literature that have found these effects to significantly explain individual sales person performance (e.g. Churchill et al. 1985; Brown and Peterson 1994; Sujan et al. 1994; Ahearne 1998).

In line with the procedures recommended by Draper and Smith (1980) and Green (1978), the effects of the control variables on sales performance were partialled out prior to testing the research hypotheses. The results of this analysis are presented in Chapter 7, section 7.3. p. 123.

5.6. Non-response Bias Analyses

Although non-response bias is less of an issue in surveys that generate high response rates (Malhotra and Birks 2000; Fowler 1993), we conducted a response bias analysis using the same procedure as in section 4.5, p. 77. The results of this analyses are reported in Table 5-2. The entries in this table show that we found no evidence of response bias in our sample. Both respondent groups differ on only one of the key variables used in this study (i.e. targeting skills). For all the other variables the null hypotheses that the means of both groups are the same can not

be rejected. Hence, the observation of a significant difference on targeting skills makes no sense as the distortion is not systematically related to the subject matter. In combination with the fact that we achieved a large response in this study, we do not expect a bias to occur in our results.

TABLE 5-2 COMPARISON OF MEANS BETWEEN EARLY AND LATE RESPONDENTS

	Mean Early Respondents[1]	Mean Late Respondents[2]	Two-Sample t	p-values (2-tailed)
Salesperson Performance[5]	-11.52	-11.14	-.08 [3]	.93
Information Technology Infusion [6]	5.45	5.31	.81 [3]	.42
Call Productivity [6]	1000.2	975.41	.46 [3]	.65
Adaptive Selling [6]	5.89	5.83	.46 [4]	.65
Sales Planning [6]	5.70	5.84	-1.15[3]	.25
Market Knowledge [6]	4.66	4.43	.91[3]	.37
Technical Knowledge [6]	5.87	5.83	.25[4]	.80
Sales Presentation [6]	5.38	5.10	1.36[3]	.17
Targeting Skills [6]	5.40	5.01	2.03 [3]	.04

[1]: n=134

[2]: n=53

[3]: Levene's test for equality of variances indicated that the null hypotheses of equal variances can be accepted

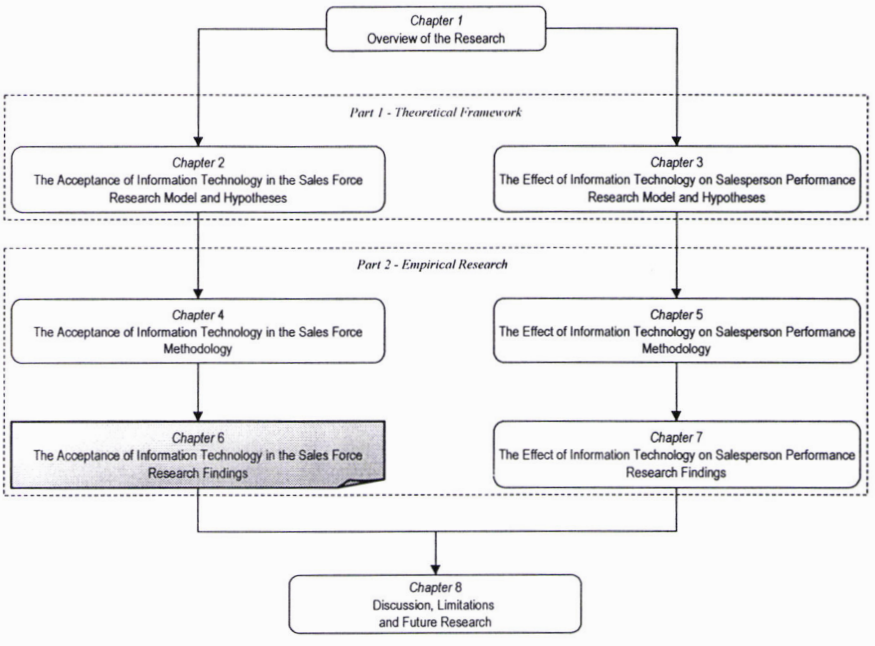
[4]: Levene's test for equality of variances indicated that the null hypotheses of equal variances can not be accepted. The test with 'equal variances not assumed' was used.

[5]: Based on unstandardized residuals after partialing out covariates (see Chapter 7 for details)

[6]: Mean composite score of items used in empirical test of the research model (see Chapter 7 for details)

CHAPTER STRUCTURE

Chapter 6 The Acceptance of Information Technology in the Sales Force: Research Findings



6.1. Introduction

The research model relating to *the acceptance of information technology by salespeople*, discussed in chapter 2, was tested using data from a cross-sectional survey of salespeople. For the criterion variable acceptance, data were also gathered from a second source, namely the focal sales rep's sales manager.

In section 6.2. we discuss the data screening procedure executed prior to the analyses. Section 6.3. overviews the confirmatory factor analysis. In section 6.4. we assess the impact of the covariate sales task complexity. Section 6.5. presents the empirical test of the structural research models.

6.2. Data Screening

Before the actual analysis started, the raw data were inspected. First, the data set was checked for coding errors using descriptive statistics. The original questionnaires were consulted for those cases with coding errors (Baumgartner and Homburg 1996). Next, negatively stated items were reverse coded. Finally, no cases with missing data were found in the final sample[1].

A multivariate procedure for identifying outliers was used based on the Mahalanobis D^2 measure (Hair et al. 1998). The Mahalanobis D^2 is a measure of the distance in the multidimensional space of each observation from the mean center of the observations. For each observation the Mahalanobis D^2 statitistic was calculated based on all 57 items used in the independent constructs. The value obtained by dividing Mahalanobis D^2 by its degrees of freedom ($=D^2/df$) is approximately t-distributed. This statistic can be used for designating an observation as an eventual outlier. In doing so, the conservative level of p=.0005 was used as a threshold value (i.e. critical t-value = 3.628). The largest D^2/df-value observed in our sample was 1.71. As this value is lower that the critical t-value, no multivariate outliers were found with respect to all our items used.

Structural equation models may be sensitive to the distributional characteristics of the data, such as a departure of normality. The analysis for univariate and multivariate normality was conducted using PRELIS (Jöreskog and Sörbom 1993). An analysis of the skewness and kurtosis of the observed variables revealed that most variables departed significantly from normality. However, the statistics showed that these violations were moderate[2]. Furthermore, maximum likelihood (see below section 6.3.) parameter estimates are rather robust against

[1] Note that in an earlier assessment of the original questionnaires, 25 surveys were eliminated because of very incomplete responses. Also, the data were screened on the acceptance items before aggregation as described in chapter 4.

[2] Maximum absolute value for skewness or kurtosis z-score was 4.56. Most p-values for skewness and kurtosis were higher than 0.01-level.

this kind of violation, provided that sample size exceed about 100 observations (Steenkamp and van Trijp 1991; Boomsma 1982; Gerbing and Anderson 1985).

6.3. Confirmatory Factor Analyses

The actual psychometric properties of our final measures were tested by means of confirmatory factor analysis procedures in Lisrel8.30 (Jöreskog and Sörbom, 1996) using the Maximum Likelihood estimation procedure and the covariance matrix as input. Following the guidelines proposed by Anderson and Gerbing (1988) a two step approach for testing structural models was used. In order to isolate the sources of misspecification, the psychometric properties of our scales were assessed by means of a "piecewise" model fitting approach (Costner and Schoenberg 1973). Bentler and Chou (1987) also suggest that scale assessment should be conducted by examining smaller confirmatory models in instances where the number of constructs and items is large. Hence, we conducted our measurement analyses on separate sets of related constructs prior to estimating an overall model. Once the reliability, validity and model fit within each of the categories was established, an overall confirmatory factor analysis on the entire set of constructs was conducted.

We conducted confirmatory factor analyses on the following groups of variables: (1) the measures of acceptance and TAM, (2) the personal variables relating to Personal Innovativeness and Computer Self-Efficacy and (3) the external environmental variables relating to organizational facilitators, supervisor pressure, peer usage, customer influence and competitive pressure. Table 6-1 lists all the items used in this study and the final model as well as the reason for dropping specific items. Appendix 3 (p. 187) reports the covariance matrix used in this study.

Once the reliability, validity and model fit within each of the categories was established, an overall confirmatory factor analysis on the entire set of constructs was conducted.

TABLE 6-1 LIST OF ITEMS USED AND RETAINED IN MODEL

Individual Acceptance	
Compared to other sales reps ... is a frequent user of our SA-system + I consider myself a frequent user of my company's SA tool	acc1
Compared to other sales reps ... has completely integrated our SA-applications into sales processes + I have completely integrated our SA applications into my sales process	acc2
Compared to other sales reps... fully uses the capabilities of our SA-system + I fully use the capabilities of our SA program	acc3
Usefulness	
Using our SA-system improves my job performance	useful1
Using our SA-program in my job increases my productivity	useful2
Using our SA-applications enhances my effectiveness in my job	useful3
I find our SA-system useful in my job	useful4
Perceived Ease of Use	
I find our SA-system easy to use	eou1
I find it easy to get the SA-system to do what I want it to do	eou2
My interaction with our SA-system is clear and understandable	eou3
Using our SA-system does not require a lot of my mental effort	eou4
Organizational Facilitators	
Training	train
My company has extensively trained me in the use of our SA-tool	train1
My company provided me complete instructions and practice in using our SA-tool	train2
There is not enough training for me on how to understand and use our SA-system (r) [a]	train3
I am getting the training I need to be able to use our SA-tool effectively	train4
Technical User Support	techsupp
I know where to turn to when I need any assistance with our SA-technology	tecsupp1
In my company a specific person or group is always available for assistance in resolving difficulties with our SA-system	tecsupp2
In my company we get good technical support for our SA-system	tecsupp3
We have extensive support to help with problems related to our SA-system	tecsupp4
Organizational Implementation Effort	orgimpl
From a top management level there is strong interest in our SA-system	orgimpl1
The usage of the SA–tool is strongly championed and advocated by our organization	orgimpl2
Extensive internal communication campaigns have promoted our SA-system	orgimpl3
My company spared no efforts in terms of internal marketing to promote our SA-tool	orgimpl4
Top management shows clear and visible commitment towards our SA-tool	orgimpl5
Supervisor Influence	
I am continuously encouraged by my immediate supervisor to use our SA-tool in my job	supinfl1
My immediate supervisor explicitly supports my using of our SA-system	supinfl2
My immediate supervisor repeatedly refers to the importance of using our SA-system during my sales job	supinfl3
My immediate supervisor truly believes in the benefits of our SA system [a]	supinfl4
Peer Usage	
The majority of my sales colleagues in my department use our SA-tool	orguse1
In my sales organization, our SA-program is heavily employed by everyone	orguse2
I do not know of many others in my department using our SA-system (r) [a]	orguse3
A lot of my sales colleagues rely on our SA-technology	orguse4

TABLE 6-1

(Continued)

Customer Influence	
My customers show great interest when I use information technologies	custit1
My customers encourage me to use information technology [a]	custit2
Many of my customers like it when I rely upon any form of information technology	custit3
The fact that I use information technologies is very appealing to my customers	custit4
My customers expect me to use information technology	custit5
Competitive Pressure	
Our competitors' sales reps use information technology extensively [a]	compit1
Our competitors' sales forces are equipped with up-to-date information technology	compit2
Competing sales executives use a lot of sales technology	compit3
Our competitors' salespeople rely on information technology in dealing with their customers	compit4
Innovativeness	
Instruction The following set of statements relates to your thoughts about information technology (IT) in general. The statements refer to your attitudes towards all "new IT and computer applications" you may possibly encounter in and outside your job.	
In general, I am hesitant to try out new IT (r) [b]	innov1
If I heard about a new IT, I would look for ways to experiment with it	innov2
I tend to be among the first to use new IT [a]	innov3
I must see other people using IT innovations before I will use them (r)	innov4
Among my peers, I am usually among the first to explore new IT	innov5
I am receptive to new IT	innov6
I often find myself skeptical of new IT (r)	innov7
I rarely trust new IT until I can see the vast majority of people around me accept them (r)	innov8
I like to experiment with new IT [a]	innov9
Computer Self-Efficacy	
Instruction Imagine that you were given a new software package for some aspect of your work. It does not matter specifically what this software package does, only that it is intended to make your job easier and that you have never used it before. The following questions ask you to indicate whether you could use this unfamiliar software package under a variety of conditions. Please rate the extent to which you are confident that you would be able to complete the job using the software package (1 being Not at all Confident and 7 Extremely Confident).	
I could complete the job using the software package …	
… if there was no one around to tell me what to do as I go [a]	cseff1
… if I had never used a package like it before [a]	cseff2
… if I had only the software manuals for reference [a]	cseff3
… if I had seen someone else using it before trying it myself	cseff4
… if I could call someone for help if I got stuck	cseff5
… if someone else had helped me get started [a]	cseff6
… if I had a lot of time to complete the job for which the software was provided	cseff7
… if I had just the built-in help facility for assistance	cseff8
… if someone showed me how to do it first	cseff9
… if I had used similar packages before this one to do the same job	cseff10

[a] indicates the item was dropped in confirmatory factor analysis because of high residuals and/or modification indices

[b] indicates the item was deleted in confirmatory factor analysis for failure of meeting criteria of acceptable reliability

(r) indicates item was reverse scored

6.3.1. Measurement Model Assessment

For each of the confirmatory models tested, a series of tests was performed to assess (1) the overall model fit (2) unidimensionality, (3) convergent validity, (4) reliability and (5) discriminant validity of each construct.

A first basic step in assessing *overall model fit* was a review of "offending estimates". Offending estimates are values of estimated parameters that are unacceptable. Examples are negative error variances (Heywood cases) and standardized coefficients exceeding 1.0 (Bollen 1989; Hair et al. 1998). Next, the overall goodness-of-fit for each model was assessed. The most popular index for testing model fit has been the χ^2 goodness-of-fit statistic (Baumgartner and Homburg 1996; Hu and Bentler 1999). Because of its sensitivity to distributional assumptions and sample size, however, the χ^2 statistic is considered to be of limited usefulness (Baumgartner and Homburg 1996; Bentler 1990; Bagozzi and Baumgartner 1994; Cudeck and Brown 1983). In an effort to deal with this problem, many researchers have developed alternative fit indices and it is recommended that model fit is assessed based on multiple fit indices (Baumgartner and Homburg 1996; Bollen and Long 1993; Bentler and Bonnet 1980). Based on the recommendations made by Baumgartner and Homburg (1996) and Hu and Bentler (1999) we use four absolute and three incremental fit indices (listed in Table 6-2) and compare the model values to the recommended cut off values.

TABLE 6-2 MODEL FIT INDICES AND CUT OFF VALUES

Fit Indices	Recommended cut off values indicating good fit	
χ^2	p>0.05	Bollen (1989)
χ^2/df	≤ 2 to 5	Marsh and Hovecar (1985)
RMSEA	Close to 0.06 - till 0.08	Hu and Bentler (1999); Hair et al. (1998)
SRMR	Close to 0.08	Hu and Bentler (1999)
NNFI/TLI	> 0.90 - Close to 0.95	Hair et al. (1998); Hu and Bentler (1999)
CFI	Close to 0.95	Hu and Bentler (1999)

The test for *unidimensionality* of each scale, or the existence of one construct underlying a set of items, was automatically proven by the previous analysis step when the particular model showed good overall fit (Steenkamp and van Trijp 1991). In the case of unacceptable fit, the models were re-specified (i.e. indicators were deleted) based on the analysis of the modification indices and standardized residuals (Anderson and Gerbing 1988; Steenkamp and van Trijp 1991; Baumgartner and Homburg 1996).

Unidimensionality is a necessary step for testing the convergent validity and reliability of each measure (Steenkamp and van Trijp 1991). A scale possesses *convergent validity* if all indicator loadings are statistically significant and substantial. Bagozzi and Baumgartner (1994) suggests that the lower acceptable bound of the squared correlation between the item and the construct (i.e. the individual item reliability) is 0.4. The *reliability* of each scale was assessed jointly for all measures of a construct by computing the composite reliability and average variance extracted (Bagozzi and Yi 1988; Fornell and Larcker 1981; Steenkamp and van Trijp 1991; Baumgartner and Homburg 1996; Bagozzi and Baumgartner 1994). For a scale to possess good reliability, composite reliability should be between 0.60 and 0.80 and the average variance extracted at least 0.50 (Bagozzi and Yi 1988). The *discriminant validity* of the constructs was assessed through the basic test of whether the correlations among the latent constructs are significantly less than 1.0. Subsequently, a stronger test for discriminant validity provided by Fornell and Larcker (1981) was performed. This test stipulates that a scale possesses discriminant validity if the average variance extracted by the underlying construct is larger than the shared variance (i.e. the squared intercorrelation) with other latent constructs.

The results of the entire multi-step modeling approach are reported in Tables 6-3 through 6-7. These tables outline the final measures estimated for each sub-group of variables, the model fit statistics, their standardized factor loadings and a reliability and validity assessment for each multi-item construct. We can summarize the findings of these analyses as follows. None

of the models contained offending estimates. Although the χ^2 statistic is significant for all models, all models fit the data very well when considering alternative fit indices. Hence, each latent construct is unidimensional. All individual item reliabilities are higher than 0.40, the lowest composite reliability is 0.80 and the lowest average variance extracted is equal to 0.52. Consequently, constructs possess adequate convergent validity and reliability. As the fit indices show, our overall hypothesized measurement model fits the data well (Table 6-6). As could be expected the validity and reliability also hold in the full model. For testing the discriminant validity, we need to turn to the correlation matrix of the latent constructs (Table 6-7). This table shows that the criteria for discriminant validty are easily met as none of the squared correlations between a pair of latent constructs is larger than the average variance extracted of the respective constructs (Fornell and Larcker 1981).

6.3.2. Acceptance and TAM Measures

As explained earlier, the three indicators of acceptance consist of the three acceptance measures averaged across the reports of the sales rep and his/her manager. All items of the central TAM constructs were retained. In fact, both the acceptance measure and TAM constructs exhibit good psychometric properties: all factor loadings are substantial and the scales posses good reliability with the lowest composite reliabilities equal to .67 and the lowest average variance extracted equal to .86. For the measures of TAM, these results confirm the findings of previous empirical studies. The confirmatory model also fitted the data well: χ^2 equal to 77.19 (d.f. = 41; P = 0.00054), a RMSEA = 0.073, a SRMR equal to 0.042, the NNFI = 0.96 and a CFI of 0.97.

6.3.3. Personal Innovativeness and Computer Self-Efficacy Measures

Six of the nine items were retained for measuring personal innovativeness. The purified scale possesses adequate psychometric properties: composite reliability is .86 and the average variance extracted .52. Although the scale of computer self-efficacy had shown adequate psychometric properties in previous studies, four items of the original 10 item scale were

eliminated in this study. The purified scale possessed adequate convergent validity and reliability indices: composite reliability was .87 and the average variance extracted .53. The confirmatory model also had a good fit to the data: χ^2 equal to 73.43 (d.f. = 53; P = 0.033), a RMSEA = 0.048, a SRMR equal to 0.049, the NNFI = 0.96 and a CFI of 0.97.

TABLE 6-3 CONFIRMATORY FACTOR ANALYSIS – ACCEPTANCE AND TAM MEASURES

	Standardized Loadings	Squared Multiple Correlation	Composite Reliability	Average Variance Extracted
Acceptance			**.86**	**.68**
… a frequent user of company's SA-tool	.73	.53		
… fully use the capabilities of SA-program	.90	.81		
… completely integrated SA-applications into sales process	.81	.65		
Usefulness			**.96**	**.86**
Using our SA-system improves my job performance	.95	.90		
Using our SA-program in my job increases my productivity	.93	.86		
Using our SA-applications enhances my effectiveness in my job	.95	.91		
I find our SA-system useful in my job	.87	.76		
Ease of Use			**.89**	**.67**
I find our SA-system easy to use	.88	.77		
I find it easy to get the SA-system to do what I want it to do	.89	.79		
My interaction with our SA-system is clear and understandable	.87	.76		
Using our SA-system does not require a lot of my mental effort	.63	.40		
Goodness of Fit Statistics				
df = 41				
χ^2 = 77.19 (P = 0.00054)				
RMSEA = 0.073				
SRMR = 0.042				
Non-Normed Fit Index (NNFI) = 0.96				
Comparative Fit Index (CFI) = 0.97				

TABLE 6-4 CONFIRMATORY FACTOR ANALYSIS – PERSONAL MEASURES

	Standardized Loadings	Squared Multiple Correlation	Composite Reliability	Average Variance Extracted
Personal Innovativeness			**.86**	**.52**
If I heard about a new IT, I would look for ways to experiment with it	.69	.47		
I must see other people using IT innovations before I will use them	.66	.43		
Among my peers, I am usually among the first to explore new IT	.81	.66		
I am receptive to new IT	.76	.58		
I often find myself skeptical of new IT	.64	.41		
I rarely trust IT until I can see that the vast majority of people around me accept them	.71	.51		
Computer Self-Efficacy			**.87**	**.53**
I could complete the job using the software package …				
… if I had seen someone else using it before trying it myself	.87	.76		
… if I could call someone for help if I got stuck	.69	.48		
… if I had a lot of time to complete the job for which the software was provided	.64	.40		
… if I had just the built-in help facility for assistance	.72	.52		
… if someone showed me how to do it first	.64	.41		
… if I had used similar packages before this one to do the same job	.69	.48		
Goodness of Fit Statistics				
df = 53				
χ^2 = 73.43 (P = 0.033)				
RMSEA = 0.048				
SRMR = 0.049				
Non-Normed Fit Index (NNFI) = 0.96				
Comparative Fit Index (CFI) = 0.97				

6.3.4. External Variables: Social Influences and Organizational Facilitators

The psychometric properties of this set of external variables are good. First, all factor loadings are significant and substantial. Next, the lowest composite reliabilities (i.e. .80) and the lowest average variance extracted (i.e. .57) of all measures, exceed the proposed threshold values. The original scales of peer usage and superior influence were reduced to three item measures.

TABLE 6-5 CONFIRMATORY FACTOR ANALYSIS – MEASURES SOCIAL INFLUENCE AND ORGANIZATIONAL FACILITATORS

	Standardized Loadings	Squared Multiple Correlation	Composite Reliability	Average Variance Extracted
Competitive Pressure			**.95**	**.81**
Our competitors' sales reps use information technology extensively	.85	.73		
Our competitors' sales forces are equipped with up-to-date information technology	.94	.88		
Competing sales executives use a lot of sales technology	.88	.77		
Our competitors' salespeople rely on information technology in dealing with their customers	.94	.87		
Customer Influence			**.92**	**.74**
My customers show great interest when I use information technologies	.84	.70		
Many of my customers like it when I rely upon any form of information technology	.91	.83		
The fact that I use information technologies is very appealing to my customers	.93	.87		
My customers expect me to use information technology	.78	.61		
Peer Usage			**.92**	**.80**
The majority of my sales colleagues in my department use our SA-tool	.93	.86		
In my sales organization, our SA-program is heavily employed by everyone	.88	.77		
A lot of my sales colleagues rely on our SA-technology	.89	.79		
Supervisor Influence			**.89**	**.73**
I am continuously encouraged by my immediate supervisor to use our SA-tool in my job	.89	.79		
My immediate supervisor explicitly supports my using of our SA-system	.77	.60		
My immediate supervisor repeatedly refers to the importance of using our SA-system during my sales job	.88	.77		
Organizational Facilitators			**.80**	**.57**
Summated score for User Training	.67	.45		
Summated score for Technical User Support	.74	.55		
Summated score for Organizational Implementation	.86	.75		
	Goodness of Fit Statistics			
	df = 109			
	χ^2 = 213.61 (P = 0.00)			
	RMSEA = 0.076			
	SRMR = 0.066			
	Non-Normed Fit Index (NNFI) = 0.94			
	Comparative Fit Index (CFI) = 0.95			

The original measures reflecting training, technical user support and organizational implementation effort were refined using a separate confirmatory factor analyses first. The measure of organizational facilitators was then modeled as a second order factor with

composite scores of the three refined sub-dimensions as indicators. The confirmatory model also fitted the data well: χ^2 equal to 213.61 (d.f. = 109; P = 0.00), a RMSEA = 0.076, a SRMR equal to 0.066, the NNFI = 0.94 and a CFI of 0.95.

6.3.5. Overall Confirmatory Factor Analysis

As a final step in the analysis of our measurement model, an overall confirmatory factor analysis was conducted on all items that had been retained based on the previous analysis (see Table 6-6). The goals of such an overall analysis are (1) to check whether the validity and reliabilities of the scales hold up in the full, (2) assess how well the data fit the hypothesized factor model and (3) to assess the discriminant validity of the constructs. The analysis of the modification indices and residuals in the original confirmatory factor analysis, suggested that deleting two measures would improve the fit of the model. More specifically, the fourth item of customer influence and the first of competitive pressure were dropped.

The results show that the factor structure and psychometric properties hold up in the full model. The fit indices of the overall model show good fit with χ^2 equal to 833.75 (d.f. = 620; P = 0.00), a RMSEA = 0.045, a SRMR equal to 0.058, the NNFI = 0.93 and a CFI of 0.94. The intercorrelations among the latent constructs are tabulated in Table 6-7. This table shows that the criteria for discriminant validity were easily met: the shared variance between each pair of constructs was never larger than the average extracted from the items (Fornell and Larcker 1981).

TABLE 6-6 OVERALL CONFIRMATORY FACTOR ANALYSIS (N=168)

	Standardized Loadings	Squared Multiple Correlation	Composite Reliability	Average Variance Extracted
Acceptance			**.86**	**.68**
... a frequent user of company's SA-tool	.73	.53		
... fully use the capabilities of SA-program	.90	.81		
... completely integrated SA-applications into sales process	.81	.65		
Usefulness			**.96**	**.86**
Using our SA-system improves my job performance	.95	.90		
Using our SA-program in my job increases my productivity	.93	.86		
Using our SA-applications enhances my effectiveness in my job	.95	.91		
I find our SA-system useful in my job	.87	.76		
Ease of Use			**.89**	**.67**
I find our SA-system easy to use	.87	.76		
I find it easy to get the SA-system to do what I want it to do	.89	.79		
My interaction with our SA-system is clear and understandable	.87	.76		
Using our SA-system does not require a lot of my mental effort	.63	.39		
Personal Innovativeness			**.86**	**.51**
If I heard about a new IT, I would look for ways to experiment with it	.68	.46		
I must see other people using IT innovations before I will use them	.65	.42		
Among my peers, I am usually among the first to explore new IT	.82	.67		
I am receptive to new IT	.77	.59		
I often find myself skeptical of new IT	.64	.41		
I rarely trust IT until I can see that the vast majority of people around me accept them	.72	.51		
Computer Self-Efficacy			**.87**	**.53**
I could complete the job using the software package ...				
... if I had seen someone else using it before trying it myself	.87	.76		
... if I could call someone for help if I got stuck	.69	.48		
... if I had a lot of time to complete the job for which the software was provided	.63	.40		
... if I had just the built-in help facility for assistance	.72	.52		
... if someone showed me how to do it first	.65	.42		
... if I had used similar packages before this one to do the same job	.70	.49		
Competitive Pressure			**.94**	**.84**
Our competitors' sales forces are equipped with up-to-date information technology	.94	.87		
Competing sales executives use a lot of sales technology	.88	.78		
Our competitors' salespeople rely on information technology in dealing with their customers	.93	.87		
Customer Influence			**.92**	**.80**
My customers show great interest when I use information technologies	.85	.72		
Many of my customers like it when I rely upon any form of information technology	.93	.86		
The fact that I use information technologies is very appealing to my customers	.91	.83		
Peer Usage			**.92**	**.80**
The majority of my sales colleagues in my department use our SA-tool	.93	.86		
In my sales organization, our SA-program is heavily employed by everyone	.87	.77		
A lot of my sales colleagues rely on our SA-technology	.89	.79		
Supervisor Influence			**.89**	**.73**
I am continuously encouraged by my immediate supervisor to use our SA-tool in my job	.89	.79		
My immediate supervisor explicitly supports my using of our SA-system	.77	.60		
My immediate supervisor repeatedly refers to the importance of using our SA-system during my sales job	.87	.76		
Organizational Facilitators			**.82**	**.60**
Summated score for User Training	.73	.54		
Summated score for Technical User Support	.78	.61		
Summated score for Organizational Implementation	.80	.64		
	Goodness of Fit Statistics			
	$df = 620 - \chi^2 = 833.75$ (P = 0.00)			
	RMSEA = 0.045 - SRMR = 0.058			
	Non-Normed Fit Index (NNFI) = 0.93			
	Comparative Fit Index (CFI) = 0.94			

TABLE 6-7: CONSTRUCT CORRELATIONS [a]

Construct	1	2	3	4	5	6	7	8	9	10
1. Acceptance	--									
2. Usefulness	.61** (.06) [b]	--								
3. Ease of Use	.54** (.06)	.68* (.05)	--							
4. Computer Self-Efficacy	.23** (.08)	.23** (.08)	.32** (.08)	--						
5. Personal Innovativeness	.39** (.08)	.31** (.08)	.29** (.08)	.55** (.07)	--					
6. Supervisor Influence	.42** (.07)	.21 (.08)	.25** (.08)	.18** (.08)	-.02 (.09)	--				
7. Peer Usage	.37** (.08)	.31** (.07)	.29** (.08)	.04 (.09)	-.11 (.09)	.55** (.06)	--			
8. Customer Influence	.26** (.08)	.27** (.08)	.37** (.07)	.23** (.08)	.32** (.08)	.08** (.08)	.02 (.08)	--		
9. Competitive Pressure	.33** (.08)	.22** (.08)	.31** (.08)	.18** (.08)	.09 (.08)	.10** (.08)	.25** (.08)	.37** (.07)	--	
10. Organizational Efforts	.50** (.07)	.37** (.08)	.46** (.07)	.06 (.09)	.02 (.09)	.61** (.06)	.55** (.07)	.26** (.08)	.09 (.09)	--

* p<.10; ** p<.05 N = 168

[a] Intercorrelations are among latent constructs (Φ matrix from confirmatory factor analysis) and thus corrected for attenuation due to measurement error.

[b] Entries in parenthesis are standard errors.

6.4. Covariates

Prior to testing the structural model and the research hypotheses, we assessed the effect of *sales task complexity* as a control variable. The objective of examining this covariate is to help rule out rival explanations for our findings and to look for the boundaries of the hypothesized effects (Draper and Smith 1980). Investigating the effect of sales task complexity on technology acceptance is in line with empirical studies from the innovation adoption and information systems literature (Gatignon and Robertson 1989; Goodhue and Thompson 1995; Ghani 1992). In order to measure sales task complexity, we used four measures based on Goodhue and Thompson (1995). The Cronbach's α for the measure was .73.

Subsequently, the mean composite score of sales task complexity was regressed on the composite score of the acceptance measure. The results of this regression analysis indicated that the regression equation was not significant ($F_{(1,166)}$=.008; significance = .93; R^2=.00). Hence, sales task complexity did not explain any of the variance in the acceptance variable

(standardized coefficient = .007, t-value = .09, significance = .93). Therefore, we excluded this covariate from further analysis. This result is similar to the findings of Gatignon and Robertson (1989) who did not find a significant relationship between selling task complexity and the organizational adoption of laptop computers in sales organizations.

This finding is important in the context of this study because it does not provide evidence for the fact that the acceptance behavior by individual salespeople is contingent upon the sales situation.

6.5. Structural Model Testing

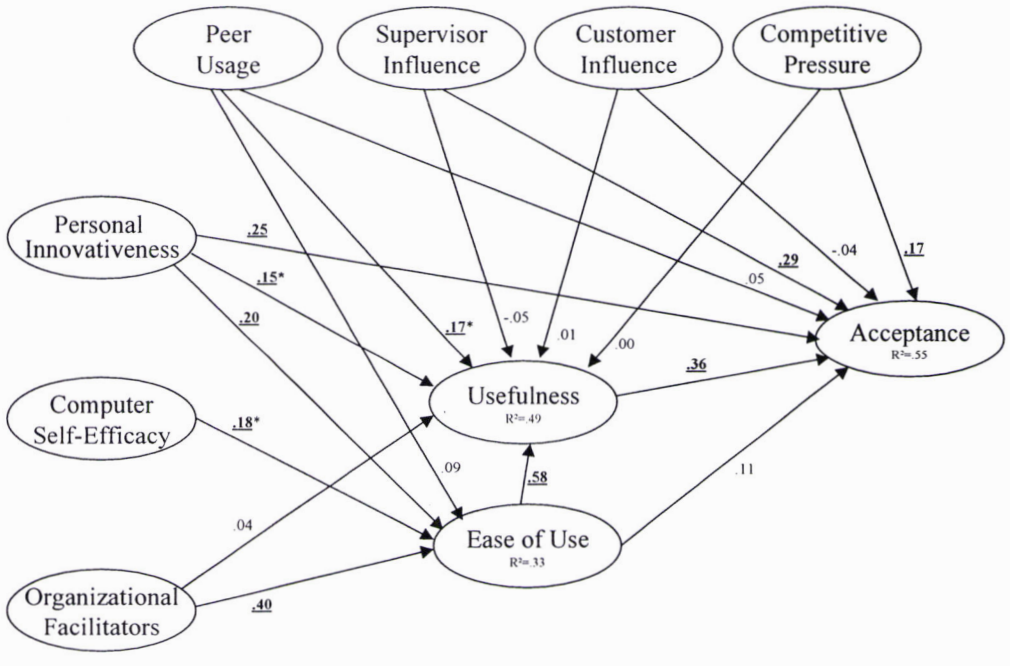
Once the proposed measurement model was consistent with the data, the hypothesized structural paths were estimated. Because it is recommended that researchers compare the performance and robustness of their hypothesized model against "plausible" alternative models (Bollen and Long 1992; Hair et al. 1998; Morgan and Hunt 1994), a rival and "revised" model were tested. The rival model allowed additional direct paths from computer self-efficacy and organizational facilitators (i.e. estimating all β and γ-relationships). In the "revised" model, all non-significant paths were removed from the preferred model and the model was re-estimated ("best"/revised model). The models were compared to establish which model was preferred. Table 6-8 summarizes the results of these analyses.

6.5.1. Empirical Test of the Hypothesized Model

The hypothesized model is visualized in Figure 6-1. Significant paths in the models are bold and underlined. These significant relationships are indicative for a supported hypothesis. The coefficients of determination (i.e. percentage of variance explained in the latent construct), are also represented for the endogenous constructs.

The "hypothesized model"-column of Table 6-8 contains the standardized parameter estimates, the goodness-of-fit statistics and the coefficients of determination for the hypothesized model. As appears from this table, the hypothesized model fits the data well (χ^2 equal to 857.85 with d.f. = 626, a RMSEA = 0.047, a SRMR equal to 0.065, the NNFI = 0.92 and a CFI of 0.93) and all significant relationships are in the hypothesized direction, thus providing evidence for the nomological validity of our model (Steenkamp and van Trijp 1991). Also, the independent variables account for a substantial proportion in the variance of the criterion variables ($R^2_{easeofuse}$=.33; $R^2_{usefulness}$=.49 and $R^2_{acceptance}$=.55).

FIGURE 6-1 HYPOTHESIZED MODEL



6.5.2. Comparing the Hypothesized Model and Rival Model

The hypothesized model was compared with a rival model including all β and γ-relationships. More specifically, this implies that three additional relationships are estimated, namely direct

effects from organizational facilitators and computer self-efficacy on acceptance and a relationship between computer self-efficacy and usefulness.

We compare this rival model with the hypothesized model by means of a χ^2 difference test. A non-significant difference between both models would suggest that our hypothesized model is preferred. By conducting the χ^2 difference test (i.e. $\Delta\chi^2 = 9.16$ with 3 df -- $\Delta\chi^2$-value compared to critical value 7.81) one can conclude that there is a significant difference between both models. Hence, the drop in the χ^2-statistic is significant. This means that the rival model fits the data better than our hypothesized model. The improved fit of the rival model is also reflected in one of the alternative fit indices: SRMR is 0.063. Checking the coefficients of the additional paths estimated, shows that the direct path coefficient from organizational facilitators to acceptance is 0.22 and close to significance at the $p = .05$ level (t-value = 1.95). This direct path may be the reason for the enhanced fit of the alternative model. In fact, the LISREL modification indices provided for the hypothesized model also suggest that the model fit could be significantly improved by freeing up the same path. Although a direct effect of the external variable organizational facilitators runs counter to the theoretical assertions of TAM, this additional path has a theoretical explanation (Hair et al. 1998). Such a direct path suggests that the organizational efforts for implementing sales automation in the sales force, may contribute positively to individual acceptance through other means than enhanced beliefs of usefulness and ease of use.

6.5.3. The "Best" or Revised Model

The final step in our estimation procedure was to remove all non-significant paths from our hypothesized models. The rationale for doing so is to provide a more parsimonious representation of the data: it is better to have more degrees of freedom, all else being equal. The end result of this procedure can therefore be labeled as the "best" model. As reported in Table 6-8 the "best" model has very good fit statistics: χ^2 equal to 851.36 (d.f. = 633), a

RMSEA = 0.045, a SRMR equal to 0.065, the NNFI = 0.93 and a CFI of 0.93. By comparing the "best" with the rival model, one notices that the χ^2 difference test is not significant. Still, the revised model is preferred compared to the rival model because: (1) the other alternative fit indices are similar for both models, (2) the rival model is less parsimonious, (3) in the rival model a lower percentage of estimated paths was significant (55%) as opposed to the revised model (100%) and (4) the revised model only sacrifices little explanatory power (Morgan and Hunt 1994).

Note also that by removing all non-significant paths, the paths from peer usage and personal innovativenss to usefulness and the direct path from organizational facilitators to acceptance become significant at the $p < .05$-level, instead of the $p < .10$-level. Similarly, the path from computer self-efficacy to ease of use becomes significant. On the other hand, the effect of personal innovativeness on ease of use becomes borderline significant (at the $p < .10$-level). The revised model is visualized in Figure 6-2 below.

FIGURE 6-2 "BEST"/REVISED MODEL

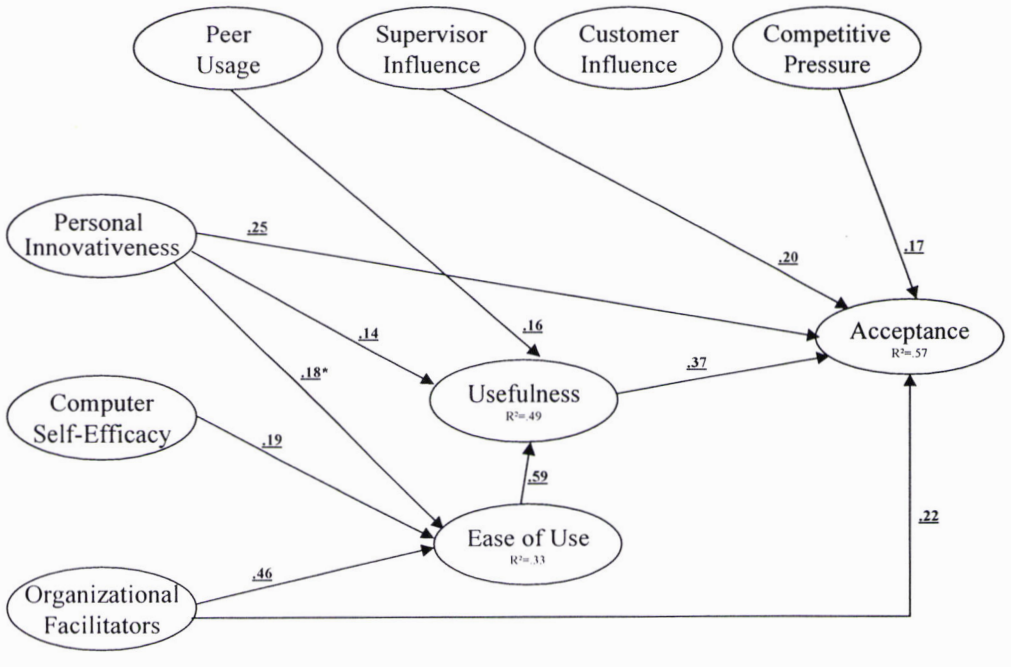


TABLE 6-8 FIT INDICES FOR PROPOSED, RIVAL AND REVISED MODEL (N=168)

Fit statistics	Hypothesized model	Rival model all β-γ-relationships	Revised ("Best") model
df	626	623	633
χ^2	857.85	848.09	851.36
χ^2/df	1.37	1.36	1.34
RMSEA	0.047	0.047	0.045
SRMR	0.065	0.063	0.065
NNFI	0.92	.92	.93
CFI	0.93	.93	.93
Usefulness → Acceptance	**.36**	**.34**	**.37**
Ease of Use → Acceptance	.11	.07	---
Innovativeness → Acceptance	**.25**	**.35**	**.25**
Supervisor Influence → Acceptance	**.29**	**.22**	**.20**
Peer Usage → Acceptance	.05	-.01	---
Customer Influence → Acceptance	-.04	-.10	---
Competitive Pressure → Acceptance	**.17**	**.21**	**.17**
Ease of Use → Usefulness	**.58**	**.59**	**.59**
Innovativeness → Usefulness	**.15***	**.18**	**.14**
Organizational Facilitators → Usefulness	.04	.02	---
Supervisor Influence → Usefulness	-.05	-.03	---
Peer Usage → Usefulness	**.17***	**.16***	**.16**
Customer Influence → Usefulness	.01	.01	---
Competitive Pressure → Usefulness	.00	.01	---
Innovativeness → Ease of Use	**.20**	**.20**	**.18***
Organizational Facilitators → Ease of Use	**.40**	**.40**	**.46**
Computer Self Efficacy → Ease of Use	**.19**	**.19**	**.19**
Peer Usage → Ease of Use	.09	.09	---
Organizational Facilitators → Acceptance	---	**.22***	**.22**
Computer Self-Efficacy → Acceptance	---	-.13	---
Computer Self-Efficacy → Usefulness	---	-.07	---
% variance explained			
Acceptance	.55	.59	.57
Usefulness	.48	.49	.49
Ease of Use	.33	.33	.33

All *underlined* and *bold* coefficients significant at a $p<0.05$ level except * which are significant at $p<0.10$.

6.5.4. Hypotheses Test Results

Many of our hypothesized relationships are supported. We find support for a direct positive effect of usefulness, personal innovativeness, supervisor influence and competitive pressure on a salesperson's acceptance of SA ($H_{2.1}$; $H_{2.6}$; $H_{2.15}$ and $H_{2.18}$ supported). Although not hypothesized, we found a significant direct effect of organizational efforts on acceptance. The effect of these five variables was substantial, explaining 57 percent of the variance in acceptance. Also, note that these relationships are quite robust as our measure of acceptance is assessed by two informants.

In contrast, the direct paths from ease of use, peer usage and customer influence to acceptance were not significant ($H_{2.2}$, $H_{2.14}$ and $H_{2.16}$ not supported).

The effect of ease of use on usefulness was significant as hypothesized ($H_{2.3}$ supported). This indicates that the effect of ease of use is fully mediated by usefulness. As predicted, the effect of personal innovativeness on usefulness was found significant ($H_{2.4}$ supported). Similarly, the impact of peer usage on usefulness was borderline significant ($H_{2.12}$ supported). With these variables, 49 percent of the variance in usefulness was explained.

No support was found for the effect of organizational facilitators, supervisor influence, competitive pressure and customer influence on usefulness ($H_{2.8}$; $H_{2.10}$; $H_{2.15}$ and $H_{2.17}$ not supported). Hence, none of the hypothesized effects from customer influence on salesperson acceptance were found to be significant.

The impact of personal innovativeness on ease of use, was borderline significant ($H_{2.5}$ partially supported). Also, organizational facilitators and computer self-efficacy significantly affected ease of use as predicted ($H_{2.9}$ supported).

No support was found for the effect of peer usage on ease of use ($H_{2.13}$ not supported).

Table 6-9 reports the direct, indirect and total effects of all variables included in the revised research model. As such, this analysis provides better insights into the decomposition of the structural relationships. Similar to the direct effects reported above, this analyses shows that important significant indirect effects on acceptance exist. The entries in this table learn that the primary variables for explaining salespeople's acceptance of information technology are (in order of importance): (1) perceived usefulness, (2) personal innovativeness and (3) organizational facilitators. Ease of use, supervisor influence and competitive pressures are secondary variables in explaining acceptance.

TABLE 6-9 DECOMPOSITION OF STRUCTURAL EFFECTS

Effect on Acceptance	Direct	Indirect	Total
Personal Innovativeness	.25**	.09**	.34**
Organizational Facilitators	.22**	.10**	.32**
Supervisor Influence	.20**	--	.20**
Peer Usage	--	.06**	.06**
Customer Influence	--	--	--
Competitive Pressure	.17**	--	.17**
Computer Self-Efficacy	--	.04**	.04**
Usefulness	.37**	--	.37**
Ease of Use	--	.22**	.22**
Effect on Usefulness	Direct	Indirect	Total
Personal Innovativeness	.14**	.11*	.25**
Organizational Facilitators	--	.27**	.27**
Supervisor Influence	--	--	--
Peer Usage	.16**	--	.16**
Customer Influence	--	--	--
Competitive Pressure	--	--	--
Computer Self-Efficacy	--	.11**	.11**
Ease of Use	.59**	--	.59**
Effects on Ease of Use	Direct	Indirect	Total
Personal Innovativeness	.18*	--	.18*
Organizational Facilitators	.46**	--	.46**
Computer Self-Efficacy	.19**	--	.19**

** p<.05, * p<.10

TABLE 6-10 SUMMARY OF HYPOTHESES

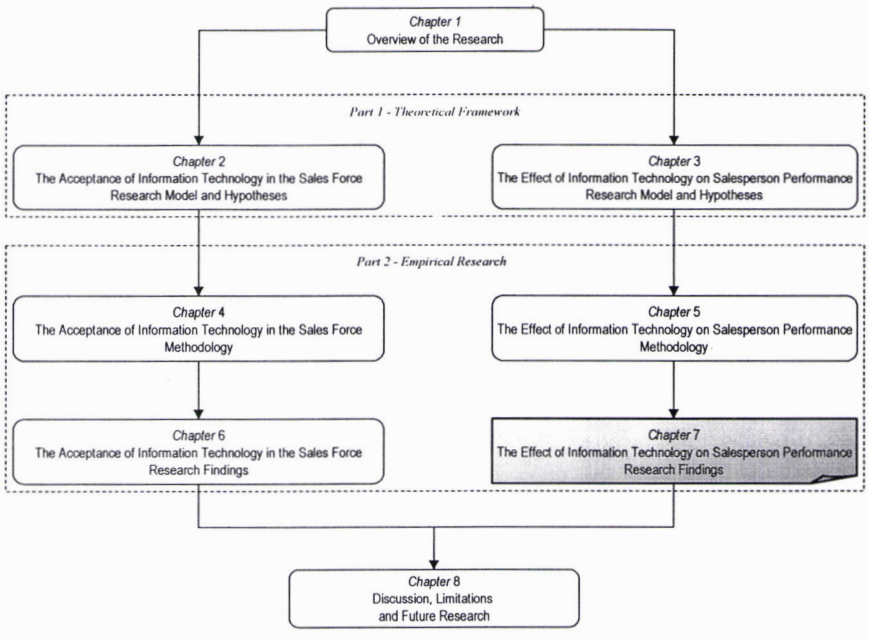
Path	Hypothesis	Path	Conclusion
Usefulness → Acceptance	$H_{2.1}$	.37	Supported
Ease of Use → Acceptance	$H_{2.2}$	ns	Not supported
Ease of Use → Usefulness	$H_{2.3}$	.59	Supported
Innovativeness → Usefulness	$H_{2.4}$	.14	Supported
Innovativeness → Ease of Use	$H_{2.5}$	.18*	Partially supported
Innovativeness → Acceptance	$H_{2.6}$	.25	Supported
Computer Self Efficacy → Ease of Use	$H_{2.7}$	.19	Supported
Organizational Facilitators → Usefulness	$H_{2.8}$	ns	Not supported
Organizational Facilitators → Ease of Use	$H_{2.9}$	.46	Supported
Supervisor Influence → Usefulness	$H_{2.10}$	ns	Not supported
Supervisor Influence → Acceptance	$H_{2.11}$	.20	Supported
Peer Usage → Usefulness	$H_{2.12}$	.16	Supported
Peer Usage → Ease of Use	$H_{2.13}$	ns	Not supported
Peer Usage → Acceptance	$H_{2.14}$	ns	Not supported
Customer Influence → Usefulness	$H_{2.15}$	ns	Not supported
Customer Influence → Acceptance	$H_{2.16}$	ns	Not supported
Competitive Pressure → Usefulness	$H_{2.17}$	ns	Not supported
Competitive Pressure → Acceptance	$H_{2.18}$	.17	Supported

6.6. Conclusion

In this chapter we developed a good measurement model as a basis for testing our hypothesized, structural model. The fit indices of the measurement model showed to be highly satisfactory, as was the case for the measures which showed good psychometric properties. Our structural model fitted the data very well and provided a lot of support for our hypothesized paths. The conclusions and implications of this study are assessed in chapter 8. However, Table 6-10 provides an overview of the support found for each of our developed hypotheses.

CHAPTER STRUCTURE

Chapter 7 The Effects of Information Technology on Salesperson Performance: Research Findings



7.1. Introduction

The research model relating to the *effects of information technology usage on salesperson performance*, discussed in chapter 3, was tested using multiple source data gathered in a mid-sized U.S. pharmaceutical company. This chapter presents the research findings of this study.

In section 7.2., we begin with a screening of the data. Section 7.3. examines the psychometric properties of our measurement scales, using structural equation modeling. In preparation for testing our hypotheses, section 7.4. explains the procedure used to partial out the effects of the control variables used. Next, section 7.5. discusses the testing of the hypothesized and revised

structural models. Section 7.6. ends with correlating the individual information technology applications with the major variables from our model.

7.2. Data screening

Before the actual data analysis, the raw data were examined. First, the data set was checked for coding errors using descriptive statistics. The original surveys were consulted for those cases with coding errors (Baumgartner and Homburg 1996). Next, negatively stated items were reverse coded. Finally, seven cases contained sporadic missing values. More specifically, 5 observations had one missing value, one respondent had two missing values and one observation had four missing values. We substituted these missing values with the mean value of the valid responses within the same construct (Hair et al. 1998).

A multivariate procedure for identifying outliers was based on the Mahalanobis D^2 measure (Hair et al. 1998) (for details on this procedure we refer to chapter 6, section 6.2., p. 98). The largest D^2/df-value observed in our sample was 1.92. As this value is lower that the critical t-value (i.e. 3.46 with 60 degrees of freedom), no multivariate outliers were found with respect to all our items used.

Structural equation models may be sensitive to the distributional characteristics of the data, such as a departure of normality. The analysis for univariate and multivariate normality was conducted using PRELIS (Jöreskog and Sörbom 1993). An analysis of the skewness and kurtosis of the observed variables revealed that most variables departed significantly from normality. However, the statistics showed that these violations were moderate. Furthermore, maximum likelihood (see below section 7.3.) parameter estimates are rather robust against this kind of violation, provided that sample size exceeds about 100 observations (Steenkamp and van Trijp 1991; Boomsma 1982; Gerbing and Anderson 1985).

7.3. Confirmatory Factor Analyses

The psychometric properties of the scales with multiple items were assessed by conducting a series of separate confirmatory factor analyses on the construct measures. This was accomplished using the maximum likelihood estimation procedure in Lisrel 8.30 (Jöreskog and Sörbom 1996) and the covariance matrix as input. As in the analyses discussed in chapter 6 (section 6.3., p. 99) we followed the guidelines for testing structural models proposed by several authors (Anderson and Gerbing 1988; Costner and Schoenberg 1973; Bentler and Chou 1987). Once the reliability, validity and model fit within each of the categories was established, an overall confirmatory factor analysis on the entire set of constructs was conducted.

For each of the confirmatory models tested, a series of tests was performed to assess (1) the overall model fit and (2) unidimensionality, (3) convergent validity, (4) reliability and (5) discriminant validity of each construct. For a detailed overview of this procedure, we refer to Chapter 6, section 6.3.1., p. 102.

The detailed results of this multi-step approach are reported in Tables 7-1, 7-2 and 7-3. Table 7-1 lists all the original items used in the analysis as well as the reason for the omission of some indicators from the further analysis. Table 7-2 and 7-3 report the confirmatory factor analyses conducted on the multiple item constructs measured at the level of (1) the sales reps and (2) their managers. These tables outline the final measures estimated for each sub-group of variables, the model fit statistics, the standardized factor loadings and an assessment of the reliability and validity. Appendix 4 (p. 193) tabulates the covariance matrix used in this regard.

TABLE 7-1 LIST OF ITEMS USED AND RETAINED IN MODEL

Information Technology Infusion	
• I consider myself a frequent user of IT	itinf1
• I fully use the capabilities of our IT	itinf2
• I have completely integrated our IT-applications into my sales process	itinf3
• I often use different IT to duplicate my efforts and see my findings confirmed [a]	itinf4
• I frequently use IT to sort, visualize and analyze market data	itinf5
• I utilize different IT in an integrated way so that they work well together	itinf6
Smart Selling	
Adaptive Selling	adapt
• Basically, I use the same approach with most physicians [a]	adapt1
• I vary my sales style from situation to situation [a]	adapt2
• I like to experiment with different sales approaches [b]	adapt3
• I use a set sales approach [a]	adapt4
• I can easily use a wide variety of selling approaches	adapt5
• I find it difficult to adapt my presentation style to certain doctors [a]	adapt6
• When I find that my sales approach is not working, I can easily change to another approach	adapt7
• It is easy for me to modify my sales presentation if the situation calls for it	adapt8
• I am very flexible in the selling approach I use	adapt9
• I feel confident that I can change my planned presentation when necessary	adapt10
• I do not change my approach from one doctor to another [b]	adapt11
• I treat all of the physicians pretty much the same [a]	adapt12
Sales Planning Behavior	splan
• I think over the steps necessary for getting a physician to prescribe our products	splan1
• I keep good records about my accounts [a]	splan2
• I set personal goals for each sales call	splan3
• I make a detailed weekly plan for what I need to do [a]	splan4
• I develop a strategy for getting a doctor to prescribe	splan5
• I manage my time effectively [b]	splan6
• I plan and organize my overall sales efforts effectively	splan7
• I think about strategies I will fall back on if problems in a sales interaction arise	splan8
Market Knowledge	
• Is an excellent resource of competitive information	mknow1dm
• Has a lot of information on industry trends	mknow2dm
• Is well-informed about important events in our industry	mknow3dm
• Is knowledgeable about our competitors' activities [b]	mknow4dm
• Keeps abreast of the marketing strategies of our competitors [b]	mknow5dm

TABLE 7-1 LIST OF ITEMS USED AND RETAINED IN MODEL

(Continued)

Technical Knowledge	
• Knows all the specifications and applications of our products	tknow1dm
• Is an excellent source of information about pharmaceuticals	tknow2dm
• Is very knowledgeable about our products, their indications, usage, and adverse reactions [b]	tknow3dm
• Knows the competition's products as well as our own [b]	tknow4dm
• Keeps abreast of technical developments	tknow5dm
• Knows and understands very well what a physician's patients are going through	tknow6dm
• Is knowledgeable about the diagnosis and treatment of the condition(s) our products treat [b]	tknow7dm
• Can be considered an expert in the field of the disease state(s) his products treat [b]	tknow8dm
• Always knows which drugs are covered under various managed care plans [b]	tknow9dm
• Knows and understands the patient population each of his/her doctors serves [b]	tknow10dm
• Understands the personal issues of each of his doctor's practice very well [b]	tknow11dm
• Is aware of the real concerns doctors and patients have with our products [b]	tknow12dm
• Is well aware of the composition of his/her doctors' patients and the diseases they treat [b]	tknow13dm
Targeting	
• Always targets the right doctors in his/her sales approach	targ1dm
• Always calls on those physicians that have potential	targ2dm
• Constantly works on the highest priority customers first	targ3dm
• Is very good at identifying, selecting and calling on profitable physicians	targ4dm
• Consistently calls on doctors that provide the most business	targ5dm
• Always knows who his/her top prescribing doctors are that she/he should call on [b]	targ6dm
Sales Presentation – Dealing with Customers	
• Presents information to customers in a clear and concise manner	sp1dm
• Is very responsive in handling customer questions	sp2dm
• Always follows up on issues discussed in previous interactions with customers [b]	sp3dm
• Provides a lot of new information to customers	sp4dm
• Communicates his/her sales message with a lot of confidence [b]	sp5dm
• Is aware of the personal interests and hobbies of his/her doctors and talks about them	sp6dm
• Always asks physicians the appropriate questions	sp7dm
• Demonstrates the product value well	sp8dm
• Addresses doctors' objections and issues adequately	sp9dm
• Gains customers' commitment	sp10dm

[a] : indicates the item was omitted during the confirmatory factor analysis for failure of meeting the criteria of acceptable reliability (i.e. low individual item reliability, high error values)

[b] : indicates the item was dropped in the confirmatory factor analysis due to high residuals and/or modification indices

We can summarize the findings of the confirmatory factor analyses as follows. None of the models contained offending estimates. Although the χ^2 statistic is significant for both models, all models fit the data very well when considering alternative fit indices. Hence, each latent construct used is unidimensional. All individual item reliabilities are larger than .40[1], the lowest composite reliability is .70 and the lowest average variance extracted is .53. Hence, all constructs possess adequate convergent validity and reliability. Further, all squared correlations (see Table 7-5) between the latent constructs are smaller than the average variance extracted of the respective constructs. This provides support for the discriminant validity of the measures (Fornell and Larcker 1981).

TABLE 7-2 CONFIRMATORY FACTOR ANALYSES - SALES REP MEASURES

	Standardized Loadings	Squared Multiple Correlation	Composite Reliability	Average Variance Extracted
Information Technology Infusion			**.85**	**.53**
I consider myself a frequent user of IT	.71	.50		
I fully use the capabilities of our IT	.73	.53		
I have completely integrated our IT-applications into my sales process	.81	.65		
I frequently use IT to sort, visualize and analyze market data	.70	.49		
I utilize different IT in an integrated way so that they work well together	.69	.48		
Adaptive Selling			**.89**	**.61**
I can easily use a wide variety of selling approaches	.63	.40		
When I find that my sales approach is not working, I can easily change to another approach	.77	.60		
It is easy for me to modify my sales presentation if the situation calls for it	.89	.79		
I am very flexible in the selling approach I use	.83	.69		
I feel confident that I can change my planned presentation when necessary	.86	.74		
Sales Planning Behavior			**.85**	**.54**
I think over the steps necessary for getting a physician to prescribe our products	.72	.50		
I set personal goals for each sales call	.61	.37		
I develop a strategy for getting a doctor to prescribe	.72	.56		
I plan and organize my overall sales effort effectively	.82	.67		
I think about strategies I will fall back on if problems in a sales interaction arise	.78	.62		
	Goodness of Fit Statistics			
	df = 87			
	χ^2 = 132.42 (P = 0.00022)			
	RMSEA = 0.053			
	SRMR = 0.047			
	Non-Normed Fit Index (NNFI) = 0.96			
	Comparative Fit Index (CFI) = 0.97			

After the measurement purification process our *information technology infusion* measure consisted of 5 items. The composite reliability was .85 and the average variance extracted .53. One item was eliminated from the further analyses after investigating the residuals and

[1] Except for the second item of sales planning for which the value is .37.

modification indices. The final measure of *adaptive selling* consists of five measures and for *sales planning* behaviors five indicators were retained. The composite reliabilities for these constructs were .89 and .85 respectively. The average variance extracted .61 and .54 respectively.

TABLE 7-3 CONFIRMATORY FACTOR ANALYSIS - SALES MANAGER MEASURES

	Standardized Loadings	Squared Multiple Correlation	Composite Reliability	Average Variance Extracted
Market Knowledge			**.94**	**.84**
Is an excellent resource of competitive information	.90	.80		
Has a lot of information on industry trends	.95	.89		
Is well-informed about important events in our industry	.91	.83		
Technical Knowledge			**.91**	**.72**
Knows all the specifications and applications of our products	.82	.67		
Is an excellent source of information about pharmaceuticals	.93	.87		
Keeps abreast of technical developments	.82	.67		
Knows and understands very well what a physician's patients are going through	.81	.65		
Targeting Skills			**.95**	**.80**
Always targets the right doctors in his/her sales approach	.92	.85		
Always calls on those physicians that have potential	.86	.74		
Constantly works on the highest priority customers first	.87	.76		
Is very good at identifying, selecting and calling on profitable physicians	.93	.86		
Consistently calls on doctors that provide the most business	.87	.76		
Sales Presentation – Dealing with Customers			**.96**	**.75**
Presents information to customers in a clear and concise manner	.89	.80		
Is very responsive in handling customer questions	.85	.72		
Provides a lot of new information to customers	.88	.77		
Is aware of the personal interests and hobbies of his/her doctors and talks about them	.84	.70		
Always asks physicians the appropriate questions	.84	.71		
Demonstrates the product value well	.90	.81		
Addresses doctors' objections and issues adequately	.91	.83		
Gains customer commitment	.81	.66		
	Goodness of Fit Statistics			
	df = 164			
	χ^2 = 388.20 (P = 0.00)			
	RMSEA = 0.086			
	SRMR = 0.048			
	Non-Normed Fit Index (NNFI) = 0.94			
	Comparative Fit Index (CFI) = 0.95			

For the final *market knowledge* construct two items were eliminated. *Technical knowledge* was measured using four items and targeting skills consists of five items. The final measure of *sales presentation skills* comprises eight items. The composite reliabilities for these scales were .94, .91, .95 and .96, respectively. Note that for the technical knowledge construct, 9 items of the original 13 were dropped. As indicated, this was done based on an analysis of the reliability, modification indices and residuals. This deletion did not affect the character of the construct, however, as it still contains items which relate to all aspects of the construct definition (i.e. technical expertise such as product applications, specifications and customer use situations).

In line with the findings from the separate confirmatory factor analyses, the final overall measurement model indicated good fit statistics (Table 7-4).

TABLE 7-4 FINAL CONFIRMATORY FACTOR ANALYSIS - OVERALL MEASUREMENT MODEL

	Standardized Loadings	Squared Multiple Correlation	Composite Reliability	Average Variance Extracted
IT Usage			**.85**	**.53**
I consider myself a frequent user of IT	.71	.50		
I fully use the capabilities of our IT	.72	.52		
I have completely integrated our IT-applications into my sales process	.81	.65		
I frequently use IT to sort, visualize and analyze market data	.70	.49		
I utilize different IT in an integrated way so that they work well together	.69	.48		
Smart Selling			**.70**	**.53**
Composite for adaptive selling	.72	.52		
Composite for sales planning	.75	.56		
Market Knowledge			**.94**	**.84**
Is an excellent resource of competitive information	.90	.81		
Has a lot of information on industry trends	.95	.89		
Is well-informed about important events in our industry	.91	.83		
Technical Knowledge			**.91**	**.72**
Knows all the specifications and applications of our products	.82	.67		
Is an excellent source of information about pharmaceuticals	.93	.87		
Keeps abreast of technical developments	.82	.67		
Knows and understands very well what a physician's patients are going through	.81	.65		
Targeting Skills			**.95**	**.80**
Always targets the right doctors in his/her sales approach	.92	.85		
Always calls on those physicians that have potential	.86	.74		
Constantly works on the highest priority customers first	.87	.76		
Is very good at identifying, selecting and calling on profitable physicians	.93	.86		
Consistently calls on doctors that provide the most business	.87	.76		
Sales Presentation – Dealing with Customers			**.96**	**.75**
Presents information to customers in a clear and concise manner	.89	.80		
Is very responsive in handling customer questions	.85	.72		
Provides a lot of new information to customers	.88	.77		
Is aware of the personal interests and hobbies of his/her doctors and talks about them	.84	.70		
Always asks physicians the appropriate questions	.84	.71		
Demonstrates the product value well	.90	.81		
Addresses doctors' objections and issues adequately	.91	.83		
Gains customer commitment	.81	.66		
	Goodness of Fit Statistics			
	df = 309			
	χ^2 = 561.92 (P = 0.00)			
	RMSEA = 0.066			
	SRMR = 0.052			
	Non-Normed Fit Index (NNFI) = 0.93			
	Comparative Fit Index (CFI) = 0.95			

Consistent with previous empirical research on working smart (Sujan et al. 1994), smart selling was modeled as a second order factor. A confirmatory factor analysis was conducted on the constructs "adaptive selling" and "sales planning behavior". Once the reliability and validity of both measures was established individually, composite scores for each of the constructs were calculated using the items from the separate confirmatory factor analysis (see Table 7-2 above).

The second order factor possesses good psychometric properties: the composite reliability is .70 and the average variance extracted equals .53.

The intercorrelations among all latent constructs, including the variables sales performance and call productivity measured by means of single indicators, are shown in Table 7-5. From the entries of this table we may conclude that the criteria for discriminant validity were met: (1) all intercorrelations were significantly different from 1 (Bagozzi 1978, 1980) and (2) the shared variance between each pair of constructs (i.e. the squared construct correlations) is less than the average variance extracted from the underlying items of the constructs (Fornell and Larcker 1981).

TABLE 7-5 CONSTRUCT CORRELATIONS[A]

Construct	1	2	3	4	5	6	7	8
1. IT Usage	--							
2. Smart Selling	.53** (.08)[b]	--						
3. Market Knowledge	.19** (.08)	.18* (.09)	--					
4. Technical Knowledge	.19** (.08)	.23** (.09)	.78** (.03)	--				
5. Targeting Skills	.17** (.08)	.19** (.09)	.64** (.05)	.76** (.04)	--			
6. Sales Presentation	.12 (.08)	.17* (.09)	.61** (.05)	.84** (.03)	.81** (.03)	--		
7. Call Productivity	.32** (.07)	.32** (.08)	.43** (.06)	.44** (.06)	.40** (.06)	.40** (.06)	--	
8. Sales Performance[c]	.27** (.07)	.30** (.08)	.47** (.06)	.43** (.06)	.50** (.06)	.39** (.06)	.44** (.06)	--

* p<.10; ** p<.05 N = 187

[a] Intercorrelations are among latent constructs (Φ matrix from confirmatory factor analysis) and thus corrected for attenuation due to measurement error.

[b] Entries in parenthesis are standard errors.

[c] Effects of covariates partialled out, see next section 7.4.

7.4. Regression of Control Variables

In line with the procedures recommended by Draper and Smith (1980) and Green (1978), the influences of the control variables on sales performance were removed from the performance data prior to estimating the hypothesized structural relationships. The procedure used to partial out

these effects consisted of regressing (i.e. with a stepwise procedure) the covariates on the sales performance measure (i.e. year bonus) and using the resulting unstandardized residuals as an indicator of sales person performance. A similar procedure was used by Ahearne (1998).

Thus, we estimated the following regression equation:

$$SALPERF_i = \beta_0 + \beta_1 EXPSAL_i + \beta_2 EXPCOMP_i + \beta_3 EXPTERR_i + \beta_4 HRSWRK_i + e_i$$

i	= focal sales rep
$SALPERF_i$	= Sales Performance of sales rep i
$EXPSAL_i$	= Experience in a sales job of sales rep i
$EXPCOMP_i$	= Experience in the company of sales rep i
$EXPTERR_i$	= Experience in the sales territory of sales rep i
$HRSWRK_i$	= Number of hours work by sales rep I
e_i	= Error term

The results of this regression indicate that two of the four control factors were found to significantly influence sales performance (i.e. experience with the company and experience in the sales territory). Table 7-6 reports the results of this analysis.

TABLE 7-6 STEPWISE REGRESSION OF SALESPERSON PERFORMANCE ON CONTROL VARIABLES

VARIABLE	Unstandardized Coefficient	Standardized Coefficient	Significance (t-value)
Included variables:			
INTERCEPT	77.81		
EXPCOMP	.241	.532	.000 (6.361)
EXPTERR	.108	.198	.019 (2.363)
Excluded variables			
EXPSAL	--	--	--
HRSWRK	--	--	--
Regression Statistics	$F_{(2,184)} = 86.57$ (p=0.000) $R^2=0.49$		

Collinearity Diagnostics	Condition Index	Variance Proportions *(CONSTANT)*	*EXPCOMP*	*EXPTERR*
Dimension 1	1.00	.06	.03	.03
Dimension 2	2.44	.88	.04	.13
Dimension 3	4.42	.06	.93	.83

Multicollinearity can have harmful effects for multiple regression in terms of how the results are obtained using stepwise regression procedures. Therefore, we diagnose the level of multicollinearity, and eventually the variables that exhibit the high multicollinearity, using a two

part process (Hair et al. 1998). First, we consider the condition index, which denotes the collinearity of combinations of variables in the data set. Next, we analyze the regression coefficient variance-decomposition matrix, which tabulates the proportion of variance for each regression coefficient attributable to each condition index. This procedure is combined in two steps: (1) detect all condition indices above the threshold value 15 and (2) for all condition indices above this threshold, identify variables with variance proportions above 90%. There is a multicollinearity problem when the condition index is above the mentioned threshold and the value accounts for a substantial proportion of variance (i.e. 90% or more) for two or more coefficients. Applying these decision rules relying on Table 7-6, we conclude that our regression analysis does not suffer from multicollinearity as none of the condition indices is larger than 15.

7.5. Structural Model Testing

Once the proposed measurement model was found consistent with the data and the effect of the control variables were removed from the performance indicator, the hypothesized structural paths were estimated. Because it is recommended that researchers compare the performance and robustness of their hypothesized model against "plausible" alternative models (Bollen and Long 1992; Hair et al. 1998; Morgan and Hunt 1994), a "revised" model was tested. In the "revised" model, all non-significant paths were removed from the hypothesized model and the model was re-estimated.

Before testing the overall structural model, we tested hypothesis $H_{2.1}$ (i.e. a salesperson's information technology usage has a positive effect on salesperson performance) by means of a regression analysis. The performance indicator was regressed on a composite score of information technology usage. This analysis showed that a salesperson's information technology infusion significantly impacts his/her sales performance (after partialling out the effects of experience in

the company and territory) (β=.242, standardized β=.255, $F_{(1,186)}$ p<0.00, R^2=.065). Hence, hypothesis $H_{2.1}$ is supported.

In addition, we tested if the positive main effect of information technology on salesperson performance was purely linear or if we would find indications that the relationship was either ∪-shaped or ∩-shaped. In other words, we tested whether this equation could be improved by taking into account the quadratic aspect of the independent variable. The test was performed by means of hierarchical regression analysis: the quadratic term is added to the linear term of information technology infusion and the increase in R^2 is assessed[2]. If the increment in R^2 is significant, then a non-linear effect is present (Cohen and Cohen 1983; Hair et al. 1998). In executing this process the R^2-change was found to be non-significant (F-change = .003, significance = .96). Hence, we found no evidence for a curvi-linear effect of information technology infusion on salesperson performance.

7.5.1. Empirical Test of Hypothesized Structural Model – Mediating Factors

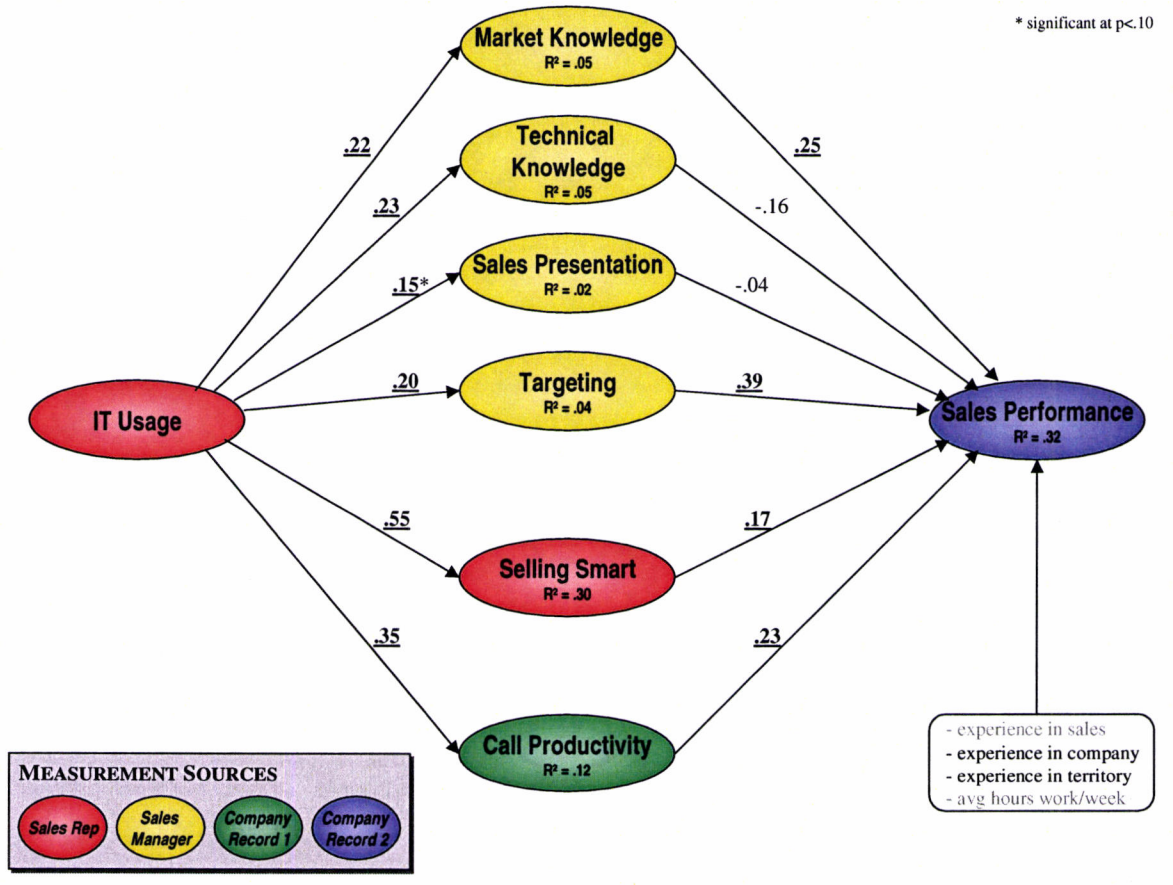
The tested hypothesized model is visualized in Figure 7-1. Significant paths in the models are bold and underlined. These significant relationships are indicative for a supported hypothesis. The coefficients of determination (i.e. percentage of variance explained in the latent construct), is also represented for the endogenous constructs.

The hypothesized model column of Table 7-7 contains the goodness-of-fit statistics, the standardized parameter estimates, and the coefficients of determination of the hypothesized model. The hypothesized model fits the data well (χ^2 statistic was 559.83 (df=361, p=.00), RMSEA equaled .067, SRMR was .087, NNFI equaled .92 and CFI was .93) and all significant

[2] To minimize collinearity between the main effect and quadratic term, we transformed the raw independent variables to z-scores, as recommended by Aiken and West (1992).

relationships are in the hypothesized direction, thus providing evidence for the nomological validity of our model (Steenkamp and van Trijp 1991).

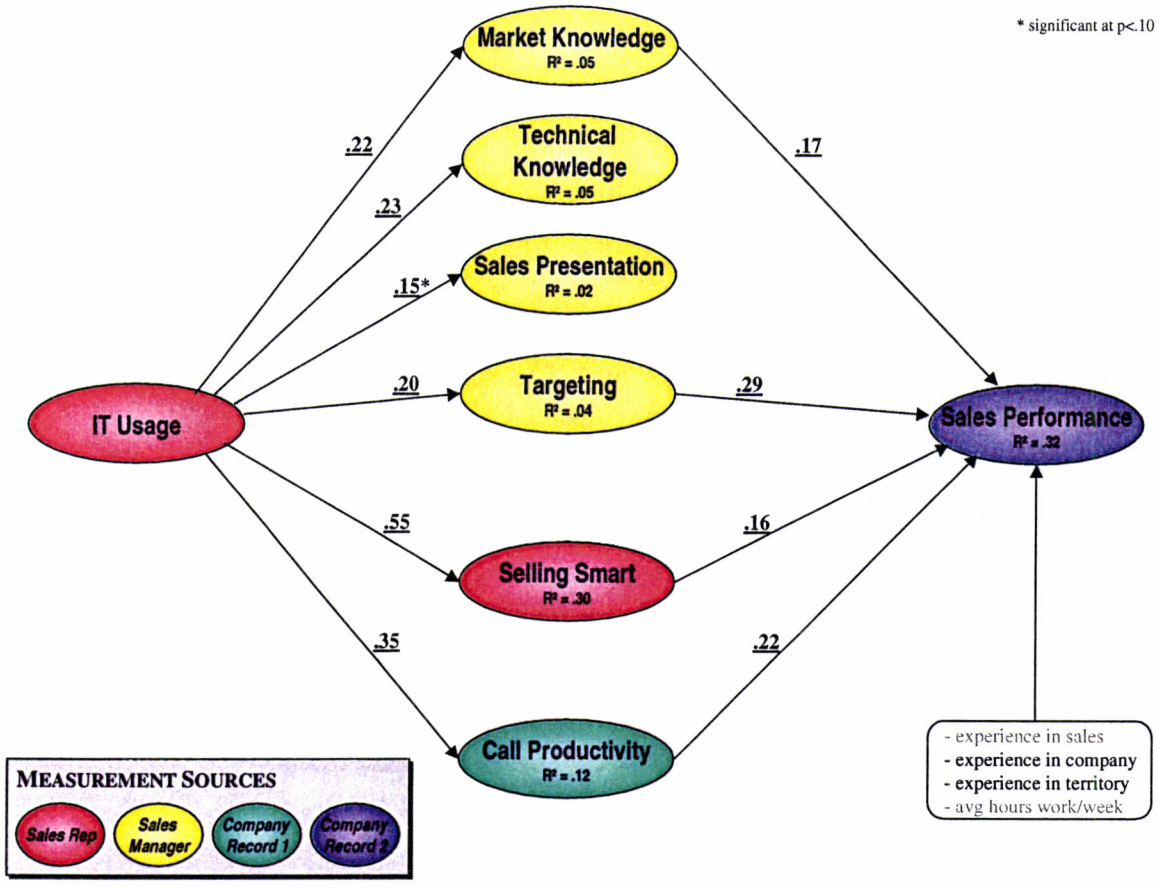
FIGURE 7-1 EMPIRICAL TEST OF HYPOTHESIZED MODEL



7.5.2. Empirical Test of the Revised Model

The final step in our estimation procedure was to remove all non-significant paths from the hypothesized model. The rationale for doing so is based on the reasoning of parsimony: it is better to have more degrees of freedom, all else being equal. The end result of this procedure can therefore be labeled as the "best" model. The model fit of the revised model was good: χ^2 statistic was 660.74 (df=363, p=.00), RMSEA equaled .066, SRMR was .086, NNFI equaled .92 and CFI was .93. These results are summarized in Figure 7-2 and tabulated in the last column of Table 7-7.

FIGURE 7-2 EMPIRICAL TEST OF "BEST"/REVISED MODEL



Although the $\Delta\chi^2$ test between the "best" and hypothesized model is not significant (i.e. χ^2 of 0.91 with 2 df) and the alternative fit indices are similar in both cases, the "best" model is preferred because it is more parsimonious (i.e. more degrees of freedom) and only little explanatory power is lost.

7.5.3. Hypotheses Test Results

In summary, our analyses provide support for most of our hypothesized main effects. As predicted in our first hypotheses ($H_{2.1}$), a sales rep's information technology infusion had a significant effect on performance. Our analysis in Lisrel supports this finding. The decomposed total (here:

indirect) effect of information technology infusion on salesperson performance is significant: path coefficient .26, t-value=4.30, p<.00[3].

TABLE 7-7: FIT INDICES FOR PROPOSED AND REVISED MODEL (N=187)

Fit statistics	Hypothesized model	Revised ("Best") model
df	361	363
χ^2	659.83	660.74
χ^2 /df	1.83	1.82
RMSEA	0.067	0.066
SRMR	0.087	0.086
NNFI	0.92	0.92
CFI	0.93	0.93
IT Usage → Market Knowledge	**.22**	**.22**
IT Usage → Technical Knowledge	**.23**	**.23**
IT Usage → Sales Presentation	**.15***	**.15***
IT Usage → Targeting Skills	**.20**	**.20**
IT Usage → Smart Selling	**.55**	**.55**
IT Usage → Call Productivity	**.35**	**.35**
Market Knowledge → Sales Performance	**.25**	**.17**
Technical Knowledge → Sales Performance	-.16	--
Sales Presentation → Sales Performance	-.04	--
Targeting Skills → Sales Performance	**.39**	**.29**
Smart Selling → Sales Performance	**.17**	**.16**
Call Productivity → Sales Performance	**.23**	**.22**
Market Knowledge ↔ Technical Knowledge[1]	**.73**	**.73**
Market Knowledge ↔ Targeting Skills[1]	**.60**	**.60**
Market Knowledge ↔ Sales Presentation[1]	**.57**	**.57**
Technical Knowledge ↔ Targeting Skills[1]	**.71**	**.71**
Technical Knowledge ↔ Sales Presentation[1]	**.81**	**.81**
Targeting Skills ↔ Sales Presentation[1]	**.78**	**.78**
% variance explained		
Sales Performance	.32	.30
Market Knowledge	.05	.05
Technical Knowledge	.05	.05
Targeting Skills	.04	.04
Sales Presentation	.02	.02
Smart Selling	.30	.30
Call Productivity	.12	.12

All *underlined* and *bold* coefficients significant at a $p<0.05$ level except * which is significant at $p<0.10$.
[1] Intermediate constructs were allowed to freely correlate.

Hypotheses $H_{2.4}$, $H_{2.5}$, $H_{2.7}$ and $H_{2.9}$ state that a sales person's sales skills are expected to be enhanced by a sales rep's usage of different information technology tools. As expected, our

[3] The total effect is calculated in Lisrel but also be obtained by summing the direct effects and multiplied indirect effects: 0 + (.22*.17) + (.20*.29) + (.55*.16) + (.35*.22) = .26.

results show that information technology usage has a significant effect on market knowledge, technical knowledge and targeting skills ($H_{2.4.}$, $H_{2.5.}$, $H_{2.9}$ supported). Although all three skills are significantly enhanced, the pattern of the results suggest that the effects are very modest. The amount of variance explained in a salesperson's market and technical knowledge and his/her targeting ranging from 4 to 5 percent. The effect of information technology on sales presentation was found to be borderline significant ($H_{2.7}$ partially supported) and, thus, weak (only two percent of the variance in sales presentation skills were accounted for by information technology).

As predicted, a sales rep's information technology infusion was also found to positively affect smart selling behaviors ($H_{2.11}$ supported). The effect of information technology was very strong, explaining 30 percent of the variance in a sales rep's smart selling behaviors.

Next, hypothesis $H_{2.13}$ maintains that integrating an array of information technologies throughout a sales rep's sales process activities, improves call productivity. Based on our data, this assertion seems to hold. The level of sales technology infusion was positively related to the number of calls a sales rep is able to make over the course of a year ($H_{2.13.}$ supported). The effect was also strong with information technology infusion explaining 12 percent of the variance in call productivity.

In turn, it was hypothesized that these intermediate variables would all positively affect salesperson performance and, thus, mediate and explain the direct relationship between information technology and salesperson performance ($H_{2.2}$, $H_{2.3}$, $H_{2.6}$, $H_{2.8}$, $H_{2.10}$ and $H_{2.12}$). As predicted, a sales rep's market knowledge and targeting skills were found to significantly impact salesperson performance ($H_{2.2.}$ and $H_{2.8.}$ supported). Similarly, hypothesis $H_{2.10}$ is supported by the significant path coefficient (.16) from a sales rep's smart selling behaviors to performance. The significant path (.22) from call productivity to salesperson performance provides support for $H_{2.12}$. In contrast, the hypothesized effect of the sales skills technical knowledge and sales presentation were not found to be significantly related to performance ($H_{2.3.}$ and $H_{2.6.}$ not supported). The

results indicate that, altogether, these predictor variables explain a substantial proportion (i.e. 30 percent) of the variance in salesperson performance.

Further, an analysis of the modification indices for the Γ-matrix[4] indicates that the index for a direct path between information technology usage and salesperson performance is not significant. This implies that the mediators included in our model, *fully mediate and explain* the effects of information technology infusion on salesperson performance (i.e. there is no direct effect of technology usage on salesperson performance over and above the intervening variables included in our model).

Still, the path coefficients of technical knowledge and sales presentation skills to performance, should be interpreted with caution. Although, the coefficients are not significant, both have a negative sign, which is counter to the related hypotheses (see Figure 7-1 and Table 7-7). Analyzing Table 7-5, p. 127, reveals that the correlations among the constructs market knowledge, technical knowledge, targeting skills and sales presentation skills, are high (i.e. ranging from .61 to .84). Similarly, the intermediate constructs correlate highly in the structural model, as indicated in Table 7-7. Although our data show discriminant validity between these constructs and the effects of information technology are differential on each of these sales skills, these high correlations could be partly explained by halo-effects and common method variance. Hence, the counter-intuitive signs of technical knowledge and sales presentation may be misleading due to multi-collinearity among these four constructs. The problem of multi-collinearity implies that the independent variables can not make much of a unique contribution to explaining the dependent variable if they are substantially correlated, and hence share a lot of variance (Cohen and Cohen 1983). The occurrence of multi-collinearity may result in path coefficients being incorrectly estimated and even having the wrong signs (Hair et al. 1998). A number of options exist to remedy multi-collinearity. First, the intercorrelations between each

[4] Gamma matrix – estimates the relationships from exogenous to endogenous constructs.

independent variable and the criterion variable can be used to understand the independent-dependent relationships under investigation (Hair et al. 1998). In this regard the entries of Table 7-5, reveal that all four constructs reflecting a salesperson's sales skills are positively and significantly correlated with salesperson performance (see Table 7-5, p. 127). Still, a salesperson's market knowledge and targeting skills have the highest correlation with performance, which supports our findings. An alternative solution to multi-collinearity, is to combine the focal constructs if "*it is thought that the shared variance is attributable to a single central property*" (Cohen and Cohen 1983, p. 115). Although we have provided evidence for the fact that the four latent constructs posses adequate discriminant validity, all four constructs relate to the higher order trait of salesperson sales skills. Hence, we re-tested the structural relationships modeling the four sales skills as a second order factor. These results are reported in Table 7-8.

TABLE 7-8 RE-TEST OF MODEL WITH SALES SKILLS AS SECOND ORDER FACTOR

Fit statistics		Re-tested Model
	df	60
	χ^2	131.21
	χ^2 /df	2.19
	RMSEA	0.077
	SRMR	0.057
	NNFI	0.92
	CFI	0.94
IT Usage → Salesperson Skills		**.20**
IT Usage → Smart Selling		**.54**
IT Usage → Call Productivity		**.33**
Salesperson Skills → Sales Performance		**.36**
Smart Selling → Sales Performance		**.16**
Call Productivity → Sales Performance		**.23**
Salesperson Skills ↔ Call Productivity[1]		.40
% variance explained	Sales Performance	.31
	Salesperson Skills	.04
	Smart Selling	.30
	Call Productivity	.11

All *underlined* and *bold* coefficients significant at a $p<0.05$ level.
[1]Intermediate constructs were allowed to freely correlate.

The re-test of the model shows good fit statistics and confirms our findings. Overall, our data indicate that a salesperson's sales skills are significantly enhanced by the use of information technology and in turn, these sales skills significantly affect salesperson performance. Based on

the analysis of the correlation matrix (Table 7-5) and the re-estimation of the model, we conclude that a sales rep's technical knowledge and his/her sales presentation skills significantly contribute to performance ($H_{1.3.}$ and $H_{1.6.}$ also supported), although the contributions of a salesperson's market knowledge and targeting skills is higher. In addition, we conclude that a sales rep's sales skills are the most important contributors to salesperson performance, followed by call productivity and lastly smart selling behaviors.

7.6. Specific Information Technology Usage and Correlation with Model Constructs

While it is not our intention to use each of the specific technologies as a separate determinant of sales performance or the intermediate benefits, correlating the specific technology tools with the other variables from our model may *improve our understanding of the relationship between technology usage and outcomes*. It may provide a managerial tool in determining which technologies are the most valuable in terms of adding value to the individual salesperson. In addition, correlating the specific technologies with our overall multiple item construct of information technology infusion may add confidence to the validity of the overall scale. Table 7-9 reports these correlations. Table 7-9 lists all the specific information technology tools available in this company. The shaded rows divide these technologies into groups based on a principal component analysis with promax rotation (explaining 69% of the variance). Based on the analyses of the eigenvalues, six groups of technologies were retained. All variable loadings were high on only one factor, indicating simple structure[5]. Each factor was labeled according to the underlying software applications (Hair et al. 1998).

[5] All item loadings were higher than .63 and thus practically significant. Only one variable had a single loading of .44. Such a loading can still be judged as important and considering our sample size, it falls within the guidelines for identifying significant factor loadings (Hair et al. 1998).

Before interpreting the patterns in this table, the specific and not generally known software tools available in our research site are briefly discussed:

- *Customer Profiling and Analysis*. The Rx-tool allows salespeople to analyze and review the prescription (i.e. product usage) *behavior of an individual customer*. Both the customer notes and calls tab are complementary to this application in that they allow the rep to make *specific notes* on a call made or review specific desires and (dis)likes of a customer, as well as input their calls made for the sales call reporting system.
- *Customer Support*. These tools allow the rep to review complementary information on an account's business (e.g. composition of staff).
- *Market and Sales Analysis*. These are applications which allow a sales rep to *conduct analysis* on the entire customer base. For instance, analyzer and query builder can be used to *classify and sort* customers, call frequency report overviews the *number of calls made on customers*, the 80/20 grid *segments* a sales rep's customer base on market (i.e. product category) and product usage. From these tools a sales rep can drill down to the level of each customer and use the customer profiling and analysis tools.
- *Lotus Notes*. These tools are generally classified as groupware. It allows salespeople to *send messages* to specific individuals (i.e. e-mail) or *search and post information* in databases focused on specific topics. Several databases concerned topics related to the entire company, others were only relevant to focal rep's territory. In contrast to the first 3 software applications, Lotus Notes is not a part of the company's sales automation package.

A number of interesting patterns emerge from this table:

1. All, but one, of the *specific* information technology applications are significantly and substantially correlated with the composite score of the multiple item construct "information technology infusion". Similarly, all grouped technology components are correlated to this composite measure. This provides support for the construct validity of the overall measure of information technology infusion.

2. Only four out of the twenty specific information technology tools are not related to smart selling behaviors. Despite the fact that this finding might be attributed to same source bias, it may also confirm the importance of information technology in enabling a salesperson to practice smart selling.
3. The market and sales analyses tools seem to be the most important applications within this firm. These applications are significantly related to sales performance and all intermediate benefits.
4. The negative correlation between the use of the customer support tools and salesperson performance, is surprising. The mean usage levels of these tools were the lowest of all (2.43 on a seven point scale). Considering the findings of the previous acceptance study, this may reflect the fact these tools are less useful and valuable in the sales job. Hence, a possible explanation for the negative relationship may be that spending time and effort in using such tools adds nothing to sales performance. In fact, this finding may point to a potential negative effect of information technology usage for salesperson performance: systems low in utility may be detrimental for salespeople who use them.
5. The communication tools, e-mail and groupware databases, seem to be particularly helpful for sharing and building knowledge, but also for end-results salesperson performance.
6. None of the web technologies was found to be correlated to sales performance nor to the intermediate factors (except for smart selling). This finding may be due to a number of reasons. First, at the time of our research, the company had only provided salespeople with free access to the web for one month. Despite the fact that many salespeople had their own internet subscription (e.g. at home), this situation may have attenuated the correlations as the novices may not have reaped the benefits of the web yet. Although our qualitative findings clearly suggested the contrary, it may however be that the web is not adding any value for the individual salesperson. Future research needs to clarify this issue.

TABLE 7-9 CORRELATIONS OF SPECIFIC TECHNOLOGY USAGE WITH MODEL CONSTRUCTS

	Mean	Standard deviation	Information Technology Infusion	Salesperson Performance	Call Productivity	Smart Selling	Market Knowledge	Technical Knowledge	Targeting Skills	Sales Presentation
I. Customer Profiling and Analyses	**5.64**	**1.28**	**.35****	.09	.07	**.14***	-.02	.00	.05	.01
Rx	5.95	1.42	.38**	.12	.04	.15*	-.03	.00	.07	.02
Customer Notes	5.39	1.67	.22**	-.04	.01	.13	.00	.00	-.02	-.02
Calls tab	5.57	1.87	.22**	.11	.04	.09	-.01	.02	.00	.01
II. Customer Support	**2.43**	**1.23**	**.19****	**-.16****	-.02	**.14***	-.02	-.03	-.10	-.02
To Do tab	2.02	1.26	.11	-.11	-.02	.17*	-.05	-.06	-.14	-.07
Staff tab	2.69	1.60	.15*	-.13	.00	.02	-.08	-.09	-.07	-.08
Affiliations tab	2.57	1.71	.23**	-.06	.02	.18*	.10	.06	-.01	.09
III. Market and Sales Analyses	**5.47**	**1.08**	**.62****	**.30****	**.23****	**.33****	**.20****	**.23****	**.18****	**.20****
Analyzer	6.20	1.04	.53**	.33**	.27**	.28**	.20**	.19**	.27**	.17**
Query Builder	6.02	1.16	.39**	.18*	.15*	.18*	.13	.15*	.13	.19**
Territory Briefing Report	5.67	1.52	.55**	.33**	.32**	.32**	.23**	.20**	.15*	.13*
Call Frequency Report	4.53	1.84	.45**	.05	.08	.19**	.04	.14	.04	.15**
80/20 Grid	4.94	1.65	.39**	.15*	.05	.21**	.07	.12	.05	.09
IV. Lotus Notes	**5.72**	**1.13**	**.42****	**.17****	**.13***	**.26****	**.17****	**.19****	.02	**.12***
Sending messages	6.31	.98	.39**	.21**	.10	.24**	.15*	.19**	.05	.10
Databases	5.13	1.59	.37**	.13	.17*	.20**	.15*	.15*	.00	.11
V. World Wide Web	**3.75**	**1.96**	**.35****	.07	.10	**.14****	-.02	.02	-.01	-.08
Web sites	3.90	1.96	.35**	.04	.08	.15*	-.05	-.01	-.05	-.11
Search engines	3.60	2.11	.31**	.00	.06	.13*	-.03	.03	-.03	-.08
Other (intranet, chat and newsgroups)[1]	2.60	1.85	.23**	-.06	.09	.02	-.06	.05	-.05	-.04
VI. Office-Personal Productivity Tools	**5.00**	**1.25**	**.45****	.10	**.15****	**.20****	.08	.09	-.01	.02
Word (processing)	5.34	1.38	.38**	.13	.11	.17*	-.02	.02	.01	-.02
Excel (spreadsheets)	5.52	1.40	.32**	-.04	.08	.13*	.03	.04	-.07	-.02
PowerPoint (presentation tools)	4.12	1.92	.40**	.16*	.17*	.21**	.21**	.18*	.04	.10
Electronic Calendar [1,2]	3.19	2.13	.30**	.06	-.04	.16*	-.06	-.03	.00	.00

[1] Eliminated from Principal Component Analysis because of several cross-loadings.
[2] Calendar tool in SA package or hand held devices (e.g. Palm Pilot).
* Pearson correlation significant at level p<.05; ** Pearson correlation significant at level p<.01

7. Office suite tools are only clearly correlated with smart selling. Still, many sales reps in our sample used these technologies regularly (mean usage level 5.00 on a seven point scale). This may point to the fact that these tools are merely support tools which are already strongly embedded into a sales rep's activities. Hence, these technologies may not have a clearly identifiable contribution to one or the other set of sales activities and skills.

7.7. Conclusions

In this chapter we developed a good measurement model as a basis for testing our hypothesized structural model of the effects of salesperson information technology infusion on salesperson performance. Our structural model fitted the data well and provided support for most of our hypothesized relationships. First, the direct relationship between information technology infusion and salesperson performance was tested. Further, this effect was explained by means of a salesperson's sales skills, as well his/her smart selling behaviors and call productivity. Furthermore, we provided insights into the contribution of each of the available specific technologies. While the conclusions and implications of these findings are discussed in chapter 8, the final chapter of this dissertation, Table 7-10 provides a summary of the research hypotheses and findings.

TABLE 7-10 SUMMARY OF HYPOTHESES

Path	Hypothesis	Coefficient	Conclusion
IT Usage → Salesperson Performance	$H_{1.1}$	.26[1]	Supported
IT Usage → Sales Skills		.22	
IT Usage → Market Knowledge	$H_{1.4}$	.22	Supported
IT Usage → Technical Knowledge	$H_{1.5}$	.23	Supported
IT Usage → Sales Presentation	$H_{1.7}$	.15*	Partially Supported
IT Usage → Targeting Skills	$H_{1.9}$	.20	Supported
IT Usage → Smart Selling	$H_{1.11}$	.54	Supported
IT Usage → Call Productivity	$H_{1.13}$	.35	Supported
Sales Skills → Sales Performance		.35	
Market Knowledge → Sales Performance	$H_{1.2}$	.18	Supported
Technical Knowledge → Sales Performance	$H_{1.3}$	ns	Supported [2]
Sales Presentation → Sales Performance	$H_{1.6}$	ns	Supported [2]
Targeting Skills → Sales Performance	$H_{1.8}$	.29	Supported
Smart Selling → Sales Performance	$H_{1.10}$	.17	Supported
Call Productivity → Sales Performance	$H_{1.12}$	.22	Supported

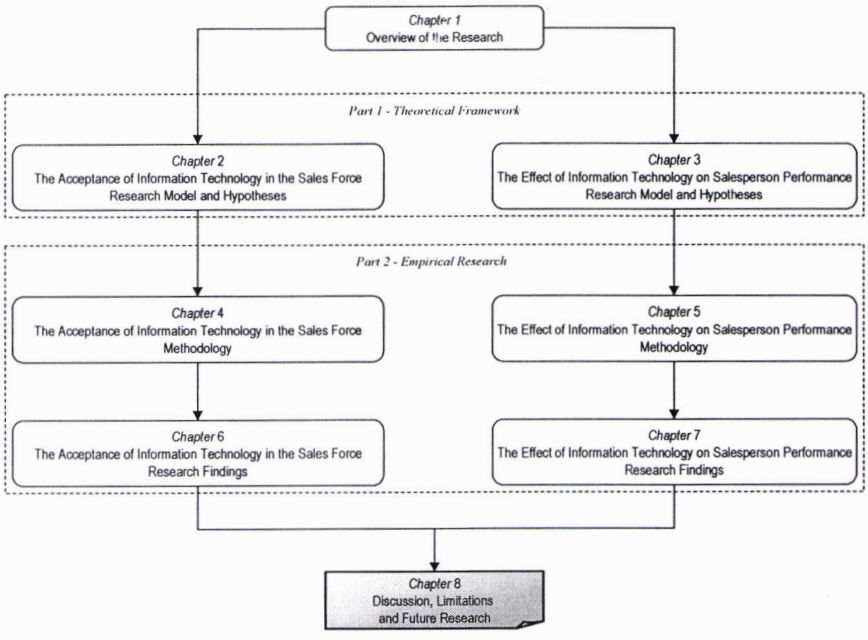
[1] Path coefficient from multiple regression.

[2] Individual paths are not significant in structural model, possibly due to multi-collinearity. Based on an analysis of the latent construct correlations these skills were also found to significantly affect salesperson performance. Hence, the hypothesis was finally accepted.

* significant at p<.10

CHAPTER STRUCTURE

Chapter 8 Discussion, Limitations and Future Research



8.1. Introduction

This final chapter of the dissertation consists of two parts. The first discusses the results, limitations and suggestions for future research of the study on *the acceptance of information technology by salespeople*. The second part does the same for the research studying *the effects of information technology on salesperson performance*.

8.2. The Acceptance of Information Technology in the Sales Force: Discussion, Limitations and Future Research

When planning the introduction of new sales technology, a prominent problem in many sales organizations is how information technology can be successfully implemented in the sales force. With the development and test of an integrated model of salesperson technology acceptance we took a first step in advancing our knowledge of the seemingly challenging link between sales reps and computer technology. Several theoretically and practically important findings resulted from this study.

8.2.1. Theoretical Implications

Technology Acceptance Model. Our study shows that the TAM is *strongly supported* in a personal selling context. The results are in line with the overall findings across several studies in the information systems area (e.g. Davis et al. 1989; Adams et al. 1992; Venkatesh and Davis 2000). The results reinforced the role of *perceived usefulness as the fundamental driver* for sales technology acceptance. Similar to previous findings, perceived ease of use is an important, yet secondary driver of acceptance (Davis et al. 1989; Venkatesh and Davis 2000). It was found to affect acceptance only indirectly through perceived usefulness.

Personal Innovativeness. By going beyond the traditional TAM and including important external variables such as personal innovativeness, this study provides a broader and richer understanding of salespeople's technology acceptance. Although the issue of personal innovativeness has garnered interest among consumer marketing researchers (e.g. Midgley and Dowling 1978; Steenkamp et al. 1999), empirical work focusing on the role of innovativeness in an organizational (sales) setting is scarce. Our study contributes to this gap and shows that the personal innovativeness of an individual salesperson in the domain of information technology, plays a key role in the acceptance of sales technology. The *direct effect of personal innovativeness* on acceptance is interesting because our findings run counter to the theoretical assertions of TAM:

our findings indicate that the effect of the personal characteristic and external variable "innovativeness" on acceptance, is not fully mediated by the key beliefs perceived usefulness and ease of use. This suggests that salespeople's technology acceptance behavior is not only determined by their instrumental beliefs, but also by their *habits* and general *attitudes* towards information technology, which they bring along in their job. The central position of a sales person's innovativeness in terms of information technology is particularly noteworthy in the personal selling context because daily management practice learns that salespeople seem to have a natural prejudice against technology. This reality seems to be confirmed by our data.

In addition, our findings confirmed the direct relationship between innovativeness and usefulness. This indicates that innovative salespeople better realize the benefits of a sales technology. However, the influence on ease of use was only found to be marginal next to a sales rep's computer self-efficacy and the organizational facilitators.

Social Influences. The role of the different social influence variables included in our model, provide some useful insights into the technology acceptance process of salespeople. *Supervisors* seem to have an important *direct impact* on the acceptance behavior of their subordinates. This effect is indicative for the fact that supervisors are able to make their subordinates comply with their persuasions. In other words, a sales rep's immediate supervisor who is an advocate of sales automation, is able to persuade his/her subordinate reps to embrace sales technology over and above the rep's beliefs about the system and regardless of his/her personal characteristics. Similarly, the finding of a significant *direct relationship from competitive pressure* on acceptance suggests that the competitive institutional pressures, which have been suggested to affect innovation adoption at the organizational level (e.g. DiMaggio and Powell 1991; Srinivasan et al. 1999), also prevail at the level of the individual sales rep. Surprisingly, both variables only have a direct impact on acceptance. This indicates that a sales rep's *motivation* to accept due to these influences is based on *other things than* the intrinsic *utility* of the technology itself (e.g. threat of losing competitive edge, supervisors' power exertion).

Peer usage has shown to be of secondary importance. Counter to what we expected, our data indicate that the influence of peers *only indirectly* affects acceptance through higher levels of usefulness. Hence, this suggests that sales reps mainly learn from their colleagues about the benefits of a sales technology, rather than feel a compelling force to accept. This is an important finding because it shows that the effect of other salespeople's acceptance primarily occurs through mechanisms of internalization (Davis et al. 1989). In other words, this finding suggests that achieving an adequate user base among salespeople can help other salespeople learn about a system's usefulness and how it can enhance their performance. This learning process can than spur the diffusion throughout the organization. The effect of peers on the perceptions of ease of use was not found to be significant. This finding might be explained by the fact that salespeople do not actually see other salespeople use the systems due to their *boundary spanning* role.

Our results provide *no evidence* for the fact that *customer influence* plays an important role in the individual acceptance of sales technology. In today's era of customer orientation this finding may seem surprising. However, this result may indicate that customers do not care about the tools salespeople use in their job and whether or not they use information technology to serve them. Next to the fact that this variable is simply *not important*, this may also suggest that the effect of customer influence is *more complex* at the individual level and only holds under specific circumstances. For example, some sales situations may not be suitable for using information technology for data gathering or in front of customers and, hence, make it less useful. Or, general market and customer relationship characteristics may moderate this relationship.

Other External Variables. The effect of the two other exogenous variables (i.e. organizational facilitators and computer self-efficacy) in our model are consistent with TAM in that both variables affect ease of use. In the case of computer self-efficacy, this finding keeps with our hypothesis and previous research. It confirms the assertion that the concept is closely related to perceptions of ease of use. Our data show that the organizational efforts are also important for

sales reps to learn about the usability and usefulness of sales technology. Still, the impact of organizational facilitators on usefulness was fully mediated by ease of use. A plausible explanation for this finding may be that organizational efforts are primarily geared towards usability and/or shape perceptions of usefulness only in the initial stages of implementation.

However, a discrepancy between the hypothesized model, as well as the assertions of TAM and the findings is that the proposed model posited that the effects of *organizational efforts* on technology acceptance would be completely mediated by the central TAM beliefs. Nevertheless, the data indicate that usefulness and ease of use only partially mediated this effect. Organizational facilitators occupy *a central role* in our revised model as they also had a *direct effect* on acceptance. Thus, it appears that TAM does not capture all the internal psychological variables through which external variables achieve their influence on user acceptance (Davis et al. 1989). In other words, there might be *other mediators* for the relationship between organizational facilitators and acceptance than the TAM variables. The adoption literature may provide such mediators, like compatibility, mandatoriness and (salesperson) image (Rogers 1995; Moore and Benbasat 1991). However, given the fact that TAM is a solid theory which has been extensively tested (e.g. Davis et al. 1989; Venkatesh and Davis 2000), this finding may also point to the fact that organizational commitment is *very important to the innovation process in a sales setting* (Scott and Bruce 1994). A firm signals commitment to an innovation by means of its investments related to information technology, the importance given to the innovation in human resource practices and the status of managers involved in the innovation process (Atuahene-Gima 1997).

8.2.2. Managerial Implications

What do our results imply for (sales) management practice? In implementing information systems for sales, technology suppliers and innovating companies would like to diagnose the reasons why a technology is (not) accepted by users and what corrective actions can be taken. Which system characteristics make technology acceptable to salespeople? Which salespeople can be expected to accept sales technology more easily and thoroughly? Subsequently, what should companies do to

improve the acceptance of sales technology among its field salespeople? The logic of these issues has been followed in this research and, hence, the results are relevant to all of these concerns.

Our data suggest that a system's usefulness is the key to salespeople's acceptance. Although technical usability and user friendliness are important for acceptance, the primary concern in a sales environment should be on how sales technology enhances performance and effectiveness. Salespeople will embrace technology much more easily *if* it improves their job performance. This is an important issue given the fact that many salespeople hold performance oriented goals which motivate their work behavior (Sujan et al. 1994).

The results indicate that targeting salespeople who have a general *innovative attitude* in the domain of information technology, would greatly benefit the technology implementation process within the firm. Not only will these salespeople accept sales technology more thoroughly, they are important advocates and will spur the intra-firm adoption process of the sales technology among their peers (Agarwal and Prasad 1998). In addition, innovative salespeople appear to understand the benefits and master the use of information systems more quickly than salespeople who are resistant to information technology. Technology suppliers and companies implementing sales technology, could use the innovativeness variable in several phases throughout the implementation process: e.g. during pilot and usability tests, to segment the sales organization and approach these potential users differently.

The finding of a direct relationship from organizational facilitators to acceptance, indicates that perceptions of organizational commitment to the innovation are of utmost importance. In fact, the results suggest that the *internal marketing* and *service efforts* (e.g. user training, technical user support and management commitment) are highly effective in influencing acceptance, both directly and in terms of learning salespeople the benefits and usage of technology in the sales job. Furthermore, the use of state of the art sales technology by competitive reps appears to provoke imitation or a threat for competitive advantage among salespeople. This suggests that

organizational implementation efforts and training should be designed such that they incorporate the above mentioned arguments: stress the technology's benefits and usability, the competitive usage of information technology and target innovative users.

Active support from salespeople's *supervisors complements these organizational facilitators* in inspiring salespeople to use technology throughout their sales job. Supervisors as advocates of sales technology are able to make their subordinate salespeople comply with their persuasions and use technology. This is a powerful example of how companies can make salespeople use sales technology regardless of their held beliefs about the technology (e.g. trial usage, applications which have mainly managerial benefits). This finding may not be surprising considering the fact that supervisory feedback literature has addressed how sales managers can influence sales behavior (Kohli 1985; Kohli et al. 1998). The influence of supervisors on acceptance behavior also implies that companies need to inspire multiple layers of the sales organization during the implementation process. In other words, organizations and technology suppliers do not only need to focus their efforts on end users, but also on first-line supervisors. Similarly, Anderson and Robertson (1995) have indicated that training expenditures complemented with supervisor attention are key to salespeople's adoption of house brands.

8.2.3. Methodological Implications

In a methodological sense, this study distinguishes itself from other studies on innovation adoption and technology acceptance. First, we successfully extended the measure of acceptance conform Rogers' (1995) broader definition of actual adoption. In addition, we effectively measured acceptance using a multiple informant technique. To the best of our knowledge, this measurement procedure was never applied in innovation studies before. Thus, we reduced the effects of common method variance and added to the robustness of our findings. For future research this implies that researchers can use similar techniques in assessing acceptance.

8.2.4. Limitations

As with all research, this study also had limitations. First, perceived acceptance was used as opposed to measures of actual behavior (e.g. objective usage measures). There is an ongoing debate in the information systems literature as to whether objective usage indicators are superior to perceptual measures (e.g. Venkatesh and Davis 2000; Hartwick and Barki 1994; Ajzen 1987). However, we have tried to alleviate the effect of common method bias in explaining acceptance, by combining a direct and an unobtrusive measure of acceptance obtained from multiple informants (i.e. the focal sales rep and his/her sales manager). In addition, the respondents were ensured anonymity, at no point reference was made to their managers as participants in the study and the completed questionnaires were send directly to the researchers. These procedures likely reduced eventual biases even more. Furthermore, studying actual acceptance behaviors involves practical constraints. These include that in order to obtain company records (e.g. computer logs) a study would have to be conducted within a single research site. This would limit the generalizability of the study results, however.

Second, the determinants of acceptance included in our model were measured by means of the same survey instrument. Hence, the interrelationships between these variables may be partially explained by common source variance. Ideally, the measurement of these variables would be separate in time and longitudinal research designs could be used to overcome this obstacle in future research.

A third and related limitation is that the use of cross-sectional data reduces the ability to make actual causal assertions which are implied in the research hypotheses. Again, to determine such causal relationships empirically, experimental or longitudinal research designs would be needed.

8.2.5. Suggestions for Future Research

The limitations mentioned above, suggest fruitful directions for future research to extend our findings. However, some additional contributions in future research can be made.

Even though we have attempted to include a wide range of variables to explain a sales rep's technology acceptance behavior, other potentially influential variables were not incorporated in our model. The finding of the direct relationships relations of external variables over and above the TAM variables, may be illustrative for the fact that, in a sales setting, TAM needs to be extended and comprise other mediating beliefs. Future research may try to elicit these additional salient beliefs that are idiosyncratic to a personal selling context (Ajzen and Fishbein 1980) or use innovation characteristics from the adoption literature (e.g. image and compatibility). Future research could also seek to further extend models of sales technology acceptance to encompass other theoretical constructs germane in personal selling. It would be interesting, for example, to explore the role of sales experience, goal orientation (Sujan et al. 1994), personal trait competitiveness and competitive climate (Brown et al. 1998) in explaining the acceptance of sales technology by salespeople.

Our results also show that the personal innovativeness of a sales rep is an important driver of sales technology acceptance. However, due to the cross sectional research design we used, we have no insights into the stability of the personal innovativeness variable over time (i.e. during the implementation process). Hence, future research, using longitudinal research, could assess the temporal dynamics of a sales rep's personal innovativeness.

8.3. The Effects of Information Technology on Salesperson Performance: Discussion, Limitations and Future Research

In this study we have aimed to provide insights in the relationship between sales technology infusion and salesperson performance. Using multiple source data on 187 sales reps from a single research site, we have tested the role of sales skills, smart selling behaviors and call productivity

as mediating variables of this overall relationship. Few, if any, prior studies have empirically examined and explained the relationship between information technology and salesperson performance. Hence, in absence of previous research, one should view our findings as initial insights rather than definitive understandings.

8.3.1. Theoretical Implications

8.3.1.1. Direct Relationship between Information Technology and Salesperson Performance

The study findings support the overall assertion that a salesperson who *integrates different information technology* tools into his/her sales activities *can significantly improve his/her performance*. Our data suggest that a salesperson's information technology infusion explains almost seven percent of the variance in his/her performance, after controlling for variables that have previously shown to be very important in explaining salesperson performance (i.e. experience in the company and territory). This is an important finding in light of the ongoing debate about the theoretical link between information technology and performance. While many organizations continue to invest heavily in advanced information technology, formal empirical evidence investigating the relationship between information technology and performance has produced mixed results (i.e. the IT-productivity paradox). The promising empirical evidence of this study, provides some resolution to the ambiguity and lingering question of an eventual similar IT-productivity paradox at the level of the individual salesperson. These study results also keep with the early evidence on sales automation which reports huge productivity gains due to sales automation (Moriarty and Swartz 1989; Rivers and Dart 1999). This is not to say, however, that an 'IT-productivity paradox' is non-existent at the level of the individual salesperson (see 8.3.3. below).

Although one can make the reasonable comment that the amount of variance explained by this direct effect is rather low, one also needs to consider the following while interpreting this relationship. First, the effect is 'robust' because it links two different data sources. Second, this seven percent of variation in salesperson performance is explained by only one variable. Third,

the amount of variance explained in salesperson performance compares favorably to the *individual* contributions made by other variables in previous sales studies. For instance, in Churchill et al.'s (1985) meta-analysis 'role perceptions' alone explained on average 8.6 percent of the variation in performance, while 'skill levels' and 'motivation' individually explained 7 and 3.3 percent respectively. Challagalla and Shervani (1996), for example, only explained 16 percent of self-reported salesperson performance using 4 self-reported predictors. Another example can be found in MacKenzie et al. (1998) where self-reported role ambiguity and role conflict concurrently explained 5 percent of objective in-role performance (i.e. measured by using company records).

8.3.1.2. Effects of Information Technology on Intermediate Variables

Although this overall relationship is an important finding, it is of little help in understanding "how" information technology may be beneficial at the level of the individual sales rep. The assessment of the mediating variables for the overall direct relationship between information technology and salesperson performance, provides some interesting insights. Our findings provide support for the fact that information technology improves performance through *efficiency gains* as well as *information based benefits*.

Call Productivity. It was found in this study that information technology usage increases a salesperson's efficiency in terms of the number of calls made. This finding supports the assumption that salespeople can *reduce time spent on non-selling tasks*, such as scheduling sales calls, updating customer records, compiling sales reports or assembling market information (Moriarty and Swartz 1991). The data further suggest that this impact of information technology is quite substantial as it explains twelve percent of a sales rep's call productivity. This is not to say that the use of information technology tools do not lead to a loss of time to the rep or make them less efficient in some tasks (e.g. due to an information and communication overload a rep

can search for hours on the Web to find nothing or spend the entire morning reading junk e-mails). However, our findings suggest that the benefits seem to outweigh the costs, in our sample.

Salesperson Skills. The information processing and communication properties of computer based technologies appear to significantly impact a salesperson's market and technical knowledge assets as well as his/her targeting skills. The positive influence of information technology on both knowledge assets, confirms the reasoning that using different information technology applications *helps salespeople's information processing* and allows them *to update their knowledge* about important business relationships (Huber 1990). Similarly, the properties of information technology appear to facilitate a salesperson's *ability to identify, select and call* on their most profitable accounts. However, the fact that information technology supports a salesperson in configuring sales presentations and dealing with customers, was only partially supported. This is a surprising finding, because one would expect technologies such as electronic mail, electronic presentation tools or databases to be effective in responding quickly to customers' questions and structuring information in a clear and concise manner. An explanation for this finding may lie in the fact that the sales context and setting under investigation does not allow information technology to make any difference in that area. Pharmaceutical sales calls are usually stand-up calls and only last up to approximately fifteen minutes. This reality practically excludes the opportunity for salespeople to use information technology during the sales call. Furthermore, sales reps call on physicians approximately every two weeks. This call pattern may point to the fact that information technology tools may add less to relationship building as customer relationships are much more built on frequent face-to-face contacts and familiarity with the representative (Ahearne et al. 1999).

Still, in interpreting the effect of information technology on a sales rep's sales skills, one needs to acknowledge that the main effect of technology is small. This may indicate that there are many other important variables which explain the enhancement of a salesperson's skills (e.g. experience, training) and that information technology is only a secondary tool for enhancing sales skills.

Working Smart. In addition, our data find support for the fact the information technology *helps salespeople to work smarter*. It seems that relying on an array of information technology tools, prompts salespeople to engage in more thorough planning behaviors. Sales technology helps salespeople to develop goals and strategies for each call and, thus, enhances the professionalism of sales planning and preparation. Similarly, accessing and unitizing information allows representatives to adopt a flexible selling approach both during and across sales interactions. In other words, information technology provides the sales rep with a pallet of market and customer information, which enhances the ability and flexibility to tailor their sales style.

Finally, the data suggest that the *intermediate variables* included in our model *fully mediate* the direct relationship between information technology and salesperson performance. This implies that we were able to include the key mediators for adequately explaining this relationship in our model. This is an important finding because it supports our theoretical assertion that the improvement of salesperson performance due to information technology, can be explained by means of variables that are on the one hand important for salesperson performance and on the other hand benefit from enhanced information processing capabilities. In fact, the mediating model learns that the direct information technology effect works through the mechanism of a sales rep's improved sales skills, smart selling behaviors and call productivity. In other words, it implies that relying on information technology helps a salesperson *only if* (s)he actually transforms the technology use into effective sales processes, behaviors and skills (i.e. work smarter, build skills or make more calls).

8.3.1.3. The Effects of the Intermediate Variables on Salesperson Performance.

This study also makes some interesting empirical contributions for the study of salesperson performance.

Call Productivity. The significant impact of call productivity on salesperson performance is consistent with previous research regarding the influence of effort/motivation on sales outcomes. Using manager ratings as measures of salesperson performance and salesperson self-reports for effort, Brown and Peterson (1994) show that effort had a strong positive effect on performance. Churchill et al.'s (1985) meta-analysis also indicated that motivation/effort was a strong predictor of salesperson performance. The finding of this study *adds important empirical support* to the effort – salesperson performance link, *combining two different company records* as sources for both variables.

Sales Skills. Of all the mediators included in our model, *the overall sales skills had the strongest impact on salesperson performance*. This finding corroborates with Churchill et al.'s (1985) meta-analysis. In an analysis of 116 studies, using 1653 associations between performance and determinants of performance, their study results indicated the set of sales skill variables as the second most important predictor of salesperson performance. Due to the high correlations among the sales skills, the assessment of the impact of the individual skills on sales performance is more challenging. However, our analysis seems to rank the skills as follows (in order of importance): targeting skills, market knowledge, technical knowledge and sales presentation skills. To the best of our knowledge, this study is the first to assess targeting as a sales skill, hence, no empirical benchmark for this relationship exists. Still, it supports the widely accepted assumption that effective prospecting and the Pareto-principle hold in a personal sales setting. The positive effect of both knowledge assets on performance is in line with previous research which has shown the importance of knowledge and use of knowledge in sales interactions (Szymanski 1988; Leigh and McGraw 1989; Sujan et al. 1988). Similarly, Behrman and Perreault (1982) showed a significant correlation between the construct of 'understanding and use of technical knowledge' and overall performance. In the same study, Behrman and Perreault (1982) also provided evidence for a significant relationship between a sales rep's 'sales presentation' and overall performance. The association of sales presentation was smaller than the one found for knowledge, as was the case in our study.

Smart Selling Behaviors. The finding of a significant relationship between a salesperson's smart selling behaviors and his or her performance, contributes *important empirical evidence* for this unquestioned, but *still underreported relationship*. Linking self-report assessments of smart selling and performance, Sujan et al. (1994) report a significant relationship between working smart and performance. Similarly, Bcorom et al. (1998) find a strong effect of adaptive selling on salesperson performance using self-ratings. Weitz and Spiro's (1990) study find a significant correlation between adaptive selling and self-reported performance, but not between adaptive selling and manager rated performance. Our study confirms these findings and even improves the nomological validity of the concept of smart selling because both constructs were obtained from different sources (i.e. the sales rep and company records).

8.3.2. Managerial Implications

This study also has implications for sales management. First, companies need their salespeople to be productive so that they sustain themselves as well as the firm. Hence, the positive relationships between information technology, performance and the intermediate benefits, provide a basis for *justifying* the implementation of information technology into the sales force. More specifically, it provides a justification towards top management as salesperson performance can be increased by means of information technology in return for the considerable investments made in these technologies. The study helps organizations to quantify some of the intangible benefits associated with computerization of the salespeople, an issue which has proven to be difficult before (Rivers and Dart 1999). Furthermore, when salespeople can see the positive outcomes of information technology usage, they may value these tools more highly and be prepared to bear the high levels of effort in learning to work with the systems. Hence, the firm may spur the company-wide acceptance and use of information technology. This reasoning keeps with the finding from our acceptance study, which revealed that salespeople accept technology if they perceive that it enhances their job performance and that they learn from their peers about the usefulness of information systems.

With respect to recruiting sales personnel, our findings imply that a salesperson's computer skills and abilities to apply computer technologies in the daily activities might be given more attention. Similarly, training efforts should emphasize information gathering and communication by means advanced information technologies. Considering the previous implication, an effective way in doing so may be to actively involve high performing, information technology savvy salespeople in the training process. Such an approach could teach other salespeople how to apply each technology effectively, as well as to increase their attitudes and comfort levels with all relevant technologies.

Our assessment of the correlates between specific technologies and the different constructs from our model, also provided interesting managerial insights. It offers the possibility to managers to assess the use and impacts of currently available technologies. These insights allow sales managers to evaluate the usefulness of different systems for specific aspects of the sales process and performance and take corrective action (e.g. by discouraging salespeople to put effort in the useless applications; improve or eliminate those applications in the systems' next upgrade).

8.3.3. Methodological Contributions

Although this study is only the first to explore the effect of information technology in personal selling, the findings are promising because we resolved a number of methodological issues often cited as an explanation for the IT-productivity paradox. First, we assessed the relationship *within* a company research site, thus allowing to control for externalities such as organizational and industry contexts. Lumping together salespeople from different firms, with different information technologies would have blurred the analyses of the relationships in our study. Second, we used multiple data sources and, hence, reduced the effect of common method variance as a potential explanation of the found effects. Third, our model also included adequately measured intangible and intermediate benefits associated to information technology, which help to explain and understand the effects of information technology.

Furthermore, in testing our research model four different information sources were combined. While many survey research studies suffer from common method bias as an alternative explanation for the falsified hypotheses, this study has seriously reduced this weakness. This strength has added to the robustness of our findings.

Also, by using established qualitative research techniques we were able to adequately identify and measure the most important intangible and intermediate benefits associated with information technology.

As such, research design can serve as a blue print for subsequent studies, in and outside the field of personal selling, in studying the consequences of information technology implementation.

8.3.4. Limitations

This exploratory study is suggestive for the positive relationship between information technology and salesperson performance, but certainly not definitive. Although the impact of information technology was found to be positive and significant, it does not rule out the absence of an 'IT-productivity paradox' at the level of the individual salesperson. Perhaps the single most important limitation of our study is the single-company frame. In terms of generalizability it would be interesting to investigate the relationship between information technology and salesperson performance in other sales situations and industries. Note, however, that the choice to focus on a single site was inspired by the fact that we wished to control for contextual factors (e.g. market and organizational factors). Insufficient attention for the organizational context and lumping together data from different firms, are frequently mentioned as potential explanations for the mixed findings in the area of information technology and performance. Furthermore, it may be difficult, if not impossible, to gather data across industries and companies if one wishes to use multiple source data. Hence, future research is needed to replicate this main effect and shed light on the generalizability of our findings by means of testing the model with independent samples from a variety of sales situations.

Despite the single empirical context of our study, however, the substance and implications of the proposed research model are readily applicable to other personal selling situations. In fact, the

mediating variables incorporated in our model have shown to be relevant predictors of salesperson performance in previous research, conducted in different settings. Still, other selling contexts may require slight changes in the model. For instance, in sales situations with a lower frequency in customer visits or smaller customer bases, the automational effects of information technology might translate into another efficiency advantages than call productivity. Or, some effects of information technology may be different (i.e. stronger or weaker) in other contexts. For instance, the effect of technology may be more apparent in sales situations where sales calls are more elaborate and where salespeople can use technology in front of the customer.

Although we combined multiple data sources in the test of our model, the research design is still cross-sectional in nature. Hence, purely causal inferences remain difficult to make. However, the sales performance indicator was collected after the measures assessed with sales reps and managers. Although this does not imply causality, it gives the findings a causal touch (Ahearne 1998).

The significant relationship between technology and smart selling may be somewhat inflated due to common method variance. Indeed, the link between technology infusion and smart selling is the only relationship in our model where the independent and dependent variables were measured at the same source, namely the sales rep. However, the data collection procedure ensured confidentiality which should have reduced the motivation, if any, for respondents to provide an overly favorable impression.

Similarly, although our findings add support to the importance of sales skills for salesperson performance, these relationships could be somewhat inflated due to the subjective component incorporated in our indicator of salesperson performance. Still, the performance measure was assembled approximately two months after the collection of the managers' assessment and the subjective component only accounts for 20 percent of a salesperson's performance.

The choice of the sales managers as informants for the evaluation of all sales skills, may also imply some limitations. The argument can be made that the dimension relating to sales presentation and dealing with customers is best assessed by customers. Customers can rate the salesperson on those aspects that impact customer attitudes and their purchases (Behrman and Perreault 1982). In an additional mailing to a sample of customers per sales representative, some of these variables (e.g. information communication, responsiveness and customer satisfaction) were measured among customers. In consultation with the advisors of this research, we have decided to analyze and report these results in a later stadium of the research.

8.3.5. Suggestions for Future Research

Some of the limitations mentioned above provide interesting avenues for future research. Longitudinal research using a field experimental approach would be a valuable contribution to the limitation of the cross sectional design and the making of causal inferences. Tracing information technology usage, sales performance and sales behavior from the outset of information technology implementation would demonstrate how both the acceptance process unfolds and when and how (performance) benefits are generated through information technology. Currently, we are collecting these kind of data in a large U.S. equipment manufacturer. Laptops and an array of software tools have been rolled out to the sales force. Surveys were/are administered at three points in time: after initial training, two months after implementation and five months after implementation. Similarly, research designs combining multiple rounds of qualitative and quantitative data collection techniques, could add a lot of valuable knowledge to the interplay between individual acceptance, its consequences and the intra-firm adoption process over time.

In this research, we focused only on the effects of information technology in terms of salesperson performance. Models in future research could also seek to incorporate other effects of information technology on the individual salesperson, that are also important for salespeople and sales management. For instance, it would be useful to explore the psychological outcomes (e.g. job

satisfaction, commitment, role ambiguity and complexity) of introducing advanced information technologies in the life of salespeople. Or, assess the effects of technology on social and group interactions in a sales environment.

Third, additional research should attempt to explore the moderators of the relationship between information technology, the intermediate variables and salesperson performance. It is possible, for instance, that the empirical findings are contingent on individual factors, such as experience and computer ability of the salesperson.

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Appendices

Appendix 1 Code List

The Effects of Information Technology on Salesperson Performance

Concept	Code
IT-Usage / IT Infusion	
1. Frequency	ITFREQ
2. Extent – full use of capabilities	ITCAP
3. Integrated Usage – linked technologies	ITINTEG
4. Decision Making, Analyses and Concrete Actions	ITANAL
1. Sales Automation (non-mandatory modules)	SA
1.1. Profile	
a. Rx	
b. Call notes and To do's	
c. Personal customer details	
1.2. Analyzer	
1.3. Query Builder	
1.4. Guided Analysis	
a. Territory Briefing	
b. 80/20 Grid	
c. Effort vs. Result	
1.5. Calendar – Planning	
2. Office Suite	OFF
2.1. Word processing	
2.2. Presentation tools	
2.3. Spreadsheets	
3. Lotus Notes	LN
3.1. Messaging -- E-mail	
3.2. Data-base consulting	
4. World Wide Web	WWW
4.1. Web sites	
4.2. Search engines	
4.3. Intranet	
Intermediate – Intangible Benefits	
Personal Sales Skills	
1. Knowledge	
- market/industry	MKTKNOW
- technical: product and customers	TECHKNOW
2. Targeting	TARGET
3. Sales Presentation – Customer Interaction	CUSTINT
Smart Selling	
1. Sales Planning	SALPLAN
2. Adaptive Selling	ADAPT

Appendix 2 Code List

The Acceptance of Information Technology in the Sales Force

Concept	Code
Acceptance	ACCEPT
Beliefs about Using SA	
1. Perceived Usefulness	PU
2. Perceived Ease of Use	PEU
Personal Innovativeness	
1. Experimentation	INNOV – EXPER
2. Resistance / Receptiveness	INNOV – RECEPT
Organizational Facilitators	
1. User Training	TRAIN
2. User Support	SUPP
3. Implementation Strategy	IMPL STRAT
Social Influence	
1. Supervisor/Managerial Influence	SUPPINFL
2. Organizational/Peer Usage	ORGUSE
3. Buyer Impulse / Customer Influence	BUYERIMP
4. Competitive Pressure	COMPPRESS

Appendix 3 Covariance Matrix Original Items

The Acceptance of Information Technology in the Sales force

	useful1	useful2	useful3	useful4	eou1	eou2
useful1	1.876					
useful2	1.695	1.939				
useful3	1.608	1.620	1.718			
useful4	1.444	1.404	1.444	1.659		
eou1	1.130	1.109	1.087	1.090	2.136	
eou2	1.027	0.944	0.900	0.900	1.616	1.907
eou3	1.152	1.127	1.114	1.091	1.488	1.506
eou4	0.870	0.797	0.800	0.725	1.250	1.021
cseff1	0.602	0.513	0.566	0.539	0.588	0.441
cseff2	0.426	0.330	0.383	0.317	0.375	0.347
cseff3	0.573	0.392	0.524	0.493	0.693	0.521
cseff4	0.363	0.326	0.309	0.451	0.540	0.492
cseff5	0.336	0.213	0.212	0.316	0.277	0.254
cseff6	0.335	0.205	0.235	0.378	0.323	0.350
cseff7	0.260	0.148	0.183	0.282	0.025	0.094
cseff8	0.263	0.190	0.225	0.261	0.477	0.262
cseff9	0.156	0.124	0.141	0.344	0.316	0.268
cseff10	0.298	0.277	0.224	0.279	0.412	0.359
innov1	0.455	0.387	0.330	0.361	0.332	0.153
innov2	0.456	0.396	0.238	0.243	0.489	0.473
innov3	0.646	0.523	0.421	0.374	0.577	0.466
innov4	0.542	0.443	0.320	0.337	0.331	0.173
innov5	0.721	0.540	0.519	0.446	0.665	0.439
innov6	0.483	0.407	0.327	0.369	0.417	0.399
innov7	0.488	0.450	0.378	0.343	0.140	0.138
innov8	0.427	0.303	0.333	0.288	0.369	0.274
innov9	0.345	0.282	0.197	0.224	0.377	0.251
supinfl1	0.248	0.265	0.192	0.235	0.338	0.470
supinfl2	0.739	0.695	0.643	0.679	0.607	0.613
supinfl3	0.411	0.465	0.379	0.372	0.314	0.475
supinfl4	0.556	0.626	0.577	0.696	0.445	0.538
orguse1	0.571	0.609	0.485	0.568	0.485	0.497
orguse2	0.517	0.579	0.435	0.542	0.426	0.462
orguse3	0.475	0.386	0.359	0.453	0.347	0.388
orguse4	0.641	0.723	0.519	0.568	0.612	0.560
custit1	0.491	0.401	0.418	0.325	0.543	0.651
custit2	0.315	0.228	0.258	0.197	0.299	0.460
custit3	0.448	0.388	0.416	0.309	0.568	0.630
custit4	0.469	0.350	0.424	0.372	0.516	0.574
custit5	0.500	0.519	0.545	0.454	0.575	0.620
compit1	0.278	0.365	0.275	0.147	0.434	0.383
compit2	0.313	0.365	0.318	0.257	0.473	0.470
compit3	0.329	0.368	0.284	0.221	0.436	0.477
compit4	0.413	0.480	0.386	0.297	0.585	0.613
acc1	0.888	0.813	0.800	0.842	0.558	0.561
acc2	1.042	0.951	0.886	0.802	0.826	0.864
acc3	0.851	0.732	0.689	0.704	0.724	0.722
train	0.570	0.486	0.453	0.620	0.750	0.899
techsupp	0.694	0.578	0.558	0.701	0.703	0.897
orgimpl	0.565	0.584	0.539	0.633	0.411	0.572

Covariance Matrix Original Items: Acceptance of Information technology in the Sales force (continued)

	eou3	eou4	cseff1	cseff2	cseff3	cseff4
eou3	1.966					
eou4	1.224	2.199				
cseff1	0.497	0.494	2.544			
cseff2	0.457	0.324	2.152	2.684		
cseff3	0.671	0.615	1.867	2.082	2.955	
cseff4	0.561	0.471	1.332	1.476	1.627	1.966
cseff5	0.339	0.366	0.690	0.769	0.856	0.974
cseff6	0.350	0.167	0.553	0.643	0.753	0.900
cseff7	0.161	0.159	0.772	0.846	0.969	0.919
cseff8	0.365	0.287	1.427	1.436	1.603	1.275
cseff9	0.329	0.078	0.487	0.514	0.687	0.826
cseff10	0.415	0.345	0.840	0.725	0.754	0.916
innov1	0.445	0.294	1.259	1.089	1.187	0.853
innov2	0.408	0.486	0.948	1.005	0.802	0.762
innov3	0.555	0.406	1.495	1.565	1.394	0.925
innov4	0.332	0.165	1.032	1.039	1.141	0.641
innov5	0.670	0.607	1.579	1.598	1.463	1.026
innov6	0.461	0.154	0.914	0.948	0.898	0.752
innov7	0.328	0.357	0.892	0.977	0.686	0.696
innov8	0.333	0.092	0.877	1.006	0.964	0.712
innov9	0.278	0.345	1.430	1.466	1.400	0.868
supinfl1	0.391	0.248	0.113	0.038	-0.120	0.357
supinfl2	0.623	0.553	0.343	0.309	0.347	0.427
supinfl3	0.467	0.303	0.048	0.007	-0.337	0.153
supinfl4	0.583	0.269	-0.006	-0.024	-0.004	0.337
orguse1	0.527	0.397	-0.182	-0.261	-0.313	0.008
orguse2	0.459	0.241	-0.265	-0.252	-0.251	0.144
orguse3	0.559	0.193	-0.352	-0.489	-0.587	-0.199
orguse4	0.608	0.408	-0.224	-0.320	-0.388	-0.086
custit1	0.501	0.186	0.520	0.680	0.415	0.250
custit2	0.423	0.195	0.382	0.529	0.350	0.259
custit3	0.596	0.298	0.523	0.617	0.540	0.385
custit4	0.528	0.325	0.450	0.573	0.487	0.314
custit5	0.541	0.380	0.472	0.481	0.385	0.251
compit1	0.192	0.350	0.362	0.249	0.108	0.266
compit2	0.314	0.408	0.336	0.215	0.171	0.315
compit3	0.301	0.437	0.203	0.234	0.205	0.318
compit4	0.417	0.526	0.415	0.335	0.290	0.399
acc1	0.596	0.334	0.135	0.111	0.176	0.178
acc2	0.889	0.658	0.575	0.470	0.427	0.538
acc3	0.737	0.482	0.440	0.416	0.429	0.291
train	0.924	0.566	-0.031	-0.034	-0.063	0.163
techsupp	0.895	0.638	0.069	-0.019	0.075	0.118
orgimpl	0.552	0.135	-0.182	-0.158	-0.155	0.120

Covariance Matrix Original Items: Acceptance of Information technology in the Sales force (continued)

	cseff5	cseff6	cseff7	cseff8	cseff9	cseff10
cseff5	1.248					
cseff6	0.838	1.128				
cseff7	0.702	0.691	1.514			
cseff8	0.762	0.652	0.882	2.131		
cseff9	0.504	0.682	0.505	0.664	1.053	
cseff10	0.538	0.416	0.612	0.858	0.558	1.255
innov1	0.509	0.345	0.385	0.867	0.346	0.693
innov2	0.359	0.180	0.254	0.673	0.188	0.610
innov3	0.559	0.323	0.524	0.911	0.348	0.657
innov4	0.418	0.307	0.577	0.601	0.398	0.500
innov5	0.514	0.309	0.454	0.984	0.373	0.646
innov6	0.483	0.383	0.369	0.693	0.357	0.537
innov7	0.390	0.334	0.180	0.395	0.114	0.517
innov8	0.448	0.323	0.267	0.512	0.332	0.486
innov9	0.403	0.137	0.460	0.876	0.259	0.575
supinfl1	0.267	0.314	0.269	0.119	0.197	0.379
supinfl2	0.505	0.407	0.481	0.242	0.218	0.451
supinfl3	0.227	0.203	0.006	-0.105	0.081	0.239
supinfl4	0.194	0.270	0.228	-0.086	0.255	0.270
orguse1	0.189	0.191	0.082	-0.167	0.127	0.225
orguse2	0.210	0.231	0.088	-0.121	0.172	0.140
orguse3	0.143	0.096	-0.035	-0.352	0.007	0.080
orguse4	0.138	0.124	-0.098	-0.149	0.097	0.087
custit1	0.211	0.312	0.173	0.182	0.194	0.094
custit2	0.137	0.307	0.142	0.023	0.136	0.115
custit3	0.267	0.237	0.211	0.328	0.244	0.235
custit4	0.254	0.261	0.223	0.244	0.196	0.133
custit5	0.114	0.192	0.082	0.157	0.145	0.124
compit1	0.060	0.129	0.117	0.278	0.027	0.180
compit2	0.027	0.163	0.048	0.186	0.072	0.144
compit3	0.150	0.171	0.137	0.224	0.074	0.185
compit4	0.074	0.154	0.164	0.283	0.086	0.238
acc1	0.209	0.143	0.054	-0.148	0.014	0.036
acc2	0.315	0.350	0.224	0.280	0.061	0.292
acc3	0.113	0.186	0.057	0.202	0.070	0.265
train	0.223	0.302	-0.027	-0.089	0.051	0.007
techsupp	0.117	0.017	-0.155	-0.081	-0.096	0.126
orgimpl	0.209	0.243	0.126	-0.078	0.115	0.035

Covariance Matrix Original Items: Acceptance of Information technology in the Sales force (continued)

	innov1	innov2	innov3	innov4	innov5	innov6
innov1	2.948					
innov2	0.797	2.311				
innov3	1.345	1.752	3.018			
innov4	1.036	1.094	1.736	2.663		
innov5	1.591	1.681	2.574	1.502	3.255	
innov6	1.082	1.002	1.425	0.994	1.509	1.661
innov7	1.180	0.959	1.111	1.138	1.316	0.894
innov8	1.032	0.926	1.331	1.197	1.382	0.948
innov9	1.050	1.555	1.981	1.183	2.116	1.098
supinfl1	-0.142	0.025	-0.212	-0.159	-0.216	-0.024
supinfl2	0.080	0.166	0.204	0.132	0.281	0.190
supinfl3	-0.207	-0.044	-0.293	-0.159	-0.232	-0.138
supinfl4	-0.179	-0.205	-0.245	-0.012	-0.257	-0.046
orguse1	-0.149	-0.167	-0.281	-0.111	-0.286	-0.250
orguse2	-0.339	-0.190	-0.357	0.033	-0.359	-0.309
orguse3	0.050	-0.325	-0.349	0.001	-0.263	-0.054
orguse4	-0.141	-0.012	-0.161	-0.073	-0.231	-0.186
custit1	0.367	0.453	0.636	0.308	0.590	0.641
custit2	0.534	0.381	0.362	0.170	0.333	0.517
custit3	0.479	0.397	0.600	0.304	0.541	0.601
custit4	0.374	0.340	0.491	0.301	0.371	0.509
custit5	0.376	0.378	0.563	0.288	0.492	0.495
compit1	0.183	0.311	0.177	0.006	0.201	0.030
compit2	0.214	0.300	0.114	-0.038	0.089	0.086
compit3	0.139	0.301	0.120	-0.088	0.191	0.062
compit4	0.278	0.364	0.315	0.084	0.298	0.204
acc1	0.088	0.236	0.264	0.094	0.441	0.231
acc2	0.277	0.528	0.621	0.340	0.741	0.399
acc3	0.190	0.606	0.789	0.474	0.750	0.349
train	-0.299	0.122	-0.135	-0.095	-0.094	0.069
techsupp	-0.025	0.193	0.026	0.030	0.151	0.168
orgimpl	-0.269	-0.135	-0.215	-0.105	-0.165	0.028

	innov7	innov8	innov9	supinfl1	supinfl2	supinfl3
innov7	2.294					
innov8	1.178	1.955				
innov9	1.013	1.288	2.882			
supinfl1	-0.062	-0.098	0.164	3.187		
supinfl2	0.010	0.130	0.423	1.904	2.367	
supinfl3	0.116	0.035	0.046	2.574	1.838	3.368
supinfl4	-0.062	0.042	0.039	1.787	1.681	2.029
orguse1	-0.008	-0.113	-0.120	1.209	1.166	1.249
orguse2	-0.080	-0.085	-0.120	1.010	0.992	1.174
orguse3	0.069	-0.109	-0.531	0.811	0.695	0.899
orguse4	-0.148	-0.018	-0.191	1.213	1.180	1.300
custit1	0.378	0.355	0.312	-0.020	0.263	-0.016
custit2	0.421	0.332	0.098	0.057	0.261	0.037
custit3	0.261	0.445	0.260	0.195	0.393	0.198
custit4	0.279	0.374	0.259	0.043	0.341	-0.002
custit5	0.216	0.320	0.137	0.056	0.439	0.083
compit1	0.120	-0.066	0.081	-0.012	0.246	0.243
compit2	0.158	-0.083	0.041	0.033	0.291	0.188
compit3	0.077	-0.019	0.004	0.001	0.309	0.130
compit4	0.214	0.009	0.203	0.154	0.461	0.241
acc1	0.315	0.248	0.274	0.584	0.829	0.717
acc2	0.607	0.554	0.612	0.715	0.813	0.919
acc3	0.566	0.587	0.633	0.453	0.600	0.647
train	0.062	0.016	-0.123	0.944	0.704	1.005
techsupp	0.069	0.154	-0.085	0.876	0.789	1.184
orgimpl	-0.191	0.135	-0.017	1.363	1.259	1.556

Covariance Matrix Original Items: Acceptance of Information technology in the Sales force (continued)

	supinfl4	orguse1	orguse2	orguse3	orguse4	custit1
supinfl4	2.379					
orguse1	1.169	2.310				
orguse2	1.335	2.050	2.740			
orguse3	0.864	1.749	1.716	3.204		
orguse4	1.179	1.977	2.033	1.515	2.493	
custit1	0.011	0.002	-0.016	-0.080	0.077	2.084
custit2	0.071	-0.033	-0.067	0.011	0.028	1.617
custit3	0.271	-0.045	-0.025	0.102	0.164	1.478
custit4	0.132	-0.002	0.065	0.141	0.158	1.489
custit5	0.207	0.129	0.223	0.074	0.335	1.364
compit1	0.021	0.380	0.431	-0.120	0.434	0.554
compit2	0.194	0.358	0.449	0.097	0.448	0.506
compit3	0.122	0.347	0.486	0.087	0.433	0.585
compit4	0.194	0.451	0.577	0.201	0.546	0.558
acc1	0.778	0.732	0.677	0.599	0.716	0.196
acc2	0.652	0.473	0.541	0.304	0.632	0.415
acc3	0.471	0.571	0.591	0.310	0.712	0.384
train	0.886	0.635	0.686	0.586	0.594	0.499
techsupp	1.119	0.730	0.777	0.678	0.739	0.377
orgimpl	1.420	1.316	1.473	0.930	1.304	0.229

	custit2	custit3	custit4	custit5	compit1	compit2
custit2	1.976					
custit3	1.294	1.699				
custit4	1.354	1.469	1.776			
custit5	1.420	1.380	1.509	2.343		
compit1	0.557	0.356	0.458	0.913	2.060	
compit2	0.543	0.474	0.643	1.064	1.605	1.904
compit3	0.572	0.495	0.585	0.974	1.332	1.465
compit4	0.538	0.499	0.662	0.972	1.575	1.641
acc1	0.096	0.216	0.134	0.197	0.235	0.232
acc2	0.321	0.409	0.365	0.476	0.591	0.557
acc3	0.284	0.439	0.402	0.473	0.454	0.449
train	0.298	0.439	0.483	0.375	-0.164	0.054
techsupp	0.308	0.551	0.474	0.350	-0.209	0.037
orgimpl	0.196	0.311	0.208	0.232	0.055	0.154

	compit3	compit4	acc1	acc2	acc3	train
compit3	1.641					
compit4	1.434	1.855				
acc1	0.203	0.190	1.435			
acc2	0.498	0.603	1.064	1.915		
acc3	0.434	0.478	0.960	1.398	1.873	
train	0.026	0.095	0.522	0.819	0.642	2.613
techsupp	0.192	0.157	0.531	0.668	0.611	1.725
orgimpl	0.272	0.230	0.822	0.783	0.651	1.312

	techsupp	orgimpl
techsupp	2.666	
orgimpl	1.539	2.339

Appendix 4 Covariance Matrix Original Items

The Effects of Information Technology on Salesperson Performance

	itinf1	itinf3	itinf5	itinf8	itinf9	itinf10
itinf1	1.024					
itinf3	0.780	1.964				
itinf5	0.797	1.212	1.876			
itinf8	0.402	0.858	0.775	2 907		
itinf9	0.681	0.808	0.984	0.787	1.832	
itinf10	0.688	0.955	1.093	0.871	1.273	2.227
calls	69.717	89.637	108.458	98.301	130.289	125.749
mknow1dm	0.380	0.259	0.487	0.113	0.632	0.350
mknow2dm	0.272	0.084	0.273	0.024	0.422	0.123
mknow3dm	0.234	0.151	0.218	0.056	0.423	0.159
mknow4dm	0.328	0.194	0.448	0.161	0.494	0.232
mknow5dm	0.289	0.276	0.478	0.130	0.501	0.248
tkno1dm	0.226	0.155	0.233	0.150	0.299	0.169
tkno2dm	0.186	0.068	0.263	0.093	0.334	0.112
tkno3dm	0.160	-0.011	0.152	0.106	0.283	0.027
tkno4dm	0.221	0.087	0.302	0.158	0.322	0.087
tkno5dm	0.236	0.122	0.277	0.111	0.294	0.101
tkno6dm	0.201	0.197	0.276	0.132	0.327	0.233
tkno7dm	0.249	0.145	0.287	0.156	0.363	0.263
tkno8dm	0.251	0.073	0.333	0.208	0.370	0.149
tkno9dm	0.360	0.295	0.552	0.139	0.520	0.287
tkno10dm	0.206	0.136	0.251	0.156	0.299	0.280
tkno11dm	0.190	-0.003	0.223	0.084	0.343	0.200
tkno12dm	0.267	0.178	0.277	0.176	0.385	0.247
tkno13dm	0.213	0.033	0.224	0.127	0.336	0.186
targ1dm	0.258	-0.040	0.239	0.253	0.334	0.168
targ2dm	0.183	0.039	0.317	0.289	0.307	0.210
targ3dm	0.216	-0.006	0.330	0.201	0.300	0.156
targ4dm	0.142	0.009	0.206	0.196	0.246	0.093
targ5dm	0.227	0.061	0.208	0.224	0.293	0.127
targ6dm	0.182	0.017	0.268	0.167	0.265	0.132
sp1dm	0.159	-0.091	0.035	0.012	0.175	0.038
sp2dm	0.286	0.047	0.320	0.226	0.427	0.320
sp3dm	0.145	-0.124	-0.010	0.097	0.106	0.113
sp4dm	0.212	-0.008	0.199	0.176	0.279	0.275
sp5dm	0.200	0.159	0.237	0.222	0.193	0.206
sp6dm	0.104	-0.013	0.093	0.092	0.225	0.107
sp7dm	0.149	-0.018	-0.002	0.031	0.200	0.166
sp8dm	0.154	-0.074	0.096	0.032	0.184	0.084
sp9dm	0.293	0.064	0.252	0.104	0.286	0.223
sp10dm	0.096	-0.085	-0.044	0.092	-0.047	-0.042
bon100ex	4.370	4.559	7.573	6.711	13.895	7.095
adapt	0.187	0.259	0.342	0.105	0.301	0.316
splan	0.201	0.390	0.344	0.356	0.292	0.269

Covariance Matrix Original Items: The Effects of Information Technology on Salesperson Performance (continued)

	calls	mknow1dm	mknow2dm	mknow3dm	mknow4dm	mknow5dm
calls	113376.570					
mknow1dm	239.796	2.785				
mknow2dm	222.859	2.356	2.766			
mknow3dm	210.517	2.232	2.415	2.772		
mknow4dm	205.913	2.117	2.005	1.970	2.238	
mknow5dm	218.919	2.191	2.125	2.302	2.164	2.772
tkno1dm	180.549	1.224	1.188	1.140	1.286	1.298
tkno2dm	191.932	1.646	1.569	1.589	1.554	1.769
tkno3dm	125.630	1.001	0.958	0.913	1.084	1.028
tkno4dm	178.625	1.259	1.260	1.246	1.351	1.412
tkno5dm	136.750	1.376	1.335	1.430	1.289	1.493
tkno6dm	155.481	1.185	1.114	1.212	1.224	1.355
tkno7dm	145.183	1.147	1.065	1.087	1.177	1.207
tkno8dm	193.738	1.453	1.456	1.465	1.506	1.656
tkno9dm	247.459	1.621	1.634	1.674	1.554	1.918
tkno10dm	195.191	1.601	1.623	1.807	1.511	1.771
tkno11dm	229.145	1.745	1.798	1.770	1.620	1.770
tkno12dm	192.323	1.672	1.614	1.716	1.520	1.799
tkno13dm	166.818	1.570	1.523	1.614	1.429	1.648
targ1dm	180.472	1.440	1.328	1.231	1.228	1.342
targ2dm	156.154	0.979	0.909	0.798	0.968	1.113
targ3dm	138.248	1.255	1.129	1.019	1.057	1.172
targ4dm	161.632	1.233	1.210	1.109	1.191	1.301
targ5dm	132.670	1.168	1.065	1.080	1.093	1.188
targ6dm	147.601	1.039	1.048	0.988	1.084	1.142
sp1dm	149.517	1.151	1.125	1.063	1.083	1.162
sp2dm	148.906	1.058	0.954	0.884	1.141	1.125
sp3dm	134.966	0.987	0.869	0.845	1.067	1.152
sp4dm	147.079	1.138	1.092	1.102	1.292	1.385
sp5dm	166.129	1.361	1.217	1.267	1.364	1.464
sp6dm	169.680	1.335	1.339	1.314	1.337	1.441
sp7dm	171.005	1.066	1.041	1.077	1.081	1.303
sp8dm	134.273	1.072	0.962	1.023	1.184	1.274
sp9dm	187.995	1.358	1.273	1.228	1.370	1.454
sp10dm	165.665	1.319	1.215	1.203	1.256	1.347
bon100ex	4137.390	22.294	20.595	17.516	19.511	21.047
adapt	65.572	0.226	0.148	0.125	0.129	0.211
splan	58.797	0.206	0.129	0.134	0.144	0.210

Covariance Matrix Original Items: The Effects of Information Technology on Salesperson Performance (continued)

	tkno1dm	tkno2dm	tkno3dm	tkno4dm	tkno5dm	tkno6dm
tkno1dm	1.549					
tkno2dm	1.331	1.937				
tkno3dm	1.153	1.130	1.390			
tkno4dm	1.273	1.467	1.215	1.720		
tkno5dm	1.006	1.481	0.903	1.305	1.759	
tkno6dm	1.044	1.309	0.929	1.079	1.094	1.641
tkno7dm	1.034	1.252	0.948	1.029	0.941	1.120
tkno8dm	1.385	1.674	1.216	1.477	1.303	1.298
tkno9dm	1.202	1.562	0.899	1.346	1.376	1.036
tkno10dm	1.055	1.478	0.725	1.107	1.251	1.278
tkno11dm	1.205	1.544	0.926	1.365	1.304	1.373
tkno12dm	1.095	1.593	0.856	1.302	1.429	1.438
tkno13dm	1.111	1.550	0.915	1.259	1.376	1.319
targ1dm	0.911	1.211	0.907	1.071	1.012	0.982
targ2dm	0.748	0.992	0.742	0.954	0.837	0.852
targ3dm	0.827	1.098	0.790	0.968	0.995	0.915
targ4dm	0.872	1.115	0.805	1.069	1.024	1.007
targ5dm	0.950	1.207	0.887	1.011	1.025	1.115
targ6dm	0.776	1.047	0.804	1.001	0.918	0.905
sp1dm	1.011	1.207	0.972	1.031	0.930	1.088
sp2dm	1.144	1.178	1.115	1.098	0.856	1.164
sp3dm	1.038	1.182	1.032	1.057	0.989	1.161
sp4dm	1.145	1.179	1.060	1.094	0.992	1.288
sp5dm	1.255	1.430	1.066	1.214	1.126	1.324
sp6dm	1.119	1.336	0.950	1.219	1.099	1.189
sp7dm	1.201	1.250	0.877	1.105	1.024	1.068
sp8dm	1.085	1.205	1.028	1.155	1.031	1.260
sp9dm	1.269	1.473	1.020	1.285	1.162	1.327
sp10dm	1.147	1.289	0.933	1.114	1.037	1.174
bon100ex	13.235	14.928	10.772	15.126	12.833	12.613
adapt	0.153	0.210	0.087	0.147	0.181	0.223
splan	0.099	0.133	0.041	0.071	0.073	0.127

	tkno7dm	tkno8dm	tkno9dm	tkno10dm	tkno11dm	tkno12dm
tkno7dm	1.333					
tkno8dm	1.349	2.174				
tkno9dm	1.079	1.441	2.758			
tkno10dm	1.094	1.381	1.561	2.132		
tkno11dm	1.155	1.630	1.801	1.764	2.682	
tkno12dm	1.163	1.657	1.662	1.751	2.003	2.226
tkno13dm	1.152	1.668	1.483	1.633	1.820	1.855
targ1dm	0.949	1.170	1.349	1.066	1.536	1.396
targ2dm	0.799	1.104	1.150	0.762	1.194	1.087
targ3dm	0.815	1.039	1.165	0.849	1.299	1.245
targ4dm	0.851	1.110	1.253	0.977	1.492	1.368
targ5dm	0.970	1.201	1.188	1.028	1.351	1.265
targ6dm	0.862	0.945	1.155	0.904	1.042	0.975
sp1dm	1.022	1.213	1.206	1.028	1.281	1.124
sp2dm	1.103	1.274	1.213	0.830	1.231	1.014
sp3dm	1.063	1.338	1.108	0.848	1.193	1.212
sp4dm	1.093	1.437	1.100	1.079	1.372	1.245
sp5dm	1.249	1.537	1.289	1.265	1.480	1.382
sp6dm	1.045	1.303	1.358	1.240	1.707	1.416
sp7dm	1.034	1.411	1.349	1.121	1.497	1.335
sp8dm	1.092	1.329	1.344	1.132	1.443	1.341
sp9dm	1.201	1.404	1.413	1.312	1.570	1.454
sp10dm	1.131	1.327	1.293	1.157	1.574	1.502
bon100ex	9.664	13.891	20.717	15.225	20.555	17.023
adapt	0.142	0.165	0.167	0.150	0.135	0.205
splan	0.093	0.166	0.158	0.114	0.087	0.157

Covariance Matrix Original Items: The Effects of Information Technology on Salesperson Performance (continued)

	tkno13dm	targ1dm	targ2dm	targ3dm	targ4dm	targ5dm
tkno13dm	2.054					
targ1dm	1.219	1.948				
targ2dm	0.904	1.368	1.506			
targ3dm	1.078	1.489	1.166	1.681		
targ4dm	1.153	1.523	1.271	1.367	1.652	
targ5dm	1.168	1.395	1.165	1.221	1.281	1.578
targ6dm	0.883	1.092	0.980	1.005	1.077	1.077
sp1dm	1.130	1.196	0.975	0.982	1.077	1.074
sp2dm	1.014	1.145	0.997	0.962	1.040	1.129
sp3dm	1.277	1.138	1.007	0.938	1.086	1.057
sp4dm	1.256	1.205	1.104	1.004	1.192	1.183
sp5dm	1.377	1.328	1.104	1.144	1.216	1.297
sp6dm	1.373	1.287	1.024	1.157	1.275	1.260
sp7dm	1.281	1.167	1.090	0.975	1.138	1.087
sp8dm	1.352	1.201	1.035	1.027	1.201	1.155
sp9dm	1.422	1.316	1.084	1.125	1.268	1.187
sp10dm	1.265	1.468	1.152	1.193	1.330	1.276
bon100ex	13.900	18.537	15.890	12.912	17.917	14.856
adapt	0.114	0.108	0.129	0.115	0.110	0.121
splan	0.117	0.140	0.156	0.088	0.150	0.149

	targ6dm	sp1dm	sp2dm	sp3dm	sp4dm	sp5dm
targ6dm	1.354					
sp1dm	0.897	1.546				
sp2dm	0.932	1.379	1.948			
sp3dm	0.812	1.377	1.609	2.178		
sp4dm	0.885	1.376	1.512	1.750	1.969	
sp5dm	1.032	1.455	1.467	1.502	1.589	2.088
sp6dm	0.938	1.287	1.363	1.392	1.428	1.582
sp7dm	0.783	1.313	1.330	1.594	1.519	1.495
sp8dm	0.964	1.378	1.549	1.746	1.624	1.578
sp9dm	1.062	1.459	1.571	1.575	1.543	1.606
sp10dm	0.908	1.332	1.281	1.543	1.509	1.720
bon100ex	12.955	12.399	11.662	9.715	13.194	12.704
adapt	0.097	0.065	0.149	0.128	0.140	0.104
splan	0.082	0.047	0.087	0.094	0.120	0.146

	sp6dm	sp7dm	sp8dm	sp9dm	sp10dm	bon100ex
sp6dm	1.996					
sp7dm	1.433	1.997				
sp8dm	1.486	1.536	2.001			
sp9dm	1.515	1.506	1.685	2.020		
sp10dm	1.486	1.563	1.550	1.519	2.236	
bon100ex	15.383	12.643	14.409	14.884	13.353	784.025
adapt	0.161	0.158	0.082	0.190	0.142	4.970
splan	0.105	0.124	0.094	0.115	0.138	4.643

	adapt	splan
adapt	0.632	
splan	0.325	0.583

bon100ex = indicator used for salesperson performance with covariates partialed out
calls = indicator used for call productivity

Samenvatting

Persoonlijke Verkoop in Industriële Markten Gefaciliteerd door Informatie Technologie

Studies m.b.t. de acceptatie en de effecten van informatie technologie in persoonlijke verkoop

Overzicht van het Onderzoek

De nieuwe informatie technologieën hebben het leven van de persoonlijke verkoper grondig veranderd. Het belang van dit onderzoek is dan ook gelegen in het feit dat het bestuderen van informatie technologie binnen de persoonlijke verkoop zowel vanuit praktijk- als academisch oogpunt aandacht verdient. Vanuit praktisch opzicht halen we vier factoren aan die dit belang onderstrepen: (1) de stijgende kost van de persoonlijk verkoop, (2) de hoge kost van verkoopsautomatisering, (3) de hoge graad van mislukking bij de implementatie van technologie in verkooporganisaties en (4) het belang van de industrie gericht op technologie en persoonlijke verkoop. Op academisch vlak is er verrassenderwijs nog maar weinig aandacht aan het onderwerp, besteed. Ten eerste, moeten we ons vooral richten naar het onderzoeksgebied van de informatie systemen indien we de *acceptatie* van technologieën door individuele verkopers beter willen begrijpen. Hoewel het "Technologie Acceptatie Model" (TAM) in die nabijgelegen tak van de managementwetenschap een gevestigde waarde is, is er ook hier maar weinig onderzoek dat ingaat op het geintegreerd samenspel van verklarende variablen. Ten tweede, is de link tussen informatie technologie en *prestaties* vooral onderzocht in de tak van de economie, de informatie systemen en de besluitvorming. Uit dergelijk onderzoek bleek daarenboven dat de relatie tussen informatie technologie en prestaties, niet éénduidig positief was, hetgeen aanleiding heeft gegeven tot het ontstaan van de zogenaamde 'IT-productiviteitsparadox'.

Om die redenen proberen we in dit proefschrift een antwoord te geven op de volgende algemene managementvragen: (1) Welke zijn de bepalende factoren die de acceptatie van informatie technologie door persoonlijke verkopers verklaren? Hoe interreleren deze variabelen met elkaar

en (2) Hoe verloopt de relatie tussen het gebruik van informatie technologie door een persoonlijke verkoper en zijn/haar prestaties? Hoe kunnen we die relatie beter begrijpen/verklaren?

Om een antwoord te bekomen op deze twee vragen werden twee onderzoeksmodellen, met elk hun eigen methodologie, ontwikkeld. Het is echter belangrijk voor een goed begrip dat de lezer beseft dat de eenheid van analyse in beide onderzoeken ligt bij de persoonlijke verkoper als individu.

De Acceptatie van Informatie Technologie binnen de Verkooporganisatie

Onderzoeksmodel

Het onderzoeksmodel dat wij voorstellen voor het verklaren en begrijpen van de acceptatie van informatie technology door verkopers, bouwt verder op het TAM. Het TAM wordt uitgebreid om een aantal tekortkomingen uit de bestaande literatuur op te vangen en het model op maat te maken voor de situatie van de persoonlijke verkoop.

We bespreken hier kort de belangrijkste elementen uit het model. Acceptatie (de uiteindelijke afhankelijke variable) is gedefinieerd als '*de mate waarin een individuele verkoper een specifiek informatie systeem frequent gebruikt, ten volle van de toepassingen gebruik maakt en op zodanige wijze dat het geïntegreerd is in zijn/haar activiteiten*'. We veronderstellen dat die acceptatiegraad rechtstreeks wordt bepaald door twee overtuigingen die de verkoper zich heeft gevormd m.b.t. het systeem in kwestie, namelijk 'gepercipieerd nut' en 'gepercipieerd gebruiksgemak'. Vervolgens introduceren we een heel belangrijk concept van ons model: de persoonlijke innovativiteit van de verkoper m.b.t. informatie technologie in het algemeen. Persoonlijke innovativiteit is gedefinieerd als '*de attitude van een verkoper die zijn/haar neiging om te experimenteren met en het adopteren van nieuwe informatie technologieën weerspiegelt, los van de gecommuniceerde ervaring van anderen*'. Het is m.a.w. een persoonlijke overtuiging en gedragsmatige neiging die de verkoper heeft t.o.v. informatie technologie, en die hij/zij meebrengt in zijn/haar job. Het centrale belang van deze variable wordt onderstreept door het feit dat de praktijk aantoont dat verkopers a.h.w. een natuurlijke weerstand hebben om technologie in hun job te integreren. We veronderstellen

dan ook dat 'persoonlijke innovativiteit' een invloed zal hebben op de beide overtuigingen 'gepercipieerd nut' en 'gepercipieerd gebruiksgemak', maar eveneens een directe impact zal uitoefenen op acceptatie. Volgend belangrijk element zijn de initiatieven die de organisatie neemt om het gebruik en de acceptatie onder de verkopers-eindgebruikers te bevorderen. Die organisatorische initiatieven bestaan uit de mate van training, technische gebruikersondersteuning en de interne marketing initiatieven bij de implementatie. Conform het TAM veronderstellen we dat deze initiatieven de beide overtuigingen 'gepercipieerd nut' en 'gepercipieerd gebruiksgemak' zullen beinvloeden. Ten laatste, formuleren we vier sociale invloeden die de acceptatie van een verkoper kunnen bepalen, met name die van de verkoopmanager, de collega-verkopers, de klanten en de concurrerende verkopers. Alle vier deze invloeden worden verondersteld zowel de overtuiging van nuttigheid als de acceptatiegraad te beïnvloeden.

Onderzoeksmethodologie en data-analyse

Na een kwalitatieve, exploratieve voorstudie hebben we onze hypothesen getoetst aan de hand van een cross-sectionele vragenlijst. De data werden verzameld in twee stappen. Vooreerst werd een selectie van verkoopmanagers gevraagd deel te nemen door een aantal van hun verkopers op te geven voor medewerking en die eveneens te beoordelen op het vlak van hun acceptatie. Daarna werd de opgegeven verkopers een vragenlijst toegestuurd. Onze intensieve dataverzamelingsprocedure leverde een bruikbare response van 29 procent op met een totaal van 224 waarnemingen. Cruciaal in de dataverzameling was de meting van het concept 'acceptatie'. Dit concept werd gemeten bij zowel de verkoopmanager als bij de eigenlijke verkoper. Beide waarnemingen werden na statitistische analyse gecombineerd en vormden samen de uiteindelijke afhankelijke variabele. We maakten m.a.w. gebruik van de zogenaamde "multi-informant" techniek. Door het toepassen van die procedure werden 61 records geëlimineerd omwille van te grote distorties in beide waarnemeningen. Zodoende bestond onze finale dataset uit 168 waarnemingen. Na een uitvoerige data-screening, werden de gegevens geanalyseerd a.d.h.v. LISREL 8.3. Uit deze analyses blijkt dat ons vooropgesteld model de data goed past.

Bevindingen en Implicaties

Onze studie toont aan dat de belangrijkste factor, die de acceptatie van technologie bij verkopers verklaart, het 'gepercipieerde nut' van dergelijke systemen is. Het 'gepercipieerd gebruiksgemak' is weliswaar belangrijk maar toch van ondergeschikt belang.

De persoonlijke innovativiteit die een verkoper in zich draagt, is een beinvloedende factor van zowel de overtuiging m.b.t. het 'gepercipieerd nut' als de eigenlijke acceptatie. Dit betekent dat verkopers hun acceptatiegedrag niet alleen afstemmen op hun gedachten m.b.t. de bijdrage van het systeem, maar dat die aanvaarding eveneens gebaseerd is op een stuk gewoontevorming en automatisme.

Verder blijkt dat vooral de 'directe verkoopmanager' en het 'gebruik van gelijkaardige technologieën door concurrent-verkopers' een directe invloed hebben op de acceptatiegraad van een specifieke informatie technologie. Het gebruik van de specifieke technologie door collega-verkopers had alleen een effect op het 'gepercipieerd nut' van het systeem. Opmerkelijk is het feit dat klanten geen enkele invloed uitoefenden op de aanvaarding van een specifieke sales technologie.

Wat betekenen deze bevindingen voor de (sales)managementpraktijk? Bij de implementatie van informatie technologie in sales, willen zowel het innoverende bedrijf als de technologie-leveranciers een diagnose kunnen stellen m.b.t. de redenen waarom een technologie al dan niet wordt aanvaard. Onze bevindingen kunnen hierbij helpen.

Ten eerste, zullen verkopers systemen veel makkelijker aanvaarden indien ze overtuigd zijn dat die hun performantie ten goede komt. Op het eerste zicht lijkt deze vaststelling niet meer dan logisch, maar ze is belangrijk in een verkoopcontext daar verkopers veel meer gericht zijn op prestaties dan andere zogenaamde 'witte boorden' medewerkers. Ten tweede, tonen onze resultaten aan dat het targeten en bewerken van verkopers met een hoge persoonlijke innovativiteit, het implementatieproces sterk kan bevorderen. Deze verkopers zijn belangrijke 'apostelen' voor de verdere acceptatie van een nieuwe technologie binnen het bedrijf. Daarnaast kunnen ze eveneens dienen als klankbord gedurende pilootprojecten, daar ze eerder dan anderen

het nut en gemak (of het gebrek daarvan) inzien. Vervolgens tonen onze data aan dat er een belangrijke rol is weggelegd voor de organisatie gedurende de implementatie van nieuwe technologieën: interne marketing, training en permanente gebruiksondersteuning zijn zeer effectief voor het beïnvloeden van de acceptatiegraad. Concreet impliceert dit dat de implementatie-inspanningen en trainingsessies moeten uitgetekend worden met deze bevindingen in gedachte: onderstreep het nut en bruikbaarheid van een toepassing, duid op het competitief gebruik van gelijkaardige systemen en selecteer de innovatieve gebruikers eerder dan de hele verkoopploeg. Ten laatste, moeten bedrijven en technologie-leveranciers tijdens de implementatie niet alleen de eindgebruikers bewerken, maar eveneens inspelen op de verkoopmanagers. Verkoopmanagers hebben een grote invloed op het doen en laten van hun ondergeschikte verkopers. Dit betekent dat ook die managers moeten worden overtuigd van het nut van de informatie technologieën in kwestie.

Beperkingen en Suggesties voor Toekomstig Onderzoek

Zoals elk onderzoek, heeft ook deze studie haar beperkingen. Een eerste mogelijke beperking is het gebruik van perceptuele maatstaven voor het meten van acceptatie. De literatuur is echter niet éénduidig over het gebruik van objectieve versus subjectieve maatstaven. Verder, hebben we dit probleem gedeeltelijk opgelost door acceptatie te meten bij twee bronnen. De andere interrelaties van ons onderzoeksmodel werden wel bij één en dezelfde bron en kunnen gedeeltelijk worden verklaard door 'zelfde-methode-variantie'. Ten slotte is de aard van dit onderzoek cross sectioneel en laat het niet toe daadwerkelijk causale relaties te veronderstellen.

Longitudinaal onderzoek kan hier echter enig soelaas brengen. Op theoretisch vlak kan ons onderzoeksmodel nog verder worden uitgebreid met andere variabelen die belangrijk zijn in de theorie van de persoonlijke verkoop. Meer bepaald is gebleken dat het TAM in een verkoopcontext mogelijkerwijs niet allesomvattend genoeg is en dient uitgebreid te worden. Onze resultaten tonen het belang aan van de variable 'persoonlijke innovativiteit'. Inzicht in de

dynamiek van deze variabele over de tijd heen kan zowel van theoretisch als praktisch oogpunt waardevol zijn.

De Effecten van Informatie Technologie op de Performantie van Verkopers

Onderzoeksmodel

Gegeven de 'IT-productiviteitsparadox' willen we in deze studie achterhalen 'of' en 'welke' het verband is tussen de mate waarin een verkoper verschillende informatie technologieën integreert in zijn/haar activiteiten en zijn/haar performantie. Op basis van een grondige literatuurstudie en een uitgebreid kwalitatief onderzoek, hebben we een onderzoeksmodel opgesteld dat die relatie verklaart. Volgens theoretische inzichten over de effecten van het gebruik van informatie technologie, hebben dergelijke technologieën een positieve impact op de effectiviteit van een persoon of organisatie d.m.v. verbeterde informatie- en communicatieprocessen. Gebaseerd op die theorie en de bestaande verkoopliteratuur, stellen we dat het persoonlijk gebruik van informatie technologie door een verkoper een positieve impact heeft op tussenliggende variabelen die bevorderd worden door betere informatie en communicatie. We lichten hierna kort de centrale elementen van ons model toe.

We definiëren 'informatie technologie intensiteit' als de mate waarin een persoonlijke verkoper verschillende informatie technologie toepassingen heeft geïntegreerd in zijn/haar dagdagelijkse activiteiten. Ons model veronderstelt dat omwille van de specifieke capaciteiten van informatie technologie, die intensiteit positief gerelateerd is aan een verkoper's verkoopvaardigheden (in termen van markt- en technische kennis, targeting en presentatievaardigheden), 'smart selling' gedrag (i.e. adaptief verkopen en verkoopplanning) en zijn/haar productiviteit in termen klantenbezoeken. Het model poneert op haar beurt dat al deze variabelen een positieve impact hebben op de performantie van de verkoper.

Onderzoeksmethodologie en data-analyse

De kwantitatieve gegevens voor deze studie werden verzameld in een middelgroot farmaceutisch bedrijf, met een verkooporganisatie van 238 verkopers. De data voor de verschillende variabelen werden verzameld bij verschillende bronnen. De variabelen informatie technologie intensiteit en 'smart selling' gedrag werden gemeten bij de verkopers. Hun verkoopvaardigheden werden beoordeeld door hun respectieve managers. De data m.b.t. het aantal verkoopbezoeken en hun performantie werden bekomen a.d.h.v. bedrijfsfiles. Na combinatie van al deze gegevensbronnen werd een dataset bekomen voor 187 verkopers (een bruikbare responsegraad van 83 procent). Na de screening van de data werden onze hypotheses getoetst d.m.v. regressie analyse en LISREL 8.3.

Bevindingen en Implicaties

De voornaamste leerles uit de deze studie is dat we aanwijzingen vinden voor een positieve relatie tussen de mate waarin verkopers informatie technologie integreren in hun activiteiten en hun performantie. Dit resultaat is hoopgevend gegeven de bestaande 'IT-productiviteitsparadox'. Ten einde deze relatie beter te begrijpen introduceerden we intermediërende variabelen in ons model. Uit die resultaten blijkt dat informatie technologie vooral aanleiding geeft tot 'smart selling' verkoopgedrag: verkopers gaan door informatie technologie meer plannen en zich meer aanpassen aan iedere verkoopinteractie. Verder blijkt eveneens dat informatie technologie een significant effect heeft op de productiviteit van een verkoper in termen van het aantal bezoeken dat hij/zij kan maken. Dit impliceert dat door het gebruik van informatie technologie, verkopers minder tijd hoeven te besteden aan niet-verkoop gerelateerde activiteiten (bv. afspraken organiseren, actualiseren van klantenbestanden, opmaken van verkooprapporten). Ten slotte, wees onze test er eveneens op dat informatie technologie positief gerelateerd is aan de vaardigheden die een verkoper ontwikkeld. Dit effect was echter veel minder sterk dan in de twee voorgaande gevallen. Deze studie bevestigt eveneens voorgaand onderzoek uit de verkoopliteratuur, daar al deze intermediërende variabelen eveneens de performantie van de verkoper significant bepalen.

De implicaties van deze studie voor (sales) management zijn niet onbelangrijk. Vooreerst geeft het een basis voor de verantwoording van de implementatie van informatie technologie in de persoonlijke verkoop. Dit zowel naar het top management van organisaties toe als naar de eindgebruikers, de verkopers. Voor de recrutering van verkopers betekent dit dat computervaardigheden tot de basisvaardigheden van een verkoper dienen te behoren. Terzelfdertijd, betekent het dat verkooptrainingen aandacht dienen te hebben voor informatieverwerking en communicatie a.d.h.v. computer ondersteunde middelen.

Beperkingen en Suggesties voor Toekomstig Onderzoek

Deze explorative studie is suggestief, eerder dan conclusief. De grootste beperking van deze studie is ongetwijfeld dat ze kadert binnen één verkooporganisatie. Hoewel deze aanpak een aantal methodologische en theoretische voordelen in zich heeft, beperkt het ongetwijfeld de generaliseerbaarheid van de resultaten. Desalniettemin, is het model opgebouwd uit variabelen die universeel en in eender welke verkooporganisatie kunnen worden toegepast. Een bijkomende beperking is dat de aard van de studie cross-sectioneel is en we dus geen daadwerkelijk causale relaties kunnen toetsen. Verder kan de relatie tussen 'smart selling' gedrag en de mate van integratie van informatie technologie gedeeltelijk worden verklaard door 'zelfde-methode-variantie'. De keuze van de managers als beoordelaar voor de sales skills heeft eveneens haar beperkingen.

In toekomstig onderzoek kan aandacht besteed worden aan deze beperkingen. Ook hier kan longitudinaal onderzoek heil bieden. Door het opvolgen van informatie technologie gebruik, performantie van de verkoper en zijn/haar verkoopgedrag over de tijd heen en van in het begin van de introductie van de technologie, kunnen zowel het acceptatieproces als de effecten op performantie in kaart worden gebracht. Terwijl de focus van deze studie ligt op de performantie van de individuele verkoper, kan verder onderzoek eveneens aandacht besteden aan andere gevolgen van informatie technologie die ook belangrijk zijn in de context van persoonlijke

verkoop (bv. job satisfactie, rol ambiguïteit en complexiteit). Tot slot kunnen toekomstige studies eveneens onderzoeken welke variabelen de relatie tussen informatie technologie versterken of verzwakken (i.e. modereren).