

Sales force automation: review, critique, research agenda

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We review and critique the research literature on sales force automation (SFA). SFA involves the application of information technology to support the sales function. SFA software provides functionality that helps companies manage sales pipelines, track contacts and configure products, *inter alia*. The paper is organized into four main sections. First, we review the SFA environment, identifying definitions, vendor classifications and software attributes. We then move to a review and classification of the academic research that has been published on SFA. We find that the entire body of SFA knowledge attempts to answer just four questions: Why do organizations adopt SFA? What are the organizational impacts of SFA? What accounts for the success or failure of SFA projects? What accounts for variance in salesperson adoption of SFA? We then critique this body of knowledge on a number of theoretical and methodological grounds, and finally propose a research agenda for the future.

Introduction

Dedicated sales force automation (SFA) applications have offered technological support to salespeople and managers since the 1980s. Prior to that time, a number of stand-alone software components such as contact management systems and sales forecasting tools were available. Recently, software vendors have bundled these and other sales-force applications into integrated packages that are now widely adopted in business-to-business environments. SFA is now seen as a 'competitive imperative' (Morgan and Inks 2001) that offers 'competitive parity' (Engle and Barnes 2000). However, Petersen (1997) has suggested that the 'jury is still out' on the value of SFA.

Given the penetration of SFA in the business-to-business context, it is timely to review what we have learned. We start by defining the field, identifying members of the SFA ecosystem and reporting trends in the deployment of SFA solutions. We then present a synthesis of the research-based literature and identify the four questions that have been the focus of past research.

What is SFA?

A number of definitions of SFA have been proposed in the academic literature:

- SFA systems utilize computerized hardware and software to provide automated collection,

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Table 1. Functionality offered by SFA software

Account management	Lead, opportunity and pipeline management
Contact and activity management	Product configuration and visualization
Event management	Sales forecasting
Order and contract management	Territory management
Document management and product encyclopaedias	Work-flow and process development
Incentive management	Proposal generation and quotation management

Source: Constructed from a review of vendor websites and collateral material.

Table 2. Classification of SFA vendors

SFA specialists	SFA as part of CRM suite	SFA as part of Enterprise suite
Selectica	Siebel	Oracle
EzRoute	Onyx	SAP
Salesnet	Pivotal	Epicor
CallWizard	salesforce.com	Deltek
Selltech	SalesLogix	Fourth Shift
CyberForms	ACCPAC	Orion
HEWSales	NetCRM	Intenia

assimilation, analysis and distribution of information to improve sales force productivity (Morgan and Inks 2001).

- SFA systems consist of centralized database systems that can be accessed through a modem by remote laptop computers using special SFA software ... [so that a] salesperson ... can get constantly refreshed information regarding various aspects of the job (Parthasarathy and Sohi 1997).
- [SFA involves the] application of technology to the selling function (Pullig *et al.* 2002).
- SFA supports the sales process by improving the speed and quality of information flow among the salesperson, customer and organization (Speier and Venkatesh 2002).

SFA can thus be characterized by, and defined as, the application of information technology to support the sales function.

Information technology, as noted by Morgan and Inks (2001), comprises both hardware and software. Hardware includes, but is not limited to, desktop, laptop and handheld devices. SFA software applications offer a range of functionality, much of which is listed in Table 1.

SFA software vendors can be classified in a number of ways. Some vendors are SFA specialists. They compete against customer relationship management (CRM) suite vendors who bundle SFA modules into packages that operate over the three front-office areas of marketing, service and sales. Many of the vendors offering SFA as part of broader CRM suites started out as SFA specialists – Siebel and salesforce.com, for example. SFA applications are also offered by Enterprise suite vendors who offer a broader range of IT solutions to support business, including supply chain management (SCM), enterprise resource planning (ERP) and CRM. A number of illustrative examples appear in Table 2.

SFA provides a mechanism for collecting, storing, analysing and distributing customer-related data to salespeople and managers. This generally includes both transactional and profiling data about customers, but might also extend to market data, competitor profiles, product libraries, pricing schedules and other information. This information can be significant to the promotion of customer orientation (Lambe and Spekman 1997) and the development of long-term mutually beneficial

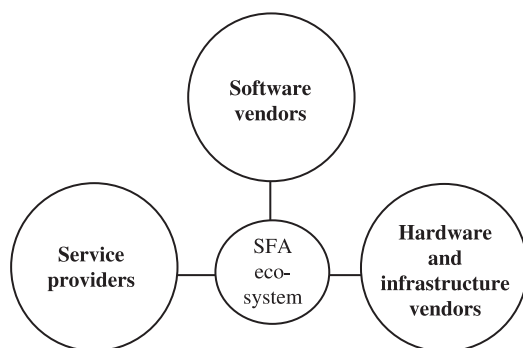


Figure 1. The SFA eco-system.

relationships with customers (Grönroos 2000). Further, as noted by Pullig *et al.* (2002, 401), 'organizations that use SFA to form superior market sensing and customer-linking capabilities are in a position to inform and guide the internal processes of the firm that are responsible for creating customer value'.

Although the software applications tabled above present a generic set of sales-related functionality, SFA software is also designed for context-specific applications. Several SFA vendors offer functionality designed for salespeople in particular industries. Siebel, the market leader, offers customized solutions for over a dozen different industries ranging from aerospace and defence to transportation. Some SFA specialists focus on particular areas of functionality. Selectica, for example, builds customized product configurators. These rule-based engines allow companies, or customers themselves, to configure complex products and services for customers.

The SFA Eco-system

The SFA eco-system consists of SFA software vendors, hardware and infrastructure vendors, and service providers, as illustrated in Figure 1.

Software vendors are only a portion of the overall SFA eco-system. SFA software must run on hardware such as Unix or Intel-based computers, and is often required to integrate with communications infrastructure such as telephony and e-mail systems. A complex

SFA project might require the deployment of a number of servers – for example, for e-mail and Internet applications. Hardware and infrastructure presents another important component of the SFA eco-system.

Variance in the location, job descriptions, communications channels and markets served by salespeople can create significant challenges for both SFA hardware and infrastructure. Whereas office-bound salespeople and sales managers might be happy to use desktops or laptops, field sales reps often prefer lighter handheld devices such as the Palm Pilot or Blackberry. Where companies have geographically dispersed salespeople, SFA systems must be able to operate out of the office and over the web. Mobile solutions are necessary, as the data held on portable devices must be regularly synchronized with the central database. SFA applications often need to integrate with a number of communication channels which use different technologies (web, e-mail, telephone). In growing industries and companies, SFA applications must be supported by hardware and infrastructure that can sustain increased numbers of users.

The services component of the SFA eco-system is very diverse. When a SFA project is completed, service costs may be of an order of magnitude that adds significantly to overall project expenditure. The hardware and software for a SFA project may account for between 10% and 50% of overall costs (Ahearne *et al.* 2004; Buttle 2004). The balance is made up of service costs. SFA project leaders might buy services from strategy consultants, business process consultants, software application consultants, technology and infrastructure consultants and other outsourced service providers (Buttle 2004).

Demand for SFA Software

Siebel Systems (2005) reports that spending on customer-facing solutions world-wide – including sales, marketing and service – is expected to grow at 11.1% compound annual growth rate (CAGR) between 2004 and 2014. Licence revenues had fallen from the turn of

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Table 3. SFA Licence Revenue (US\$ millions, US market)

	2003	2004	2005	2006	2007	2008
SFA spending	\$534	\$552	\$569	\$585	\$598	\$608

Source: Datamonitor (2004).

the century, but stabilized in 2003. They started growing again in 2004 (eMarketer 2005). The anticipated growth is being driven by both supply and demand factors. On the demand side, a return to economic growth and improved business profitability has meant that companies are prepared to spend more on their IT investments. On the supply side, vendors have invested in improving the ability of their solutions to integrate with back-office applications and have tailored them to meet the needs of particular industry verticals. Furthermore, hosted solutions such as salesforce.com and Siebel OnDemand have become more popular (eMarketer 2005).

According to a Datamonitor (2004), spending by US enterprises on SFA applications alone is projected to grow from US\$534 million in 2003 to US\$608 million in 2008, as shown in Table 3. By some estimates, the USA market accounts for about 50% of world-wide CRM spending (eMarketer 2005), indicating that the current value of the SFA market world-wide is in excess of US\$1.1 billion. SFA vendors are targeting the 9 million salespeople in the USA and 36 million salespeople in the rest of the world (Siebel and Malone 1996).

In 2004, spending on SFA applications accounted for about 16% of CRM software sales, compared with 21% on customer service applications and 12% on marketing automation and analytics (Datamonitor 2004). SFA is widely regarded as a relatively mature segment of CRM spending (Engle and Barnes 2000), particularly when compared with analytics. However, within the small and medium-sized enterprises (SME) segment, SFA remains a popular starting point as they begin to adopt customer-facing software (eMarketer 2005).

The SME segment is a relatively late adopter of customer-facing software applications. According to a Bain & Co. study (eMarketer 2005), although some three-quarters of large enterprises are already using CRM software, a much smaller proportion of SMEs have adopted the product.

Literature Review: Research into SFA

Investigators first started researching SFA in the early to mid-1980s (e.g. Collins 1984; Klompaker 1980–81; Wedell and Hempeck 1987a,b). However, by the mid-1990s, Bush and Grant (1994) were still reporting that little SFA research has been conducted. They and others (e.g. Engle and Barnes 2000; Jones *et al.* 2002) called for further studies in the light of conflicting reports on the success rates of SFA implementations. On the positive side, Siebel and Malone (1996), for example, reported that economic returns from SFA were ‘immediate’, and that the business case for its implementation was ‘compelling’.² Even more emphatically, Moriarty and Swartz (1989) reported that some SFA implementations have achieved return on investment in excess of 100%. However, on a more cautionary note, a number of reports signalled alarms about the outcomes of SFA implementations. Block *et al.* (1996) found that 61% of all SFA implementations fail. Morgan and Inks (2001), Rivers and Dart (1999) and Schafer (1997) have also reported similar failure rates. Blodgett (1995–96) testified to failure rates of 75% and Bush *et al.* (2005) of up to 80%.

In summary, our synthesis shows that SFA research can be clustered into subsets that have attempted to answer just four research questions, as follows:

- Why do organizations adopt SFA?
- What are the organizational impacts of SFA?
- What accounts for the success or failure of SFA projects?
- What accounts for variance in salesperson adoption of SFA?

In the analysis that follows, we review the SFA literature in relation to these four research questions.

Why Do Organizations Adopt SFA?

Vendors and consultants claim a number of benefits from SFA implementation, including accelerated cash-flow, shorter sales cycles leading to faster inventory turnover, improved customer relations, improved salesperson productivity, accurate reporting, increased sales revenue, market share growth, higher win rates, reduced cost-of-sales, more closing opportunities and improved profitability. These hard outcomes can be complemented by softer outcomes such as less rework, more timely information, and better quality management reports.³ Case histories published by vendors offer testimonials to SFA's impacts.

These benefits appeal to differing SFA stakeholders:

- *Salespeople*: shorter sales cycles, more closing opportunities, higher win rates
- *Sales managers*: improved salesperson productivity, improved customer relations, accurate reporting, reduced cost-of-sales
- *Senior management*: accelerated cash flow, increased sales revenue, market share growth, improved profitability

Research suggests that efficiency gains are a primary motivation for investing in SFA. Erffmeyer and Johnson (2001) interviewed informants at 40 US manufacturers and service firms to discover their motivations for implementing SFA. The primary motivation was improved efficiency (see Table 4). Harris and Pike (1996) reported that greater operational flexibility, better sales management, enhanced

Table 4. Motivations for implementing SFA

Motivation	% of sample reporting
Improve efficiencies	72
Improve customer contact	44
Increase sales	33
Reduce costs	26
Improve accuracy	21

Source: Erffmeyer and Johnson (2001).

customer support, higher sales force productivity, superior customer account management and improved communications between headquarters and the field were expected outcomes from SFA implementations. Ingram *et al.* (2002) agree that many companies are turning to SFA to help them manage their customer relationships more efficiently. However, Erffmeyer and Johnson (2001, 170) report that only 'a limited number of respondents were able to offer details regarding formalized goals and objectives for SFA'.

Wright and Donaldson (2002) identified four 'quite strategic' objectives for sales information systems applications – increased customer retention (mean score of 6.1 on a 7-point importance scale), enhanced customer relationships (6.1), increased customer acquisition (5.7) and integration to contact management (5.5). On further investigation, they suggest that the application of these systems reflects a 'mailing-list mentality'. Like Erffmeyer and Johnson (2001), they also found little evidence of the sample companies actually measuring outcomes in terms of these strategic objectives.

What Are the Organizational Impacts of SFA?

Kraemer and Danziger (1990) report that SFA implementations have both task and non-task outcomes. Task-related outcomes include productivity effects, and non-task outcomes include effects on job enhancement and social interactions. Most of the research performed on this topic has studied task-related outcomes.

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One of the early studies was conducted by Cronin and Davenport (1990), who were commissioned to conduct a before-and-after study to measure the benefits of SFA implementation in a single manufacturing company. They found that a number of hard and soft outcomes were achieved. The harder outcomes were enhanced quality of customer communications, better time management and improved knowledge management. Softer outcomes were classified as structural (rationalization of order processing, development of a 'virtual office' held on laptops), motivational (lower sales force attrition, improved image, better stress control) and cultural (the creation of an extended 'invisible college' of salespeople).

Although reporting that 50% of SFA adopters make no formal attempts to measure SFA impacts, Erffmeyer and Johnson (2001) identify improved access to information (60% of the sample), improved communication with customers (65%), a more efficient sales force (27%) and faster revenue generation (16%) as realized benefits from SFA implementations. They report that 85% of managers are either very satisfied or somewhat satisfied with the SFA implementation, compared with 80% of salespeople and 50% of the adopters' customers. Wright and Donaldson (2002) also report that their sample failed to measure achievement of their strategic SFA objectives, opting instead for operational measures such as number of sales generated (81% of the sample), contribution to profits (79%), opportunities identified (69%) and revenue per customer (66%). Although customer acquisition was cited as an important strategic objective, only 74% of respondents measured the number of customers gained. The authors found that the biggest impact of sales information systems was in developing mailing lists, producing sales reports, contact management and sales-cycle tracking.

Engle and Barnes's (2000) investigation of one pharmaceutical company's operations in three countries found a clear relationship between SFA adoption and salesperson performance. They conclude: 'Does the use of SFA

really contribute to higher sales performance? With overall sales growing, and with 16.4% of the variance in sales explained by the use of SFA systems, this study suggests the answer is "yes".'

Ahearne and Schillewaert (2001) also found that use of SFA was associated with improvements in reps' performance, as well as selling skills and knowledge. They found positive correlations between SFA implementation and sales reps' market knowledge, technical knowledge, targeting skills, adaptive selling and call productivity. Essentially, sales reps with SFA support became more adaptable and productive. Sales reps' use of SFA accounted for a small, yet significant portion (7%) of their sales performance.

In a later study, Ahearne *et al.* (2004) obtained objective measures of technology usage and performance by 131 sales reps in a mid-sized American pharmaceutical company. They found a curvilinear relationship between SFA usage, as measured by reps' accessing of SFA screens over a 3-month period, and salesperson performance, as measured by sales against quota. The worst performing reps either had very little or a large amount of interaction with the SFA software.

What Accounts for the Success or Failure of SFA Projects?

It is clear that SFA projects can be both costly and time consuming. Costs are incurred as project leaders buy product or service from one or more of the SFA eco-system members. Although some software vendor case studies suggest that payback is achievable within days, many projects take between 12 months and 24 months to implement, let alone yield a return. Taylor (1994) found that the average implementation period was 21 months, while Engle and Barnes (2000) found that payback periods were in the 6–7-year range. Conner and Rumelt (1991) claimed that users needed over 100 hours' experience with the systems before they could claim to have mastered them.

Researchers have employed a number of different approaches to this question, and have

identified several variables or factors that are associated with SFA success or failure.

Pullig *et al.* (2002) positioned their research on SFA effectiveness within the literature on innovation adoption. Their theoretical model proposed that the effectiveness of SFA implementation was related to organizational climate and shared values. They suggested that organizational climate would create the 'enabling conditions' necessary for successful implementation, and that commitment to effective implementation would be determined by the fit between organizational members' shared values and the characteristics of the SFA innovation. These hypotheses were tested and broadly supported by collecting data from 23 salespeople, sales managers and marketing managers. Among the important enabling conditions were training, encouragement, facilitative leadership and organizational support. Five shared values emerged as important correlates of SFA success: customer orientation, adaptive cultural norms, an information-sharing culture, entrepreneurial values and high levels of interpersonal trust.

Wright and Donaldson (2002) conducted a factor analysis of the barriers to successful sales information system adoption. Their self-report data indicated that technical barriers were much less important than strategic and organizational barriers. For example, a shortage of IT specialists and a lack of board-level backing were highlighted as more significant barriers than having access to highly fragmented market and sales data. In a parallel study, the same authors (Donaldson and Wright 2004) investigated the barriers to adoption of SFA within the UK pharmaceutical industry. Technical issues such as data availability and highly fragmented systems were identified as important barriers to successful SFA implementation.

Bush *et al.* (2005) set out to understand SFA outcomes by investigating 'factors beyond those typically included in technology acceptance studies'. They conducted semi-structured qualitative interviews with managers in three companies. The data identified three major influences upon SFA outcomes: the degree of

process change (from incremental to disruptive), the extent of salesperson buy-in and the perception of technology enablement (from low to high). In their sample, buy-in by salespeople ranged from 50% to 70%, suggesting a good deal of disinterest or resistance.

Speier and Venkatesh (2002) investigated two different firms where SFA technologies had been *withdrawn* following implementation. They apply a multifactorial model to explain success and/or failure, drawing on both prior learning about technology diffusion, and identity theory. Among the variables examined were individual characteristics such as age and sex, disposition towards technology, role perceptions and organizational attributes such as management support and user involvement. Measures were also taken of personal perceptions of technology with regard to any relative advantage that it might deliver, its visibility and image, its compatibility to job roles, its complexity and the demonstrability of results. Using a number of scales that had been validated in other contexts, they found that, although the salespeople had been 'fairly positive' about the implementation of SFA at the outset, they turned against the system, demonstrating their dissatisfaction with increased absenteeism and voluntary turnover. Sales performance did not increase following SFA implementation. The primary reason appeared to be the perceived lack of 'professional fit' between the SFA tools and the sales force. The tools did not 'play to the strengths' of the salespeople. The sales team's expectations of relative advantage to be delivered by the SFA tools had been high, but their perceptions of its delivery were much lower. Six months after implementation, organizational job commitment, job satisfaction, perceptions of salesperson-organization fit, and perceptions of salesperson-job fit had also decreased significantly.

Larpsiri and Speece (2004) uniquely investigated customer response to the implementation of SFA by suppliers. They reveal that customers are generally happy to see salespeople employ technology, but they do not want to see them replaced with self-service

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Table 5. Classification of critical success factors

Category of variable	Item
Organizational/cultural	Senior management facilitation and buy-in; organizational encouragement and support; customer orientation; adaptive cultural norms; entrepreneurial values.
Project-related	Well-developed project plan; user group involvement; customer involvement; deployment of a multidisciplinary implementation team; appropriate-to-task training.
Inter-personal	Sensitive management of user expectations; information-sharing culture; high levels of inter-personal trust.
Intra-personal	Strong belief that the technology will enable desired outcomes; adaptability; perceived usefulness of the technology; perceived ease-of-use; skills in computer use.
Technical	Access to a competent IT/IS resource; data availability; fragmented and poor quality data; development costs; degree of change required; technology fit to job role.

technology (SST). SST was seen as being riskier than interaction with a salesperson. The research was undertaken in Asia, where business is strongly 'relationship-based' (Larpsiri and Speece 2004, 392).

Summarizing this research-based literature, we can identify a number of critical success factors (CSF). These can be classified as organizational/cultural, project-related, interpersonal, intrapersonal and technical, as indicated in Table 5.

What Accounts for Variance in Salesperson Adoption of SFA?

It has been observed that SFA adoption is a two-stage process (Parthasarathy and Sohi 1997). First, the organization decides whether to adopt the technology; second, the sales-force decides whether to use the technology. On the grounds that SFA cannot deliver the sought benefits if salespeople do not use it, a number of researchers have attempted to 'forward understanding of sales force acceptance of SFA' (Morgan and Inks 2001).

As noted by Ahearne *et al.* (2004), much of the research on this particular question has focused on technology adoption, rather than on technology usage.

In one of the earlier studies, Morgan and Inks (2001) found, first, that salespeople were more accepting of the SFA implementation if they believed that training would be provided, and that the costs of attending the training (being absent from the field and reduced service levels to customers) were outweighed by the benefits. Second, they were more accepting if they were involved in the implementation, thus confirming the conventional wisdom that involvement promotes acceptance. They also found that, if sales reps have accurate expectations about what the implementation will deliver, they are more likely to accept its implementation. Contrary to hypothesis, the researchers found no connection between sales force acceptance of SFA and managerial commitment. They account for this unexpected outcome by explaining that salespeople in the field are more autonomous than their office-bound colleagues and therefore less influenced by managerial authority.

There are two models of technology adoption that have recently featured prominently in this research – the Technology Acceptance Model (TAM) (Davis 1986, 1989) and its extension TAM2 (Venkatesh and Davis 2000). Robinson *et al.* (2005) combined the TAM (Davis 1986, 1989) with the Theory of Reasoned Action (TRA) (Ajzen and Fishbein

1980) to identify the relationship between perceived usefulness, perceived ease of use, attitude towards using technology, and intention to use the technology. In addition, they tested the relationship between technology acceptance, adaptive selling practice and job performance of field salespeople. Their analysis of data from Fortune 500 companies used structural equation modelling. This indicated that the attitude towards using technology is positively related to its perceived usefulness and perceived ease of use. Furthermore, the more positive the attitude towards using technology, the higher the behavioural intention to use the technology. They also found that, although intention to use SFA tools is not directly related to better job performance, it is positively related to the adoption of adaptive selling practices by salespeople, which, in turn, leads to better job performance.

Schillewaert *et al.* (2005) also used the TAM to explain why salespeople adopt technology. Salesperson characteristics, social influences and organizational facilitators were identified as factors affecting the adoption of technology in addition to usefulness and ease of use of the technology. These first three factors may be directly related to the adoption of technology or mediated by usefulness and ease of use of technology. Their results reinforce the importance of perceived usefulness and ease of use as the main drivers of technology adoption in the sales force setting. In addition, salesperson innovativeness, user training, supervisor support and peer usage affect adoption of technology directly as well as being mediated by usefulness and ease of use of the technology.

Avlonitis and Panagopoulos (2005) deployed TAM in conjunction with the DeLone and McLean Information System Success Model (DMISSM) (DeLone and McLean 2004) to explain the acceptance of CRM technology by salespeople. Accurate expectations regarding system usage is the prime organizational factor positively associated with perceived ease of use, and salespeople participation in system design and implementation was found to be

positively related to perceived usefulness of the technology. They also measure the impact of CRM technology on sales force performance and conclude that the higher the positive perceived usefulness of CRM technology, the better the sales performance.

Jones *et al.*'s (2002) longitudinal study examined actual usage of SFA technology. They took measures of salesperson intention 2 weeks prior to implementation and salesperson adoption 6 months after implementation. Like Robinson *et al.* (2005), they also used the TRA and the TAM. Three variables explained salesperson intention to use the technology – perceived usefulness of the new system, attitude towards the technology and its perceived compatibility with the current system. However, actual use of the technology was shown to be strongly associated with the personal innovativeness of the salesperson, attitude towards the technology and facilitating conditions. They conclude that the use of SFA technology is both connected to individual differences such as innovativeness and attitude to technology, as well as having access to facilitators such as training, training manuals and support from a help desk.

A number of researchers have investigated the connections between SFA adoption and the age or experience of the adopters. Two investigations (Buehrer *et al.* 2005; Keillor *et al.* 1997) have found that younger sales reps were more positively inclined towards technology adoption. Ko and Dennis (2004) point out that SFA systems tend to store formal knowledge about products, customers, markets and competitors, and are therefore more likely to be of value to newer sales reps. Such codified knowledge would, they hypothesized, be of lesser value to high-expertise, more experienced sales reps. This turned out not to be the case. Indeed, high-expertise reps gained four times as much value from the knowledge base as the 'average' sales rep. They explain this by suggesting that the more experienced rep has already assimilated much of the knowledge, and would be able to gain incrementally by identifying and integrating new value-adding knowledge.

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Other researchers have offered different explanations for variance in salesperson adoption of SFA. Buehrer *et al.* (2005) found that reps adopted SFA not only because of its promised 'efficiency', but also because they 'had to'. Reps also reported that they would be more likely to use SFA if there was continuous or on-demand training. Erffmeyer and Johnson (2001) and Gohmann *et al.* (2005) both identify improved productivity as a reason for SFA adoption by reps. Other researchers, however, have pointed out the negative outcomes for salespeople of adopting SFA. Rangarajan *et al.* (2004) find that salespeople adopting SFA experience strong and stressful feelings of role ambiguity and role conflict. Speier and Venkatesh (2002) found that, if the fit between SFA tools and reps' roles is poor, the tools may fall into disuse.

Taken collectively, this body of research strongly suggests that salesperson adoption of, and intention-to-use, SFA software is highly dependent upon the software's perceived usefulness and ease of use, the accuracy of their expectations regarding the implementation, and intrapersonal attributes such as innovativeness. Facilitating conditions such as availability of training and technical support also emerge as important considerations.

Critique

Since the mid-1980s, there has been a small but growing number of research publications on SFA. Our analysis and synthesis shows that researchers have focused on just four questions: Why do organizations adopt SFA? What are the organizational impacts of SFA? What accounts for the success or failure of SFA projects? What accounts for variance in salesperson adoption of SFA?

We critique this body of knowledge on both theoretical and methodological grounds. Our theoretical critique identifies shortcomings in the conceptualization and operationalization of SFA variables, and modelling the linkages between them. Our methodological critique identifies weaknesses in the research processes employed.

Theoretical

Although some important empirical insights have been achieved by this body of research, there has been little by way of theoretical progress. Some of the published research floats free of any theoretical grounding. For example, Harris and Pike (1996) claim to have investigated reps' attitudes towards SFA, but they fail to use any acknowledged theoretical framework for measuring attitudes. Their work is better described as an opinion survey. Some research aims to be theory building, while some aims to be theory testing. Parthasarathy and Sohi (1997), for example, build a model that suggests a number of factors that influence organizational adoption and salesperson use of SFA. In their theory-building research, Avlonitis and Panagopoulos (2005) integrate two theories, the TAM and the DMISSM, both of which we explore more fully below. Robinson *et al.* (2005), in contrast, set out to test whether TAM explains salespeople's intention to use SFA.

As Ahearne *et al.* (2004) note, there are a number of theories that could be employed to understand sales-force technology adoption and use. These include the TAM, and its successor TAM2, developed by Davis (1986) and Venkatesh and Davis (2000), respectively. TAM is the most widely used framework for researching technology adoption (Avlonitis and Panagopolous 2005; Hu *et al.* 2003; Robinson *et al.* 2005). The fundamental claim of TAM is that a salesperson's attitude to using SFA determines that person's behavioural intention. Attitude is jointly determined by the perceived usefulness and perceived ease of use of the technology.

Other theories include the TRA (Davis *et al.* 1989), the Theory of Planned Behavior (Taylor and Todd 1995), Innovation Diffusion Theory (Moore and Benbasat 1991) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.* 2003). These models share the same dependent variable – technology usage – but employ different independent variables. Other than

the TAM and TRA models, the others are as yet unexplored in SFA research, although they have been applied in other arenas of technology adoption. Ahearne *et al.* (2004) suggest that it is time that SFA research moved to a model that stresses the relationship between adoption, usage and performance, a model they dub TPUM, the Technology Performance Usage Model.

Avlonitis and Panagopoulos (2005) have integrated the DMISSM and TAM models into their work. The DMISSM was developed on the grounds that 'new models and paradigms' are required in the information age (DeLone and McLean 2004, 31). The model offers a comprehensive and widely applied framework to assess the performance of an information system. The original model (DeLone and McLean 1992) was updated in 2004 (DeLone and McLean 2004). Engle and Barnes (2000) employed it in their research, and Ko and Dennis (2004, 312) justified their claim that 'SFA systems can only add value to an organization when they are used' by reference to the DMISSM. The seven variables integrated into the newer framework by DeLone and McLean (2004) are system quality, information quality, service quality, intention to use, use, user satisfaction and net benefits. The model is presented in Figure 2. DeLone and McLean (2004) define each of these variables and note that context-specific measures can be developed for each. They comment that 'net benefits are the most important success measures, because they capture the balance of the positive and negative impacts of [the information system] on customers, suppliers, employees, organizations, markets, industries, economies and even society as a whole' (DeLone and McLean 2004, 34). Their model certainly highlights the dominant focus of extant SFA research upon employees (salespeople) and organizations, and to a much lesser extent, customers. Whether SFA has had impact upon markets, industries, economies and society remains unexplored.

There are some additional concerns about the conceptual and operational definitions of

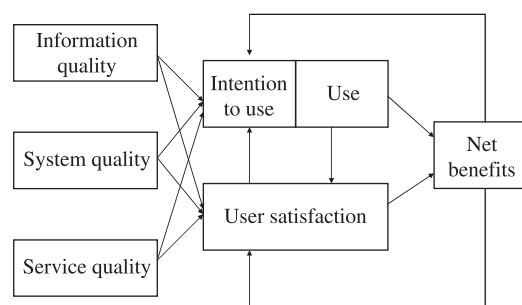


Figure 2. DeLone and McLean Information System Success Model.

failure and success. Few of the academic papers make clear what is meant by success, or, for that matter, failure. As Bush *et al.* (2005, 8) observe: 'the first point in managing SFA systems is to know exactly what the technology is set out to accomplish'. The corollary for researchers is that definitions of success and failure must be contextually defined. If success means that an SFA implementation has met its goals, researchers must understand the objectives of an organization's implementation before making judgements about failure and success. It is meaningless to propose measures of success or failure that are disconnected from a project's goals. Given that 50% of SFA adopters make no formal attempts to measure the impact of SFA (Erffmeyer and Johnson 2001), perhaps because SFA is increasingly regarded as a 'competitive imperative' (Morgan and Inks 2001) rather than an optional technology investment, this presents a considerable challenge to researchers.

Furthermore, failure and success may be defined in different ways by different constituencies – salespeople, sales managers, senior management, IT specialists and customers of companies implementing SFA. For a salesperson, success might mean 'increased commission' or 'more time released from administrative tasks for selling'. For a sales manager, success might be 'better management of underperforming reps'. For senior management, success might be 'improved market share and

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reduced cost-to-serve'. For an IT specialist, success may mean that the system experiences very little downtime or that expenditure on system maintenance is within expected limits. For a customer, success might mean access to a single point of contact with a vendor, full visibility of the contact and transactional history and better customer service.

Researchers have also ignored the possibility that notions of success and failure might vary across time. If sales reps are denied the opportunity to become involved in planning and implementing a SFA project, they may fail to adopt the new selling practices. If an early failure of this kind is remedied by appropriate-to-task training and a suitable rewards programme, success might eventually result. Short-term failure does not preclude longer-term success. Equally, short-term success does not necessarily preclude longer-term failure. Short-term enthusiasm for SFA implementation might decay over time if it fails to produce the benefits reps have been lead to expect. In consequence, reps might well revert to pre-automation practices. Also, given that SFA investments in both hardware and software require periodic upgrade, setting time-scales for the assessment of success or failure can be very difficult. Because of the frequent upgrades, a SFA project might be thought of as an ongoing series of smaller projects, each of which may be more, or less, successful. For example, sales reps in the field might not use new SFA software because their hardware is outdated. What looks like a failure might become a success as the company buys new laptops or handheld devices.

A further theoretical weakness of SFA research is researchers' failure to acknowledge or differentiate adequately between salesperson acceptance and adoption of SFA, intention to use, usage and performance. As noted by Ahearne *et al.* (2004) much of the research focuses on SFA adoption by sales reps and not its impact on sales performance. Clearly, there is a relationship between these four indicators, but the relationship is not necessarily linear or symmetrical. Unless techno-

logy is accepted by a salesperson, there is unlikely to be an intention to use, and unless rewards and facilitators such as training are put in place, intention may not convert into actual use. As Bush *et al.* (2005, 376) observe: 'everyone must "buy-in" ... If salespeople do not understand the changes in organizational processes (e.g. shift from transactional to relational selling) ... there is bound to be resistance to the SFA initiative and possible SFA failure'.

Whereas acceptance is indicated by attitude, usage is represented by behaviour. The former is unobservable but inferred, the latter is objectively observable. However, higher levels of usage should not necessarily be taken as indicative of better sales performance. As Ahearne *et al.* (2004, 297) observe: 'there is an underlying assumption that technology utilization is a proxy of its perceived usefulness'. This assumption was tested by Ahearne *et al.* (2004), who found a curvilinear relationship between usage of SFA software and sales performance. More does not necessarily mean better. This suggests that researchers should be careful in their choice of dependent variable and its operationalization.

Methodological

In addition to these theoretical concerns, there are also a number of methodological shortcomings in the research. First, much of the work has been performed on very small samples, ranging from one company (Engle and Barnes, 2000; Morgan and Inks 2001), two companies (Speier and Venkatesh 2002), three companies (Bush *et al.* 2005) to 40 companies (Erffmeyer and Johnson 2001) and, in one case, 210 companies (Rivers and Dart 1999). The variance in sample sizes does, of course, reflect in different methodologies and research foci. The smaller samples are generally, though not exclusively, associated with qualitative case-based research; the larger samples are employed for quantitative research.

Another problem concerns the type of evidence or data that are collected. Most of the

research collects and analyses self-report data. The shortcomings of this approach have been recognized for many years (Hansen and Scott 1978; Peterson and Kerin 1981). Access to objective input and output data should be feasible in this field of research. Input data such as financial dollar investment in SFA or hours of training, and output data such as salesperson performance against quota or number of new accounts obtained would enable researchers to draw more robust findings about relationships between SFA investments and SFA outcomes. Some costs of adopting SFA are less evident than others. For example, while software licensing costs are known, other costs associated with reduced service levels to customers as reps become accustomed to the new software, or costs attached to the absenteeism associated with the stress of adopting new work practices are not readily computed.

Table 6 lists SFA outcome measures that researchers have employed. It is clear from this table that very few researchers have employed objective measures. Ahearne *et al.* (2004), Engle and Barnes (2000), Ko and Dennis (2004) and Speier and Venkatesh (2002) are exceptions. Ahearne *et al.* (2004) and Ko and Dennis (2004) treat sales performance against quota as the dependent variable and interaction with SFA software as the independent variable. Ko and Dennis (2004, 318) find that 'the more SFA system documents a sales representative read, the greater his or her sales against quota', and the greater the expertise of the salesperson, the more they benefited from the system. As noted earlier, Ahearne *et al.* (2004) find that the relationship between SFA usage and sales performance is curvilinear. Increasing usage of technology has a positive effect upon performance improved until the optimum point – the point of inflection – is reached and then the positive effects of SFA taper off to zero.

Another methodological concern linked to the failure to measure SFA success or failure over time is that most of the research is cross-sectional rather than longitudinal. Given that it might take up to 7 years for a SFA imple-

mentation to pay back (Engle and Barnes 2000), a more patient approach is warranted to the assessment of SFA outcomes. We can identify only two studies that take a longitudinal approach. Cronin and Davenport (1990, 278) were commissioned by a single company to 'establish a before-and-after study to enable the company to qualitatively and quantitatively measure the result business benefits [of their SFA implementation]'. Jones *et al.* (2002) took measures of salesperson intention 2 weeks prior to SFA implementation, and salesperson adoption 6 months after implementation. Although the Cronin and Davenport (1990) paper does not make clear the period of time that elapsed between the before and after measures, it seems that neither study took measures beyond a 6-month period following implementation.

None of the research makes clear whether the companies and reps using SFA have adopted on-premise or hosted solutions. Given the dates on which research was published, it seems highly likely that most of the research was conducted in contexts where on-premise solutions were employed. Only in recent years have hosted solutions begun to challenge more conventional on-premise solutions (CIO Insight 2004). Given the distinctions between these two forms of SFA, different costs and benefits may be experienced by companies (Buttle 2006). Consequently, definitions and computations of success and failure might differ between hosted and on-premise solutions.

Another problem concerns the generalizability of findings beyond the specific sectoral or organizational context within which the research was conducted. The measurable impacts of SFA may vary between industries. Although the pharmaceutical industry is 'highly profitable', payback periods are still in the region of 6–7 years (Engle and Barnes 2000), perhaps because of the complexity of the sales role, which requires a customized SFA solution. A simpler, less regulated sales environment could employ off-the-shelf SFA software with a narrower range of functionality, and expect payback to be very rapid. It has also been

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Table 6. Outcome measures used in SFA research

Research paper	SFA outcome measures
Avlonitis and Panagopoulos 2005	Four 5-point Likert self-report scales measuring salesperson performance in terms of sales volume, market share, new account development, servicing existing accounts.
Gohmann <i>et al.</i> 2005	Eight 7-point Likert scales measuring, <i>inter alia</i> , perceived effectiveness of the SFA system, overall satisfaction, time spent working on individual sales leads, time made available for sales activities, perceived salesperson effectiveness, salesperson productivity.
Rangarajan <i>et al.</i> 2005	Four 7-point Likert scales measuring perceived usefulness.
Robinson <i>et al.</i> 2005	Three 7-point Likert scales measuring intention to use technology.
Bush <i>et al.</i> 2005	SFA success is defined by a target percentage of sales reps (between 50% and 70%) buying into and using SFA software.
Ko and Dennis 2004	Dependent variable: salesperson performance as percent of quota achieved. Independent variable: objective measure of salesperson interaction with SFA system.
Larpsiri and Speece 2004	Outcome variables included solving customer problems; perceptions of salesperson credibility, honesty and competency; relationship development; cycle time.
Ahearne <i>et al.</i> 2004	Dependent variable: salesperson performance as percent of quota achieved. Independent variable: objective measures of salesperson interaction with Siebel system.
Jones <i>et al.</i> 2002	Six 7-point Likert scales measuring perceived usefulness.
Pullig <i>et al.</i> 2002	Self-reports about whether SFA helped improve prospecting, improve account development and generate better buyer profiles.
Speier and Venkatesh 2002	Objective measures of SFA system usage, sales performance, absenteeism and voluntary salesperson turnover.
Wright and Donaldson 2002	Three 7-point Likert scales measuring the extent to which informants agreed that SFA had increased customer acquisition, increased customer retention, and enhanced customer relationships.
Erfmeyer and Johnson 2001	Ten open-ended questions about informants' positive and negative experiences with SFA.
Engle and Barnes 2000	Dependent variable: sales performance by sales representative Independent variables: Thirty-four 5-point Likert scales about frequency of use of laptop computer for sales activities; eight 5-point Likert scales about importance of computer functionality for various sales activities including territory planning, customer communication, sales training, sales presentations, analytics.
Rivers and Dart 1999	Estimates of costs savings, sales force efficiency and payback period.

suggested that larger companies might take longer than smaller companies would to see payback (Taylor 1994), and that more complex projects take longer to produce the desired returns (Moriarty and Swartz 1989).

None of the research has used a control group so that the effects of SFA can be isolated. Even the *Journal of Marketing* piece by Speier and Venkatesh (2002) is subject to this methodological flaw. This paper investigated two companies where SFA had been implemented and subsequently withdrawn. Because no control group was used, we cannot know with any certainty whether the absenteeism and voluntary turnover found in the studied organizations was any better or worse than in other organizations where SFA had been implemented and retained. The paper also infers that voluntary turnover is an undesirable outcome. It may not be so. If poorly performing salespeople who are not prepared to use SFA software quit, this may be a blessing. Indeed, many of the undesirable outcomes that were measured in this study may be accounted for by aversion to change or the change management processes the sampled companies adopted. That SFA was implicated may have been merely coincidental.

Finally, there has been no notable research into the non-task outcomes of SFA implementation as noted by Kraemer and Danziger (1990). Given the managerial orientation of all these studies, researchers have focused on task-related outcomes for salespeople, sales managers, companies implementing SFA and, to a much lesser extent, their customers. Nothing of note has examined non-task-related outcomes such as the impacts of SFA on interpersonal communication patterns, users' evaluations of self-worth, and life-work balance.

Research Agenda

Our critique shows that there are many opportunities to improve knowledge about SFA. We suggest that researchers focus on addressing the specific weaknesses that we have identified. We suggest that researchers try to obtain

a clearer understanding of what is meant by 'success' from the perspective of different stakeholders, whether salespeople, sales managers, senior management, IT specialists or customers of companies implementing SFA. Vendors have certainly attempted to influence this discourse on success in order to promote their products and services. They have made many claims about the impact of SFA on salesperson and/or business performance. We suggest that researchers investigate the veracity of these claims. Our review of vendor websites shows that their claims for beneficial outcomes include: accelerated cash flow, shorter sales cycles leading to faster inventory turnover, improved customer relations, improved salesperson productivity, accurate reporting, increased sales revenue, market share growth, higher win rates, reduced cost-of-sales, more closing opportunities and improved profitability. We know of no academic research that has roundly and independently tested these claims.

We certainly endorse Ahearne *et al.*'s (2004) suggestion that SFA research should examine the impact of SFA on two important stakeholders – salespeople using SFA and companies implementing SFA. They propose that researchers examine the link between SFA adoption, usage and salesperson and/or business performance. The dominant theoretical models that have been used in SFA research fail to make the connection to performance – the TAM and TRA for example. However, some researchers have recently begun to make this link between user acceptance of SFA and performance by building and testing new theoretical models (see Avlonitis and Panagopoulos 2004). Many companies appear not to set specific measurable objectives when adopting SFA (Erffmeyer and Johnson 2001). However, some do, and these can be in terms that are consistent with, or different from the vendor claims detailed above. Where objectives have been specified, researchers can assess whether the companies' goals have been achieved. One of the major methodological weaknesses that we identified is the use of self-report data. We strongly suggest that researchers strive to

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obtain objectively verifiable performance or outcomes data wherever possible.

Although salespeople and companies are clearly important stakeholders in SFA implementations, so are those companies' customers. Very little has been published on the impact of SFA on customers. Does SFA reduce transaction costs by making purchasing processes more efficient? Does SFA mean that service levels are enhanced? Does SFA raise customer satisfaction levels? Does SFA influence customers' intentions to continue to do business with a supplier? These and other customer-related questions remain unanswered.

We also suggest that researchers take a longitudinal perspective to their research on salesperson, corporate and customer outcomes. The vast majority of the published research has been cross-sectional. A longer time frame for the evaluation of SFA outcomes would allow for individual and corporate learning to occur, projects to be concluded and change management processes to be completed. Attitudes, behaviours and outcomes can change over time.

SFA research also lends itself to experimental or quasi-experimental designs. This is a major shortcoming in the published research. Researchers have been unable to say with confidence that salespeople and companies that have adopted SFA perform better than companies that have not. None of the research has compared data from companies that have employed SFA with comparable companies that have not. No control groups have been employed. As SFA becomes commonplace in business-to-business environments, the opportunity to conduct this research will be lost. However, there will still be opportunities within individual companies to measure outcomes at the level of the salesperson. Do early adopters in a sales force obtain significantly different sales results from those who have not adopted? This would be indicative of experimentally valid effects of SFA on performance.

In other cognate research, context has been shown to be an important consideration in the implementation of, and outcomes from, cus-

tomers management strategies. On the basis of extensive case-based research, Ahmad and Buttle (2001) conclude that firms 'should develop and implement [customer retention] strategies that are appropriate to their business context'. Contextual factors that could be considered in SFA research include the competitive environment (from turbulent to stable), sectoral adoption of technology (from early adopters to laggards), time (from short-term to long-term), infrastructure availability (from countries or regions with poor infrastructure to those with advanced infrastructure), form of installation (on-premise or hosted or blended) and relational complexity (from highly regulated to *laissez-faire*). These contextual conditions may have an impact upon the achievement of desired outcomes from SFA implementations. For example, researchers might hypothesize that corporate returns from SFA investments are lower when infrastructure is unreliable or undeveloped, or that market share growth is less significant for later adopters of SFA in a sector.

Research into the factors that impact on the outcomes from CRM implementations may also serve to guide further research into SFA. CRM is often thought of as consisting of three elements: people, process and technology (Buttle 2004). Put another way, CRM implementations involve people performing marketing, selling and service processes with the help of technology. Though it is a subset of CRM, SFA research thus far has focused on people and technology issues. We believe that there is considerable potential to research the impact of processes on SFA outcomes. For example, SFA systems generally are built around a particular approach to, or model of, selling. Software is then developed or bought to support this selling process. Branded selling processes such as SPIN, TAS and RADAR are already available in automated format. Sub-processes of selling, such as the lead allocation process or the quotation process, can also be automated. CRM research tells us that, if front office processes such as these are not widely understood, agreed and implemented, investment in CRM technologies is at risk

(Iriana and Buttle 2004). By extension, designing or re-engineering key selling processes so that they are both effective and efficient is critical for an organization to be able to execute its selling strategy and to fulfil customers' needs (Lee 2000; Rigby *et al.* 2002).

We conclude this review and critique by presenting a number of specific research questions that reflect the discussion above and, in our view, deserve further attention:

- What objectives are executives and managers pursuing when they adopt SFA, and how do these vary, if at all, across context?
- How do definitions or claims of SFA success (or failure) vary contextually?
- What counts as SFA success (or failure) from the perspective of the various internal (salesperson, sales manager, senior manager, IT manager) and external (vendor and customer) stakeholders?
- What impacts does SFA have on customers and on supplier–customer relationships?
- What are the organizational and environmental conditions that are associated with the achievement of desired SFA outcomes?
- Does the implementation model – hosted, installed or blended – make any difference to SFA outcomes?
- Which technology, people and process factors are important components of SFA implementations, and what impact do they have on SFA outcomes?
- Does SFA deliver competitive advantage? Put another way, do competitors with SFA achieve better outcomes than their counterparts without and, if so, is the advantage sustainable?

Clearly, research conducted thus far has only just begun the task of shedding light on the role and contribution of SFA to salesperson and business performance. In view of increasing spending on SFA technologies in the coming years, the time is now ripe for a more thorough look at SFA. It seems to us that there is considerable scope to generate better knowledge about SFA.

Notes

- 1 All correspondence should be sent to the first-named author at Macquarie Graduate School of Management (MGSM), Macquarie University, North Ryde, Sydney, NSW 2109, Australia; e-mail francis.buttle@mgsm.edu.au
- 2 The author, Siebel, is Tom Siebel, the founder of CRM software vendor and market leader Siebel Systems
- 3 These claims were extracted from the websites and collateral material of SFA software vendors.

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