Journal of Enterprise Information Management

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Understanding customer relationship management technology adoption in small and medium-sized enterprises

An empirical study in the USA

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Abstract

Purpose – The customer relationship management (CRM) technology adoption process in small- and medium-sized enterprises (SMEs) is an under-researched area and the purpose of this paper is to extend the knowledge and offer greater understanding of the CRM adoption process through an empirical study in the USA.

Design/methodology/approach – In this study it is hypothesized that the likelihood of CRM technology being adopted is dependent on management characteristics, organizational characteristics and management’s perception of CRM technology. To investigate the proposed model a survey of SMEs in the retail, manufacturing and services sectors was conducted in Southern California, USA.

Findings – The results indicate that management characteristics significantly influence a firm’s perception of CRM technology specifically innovativeness and positive attitude to CRM. Organizational characteristics such as the employee, information technology (IT) resources, a firms’ innovativeness influence the likelihood that CRM technology will be adopted and the extent to which CRM technology will be implemented.

Research limitations/implications – First, the industries focused on were in retail, manufacturing and services. Second, the sample was geographically specific to Southern California. Third, the sample size in this study was relatively small, although it is within the testable range. Finally, only one respondent was surveyed from each firm.

Practical implications – Management regardless of gender, age or education level, must be supportive, innovative and have a positive attitude towards the new IT application, as positive perception will likely to lead to decision to adopt. In addition, there must be innovation within the organization and the firm must have the ability to absorb knowledge and to use it. There must be an availability of IT resources, both infrastructure and skills to support the change.

Originality/value – The results of this study have implications for CRM adoption in SMEs. More importantly, they suggest a framework which demonstrates the necessary linkage between organizational characteristics and CRM adoption process.

Keywords Customer relationship management, SMEs, Innovation decision, Partial least square, Information technology adoption, Organization characteristics

Paper type Research paper

1. Introduction

Small- and medium-sized enterprises (SMEs) play an important role in the economy of most countries. In the USA, 99 per cent of all businesses are generally of <500

This paper is an extended version of a paper presented at the UKAIS Conference 2012.
employees, representing about 99.7 per cent of all employers, employing more than half of the private sector workforce and contributing to approximately 41 per cent of private sales in the country (Barreto, 2006). These figures demonstrate the importance of this sector to the US economy. One aspect of SME businesses that can differentiate them from larger organizations is their tendency to be risk averse in investing in new information technology (IT) applications (Nguyen, 2009). Many SMEs are also known to lack resources such as finance, IT knowledge and skills (Ramdani et al., 2009) and this has been suggested as a major reason for low IT adoption and success rates (Shin, 2006).

Customer relationship management (CRM) has as its aim the enhancement of a company’s ability to achieve the ultimate goal of retaining customers and so gain a strategic advantage over its competitors. It has been found that investment in and implementation of a CRM system results in a positive change in consumer behaviour which in turn leads to increased revenues through increased sales or efficiency savings (Maklan and Knox, 2009). CRM technology allows for a wider reach of the “relationship marketing” approach by utilizing IT to take over the labour-intensive aspects of developing meaningful relationships, thereby making it feasible across a wide range of different customers (Baumeister, 2002). The concept of relationships is particularly prominent within SMEs with the key decision makers often having close connections with the customer base. Where CRM can make a positive contribution to SMEs is by using technology to manage these relationships. However, for risk averse organizations the concept of investing resources into a CRM system is not considered to offer a good return on investment, especially given the widely reported high failure rates. Even though CRM has the potential to deliver benefits to SMEs, studies focusing on CRM success rates in SMEs have reported less success in terms of the realization of those benefits (Bull, 2003; Harrigan et al., 2009). Nevertheless, the demand for CRM technology has grown as more organizations see the value of better customer relationships, customer knowledge and customer retention and if SMEs are to successfully adopt and implement CRM technology it is important to better understand their specific needs (Bull, 2003). Other factors which are considered to influence CRM adoption include user acceptance and the extent of CRM integration with existing systems and the overarching business orientation (Ko et al., 2008). When making a business case for CRM adoption, organizations often argue that as a result of CRM investment consumer behaviour will change in a positive way and this will in turn lead to increased revenues through increased sales or efficiency savings (Maklan and Knox, 2009).

Research demonstrating the benefits of CRM in SMEs has shown that effective adoption is hard to achieve and that expected benefits in over half of the cases are not realized (Ismail et al., 2007; Reijonen and Laukkanen, 2010). Studies have carried out in different industry sectors with, for example, Ozgener and Iraz (2006) focusing on the tourism industry, Ko et al. (2008) on the fashion industry and Peltier et al. (2009) on the retail sector. Regardless of the sample populations, these studies are searching for factors that affect the decision and intention to adopt CRM technology. These factors include cost-benefit, management innovativeness, perception, knowledge and skills, employee attitudes, acceptances and contributions, IT skills and knowledge of management and employees, and IT infrastructure. Some also include the business size and the firm’s culture of innovativeness.

This paper extends these debates and offers greater understanding of the CRM adoption process in SMEs, which is an under-researched area (Wahlberg et al., 2009). The CRM adoption process is encapsulated in our proposed research module.
shown in Figure 1. This paper offers a twofold approach: first, it investigates management’s characteristics towards the perception of CRM and the effects on the likelihood of CRM technology being adopted; second, it examines the organizational characteristics relating to the extent to which CRM technology will be implemented in the specific context of three industry sectors: manufacturing, retail and services in Los Angeles County and Orange County in Southern California, USA.

The remainder of this paper is structured as follows: the next section presents a review of key aspects of the cognate literature in this area and an outline of the study research framework. This is followed by the research methodology, the results analysis, and a discussion of the findings and implications. Limitations of the study are also discussed with some suggestions for future research.

2. CRM and diffusion of innovation (DoI)
The exact nature of CRM is highly contested and consequently there is no universal agreement on what it is (Ngai, 2005; Teo et al., 2006). For some researchers, CRM is a technology or enterprise application (Elmuti et al., 2009), while for others, CRM is a sophisticated concept, expensive to implement and entails a high level of financial investment and the long-term commitment of a company, in the same way as Enterprise Resource Planning, Supply Chain Management and other enterprise systems (Nguyen et al., 2007). Within the context of this paper we adopt the definition of Payne and Frow (2005, p. 168) that CRM is a cross-functional integrated process among the organization’s strategies, marketing capabilities, people, technology and applications. The key issue here is that CRM brings together the relationship marketing strategies and IT application to create profitable, long-term relationships with its customers and other stakeholders. Thus it can be seen that CRM is a philosophy inculcated within an organization and supported by an information system founded on a large database of customers (Zwick and Dholakia, 2004). This technology has been attractive to many large companies who have struggled to better understand

![Figure 1. Research model of CRM adoption process](image-url)
their customer needs, identify valuable customers and develop strategies for customer acquisition and retention (Gummesson, 2004).

To apply CRM concepts and technology to a business operation is challenging and if undertaken without due consideration may result in failure (Nguyen et al., 2007). It is important to investigate a number of organizational factors including understanding the CRM adoption process as well as the characteristics of the organization such as IT resources, management and firm characteristics. This is particularly important in the SME environment as there is little research that provides insight into the adoption process, an exception being the work of Ko et al. (2008). For many SME organizations CRM is viewed as an IT innovation which can enhance their business and provide them with strategic advantage. Nevertheless they are often unprepared for the process and many have misconceptions regarding the capabilities of these systems (Mazurencu-Marinescu et al., 2007). One of the issues that appears to be pertinent is the lack of understanding of the adoption and diffusion process.

DoI research and practice originates from many diverse fields of study. Generically an innovation may be viewed as something that is new to an adopting organization but not necessarily new in its own right. Rogers (2003) over the course of several decades has developed and refined a DoI framework. In this framework, diffusion is defined as the process by which an innovation is communicated through certain channels over time among the members of a social system and that an innovation is an idea, practice or object perceived as new by an individual or other unit of adoption. Innovation and innovative change are terms which have various meanings in different contexts. Amongst some of the more popular definitions are those shown in Table I.

It is clear that all these definitions include the aspect of “newness” within organizations but the degree to which an innovation is new or radical is often the focus of debate. CRM and the systems which support it are considered to be an innovation for many SMEs.

In terms of SMEs, CRM innovation research studies have tended to incorporate a number of these concepts in their research. For example Cooper et al. (2005) explored family and non-family firms in the UK when studying the importance of relative

<table>
<thead>
<tr>
<th>Author</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Albury (2005)</td>
<td>Successful innovation is the creation and implementation of new processes, products, services and methods of delivery which result insignificant improvements in outcome, efficiency, effectiveness or quality</td>
</tr>
<tr>
<td>Bessant (2005), Moore (2005)</td>
<td>Explicitly reserve the term innovation for radical, permanent change and real breakthroughs. They prefer to use the term continuous improvement, a term contentiously disputed by many innovation academics and practitioners, for smaller steps, while not judging one of the types to be superior to another</td>
</tr>
<tr>
<td>Buijs (2007), Hartley (2006)</td>
<td>Innovation is about coming up with and implementing something new Innovation as including aspects which avoids small, continuous improvement innovation, but which does not have to meet the high hurdle of permanent transformation. Innovation represents a step change, or a disruptive change for the organization or service</td>
</tr>
<tr>
<td>Rogers (2003), Mack et al. (2008), Zhuang (1995)</td>
<td>Innovation “the adoption of an existing idea for the first time by a specific organization” The act of creation which is both new and unique. Moving outside of existing paradigms and finding new approaches lies at the heart of the innovation process including diffusion</td>
</tr>
</tbody>
</table>

Table I. Example definitions of innovation
advantage to the companies and CRM knowledge in the decision process. Özgener and Iraz (2006) studied the adoption of CRM in the Turkish SME tourism industry, where they investigated the characteristics of management and the purpose of the CRM adoption. What emerged was that firms adopted CRM for cost reduction, sustaining competitive advantage, improving customer service, customer retention, acquiring new customers and increasing profits. However, when looking at the innovation decision process they lack the CRM knowledge, they fail to get management buy-in, and poor communication prevents successful implementation.

The innovation decision process is extremely important when studying CRM. Bull (2003) and Peltier et al. (2009) have identified that management and leadership play key roles in delivering a CRM project and must show their commitment and involvement throughout. However, Mazurencu-Marinescu et al. (2007) argue that managers are often unclear as to what approach should be taken towards CRM. They lack knowledge and expertise and may make decisions based on vendor promises of strategic advantage for the company. In terms of IT many SMEs lack the IT skills with which to implement CRM (Bull, 2003) and this has led to a number of initiatives to develop CRM applications for the SME sector (Baumeister and Kosiuczenko, 2000; Baumeister, 2002).

CRM technology adoption is the stage at which a decision is made about adopting a particular CRM application package and integrating it into an organization's business systems either physically (purchased software that is installed and maintained in-house) or virtually (purchased memberships/user licenses and used via an interface supplied by service providers such as those from Microsoft, Sage, SAP, SaleForces.com or Oracle). This process involves various activities, including managerial and professional/technical staff decision-making in both the internal and external environment of the organization, and this must occur before the given technology can have a physical presence in the organization (Preece, 1995).

Organizational capabilities include the people within the firm (their attitudes, culture and identity), innovation ability and knowledge (Battor and Battor, 2010). These elements have direct impact upon the nature of the firm and its willingness to accept new ideas and change. Firms that are open to accept new, challenging activities and embrace learning cultures and recognize the strength of their culture are likely to advance innovation and gain advantage over their competitors (Denison et al., 2004). This suggests that the firm itself needs to have the ability to absorb knowledge, transform it and use it to generate new knowledge, which, in turn, promotes innovation (Gray, 2006). It is our contention that the innovation decision and CRM adoption processes are intrinsically linked to the nature of the organization and the individuals within. Despite the willingness of a large proportion of SMEs to engage with CRM systems, many CRM integration and adoption activities are flawed not by the CRM system itself, but by the capabilities of the organization to adapt to changing processes and activities resulting from the adoption of these systems. It can be further argued that dynamic capabilities are grounded in a manager’s tacit knowledge of the business and are therefore often difficult to identify and embed in the processes (Maklan and Knox, 2009). In the context of SMEs, DoI can be defined as programmes of change affecting the uptake of new technologies, working practices or behaviours that affect an organization (Greenhalgh et al., 2004). The study of innovative change and factors relating to the adoption of innovative change is extremely varied and the literature is subsequently vast and has been the subject of a number of meta analyses and literature reviews (Damanpour, 1991; Damanpour and Gopalarkrishnan, 2001; Greenhalgh et al., 2004; Mustonen-Ollila. and Lyytinen, 2003; Schrijvers et al., 2003). This research has
been carried out within a large range of traditions, each of which has addressed the subject of innovative change within its own discipline, from different perspectives and with different objectives as their aim. The approach that has been adopted within this paper is that of Rogers (1983) which is seminal work developed in the 1960s and updated over time and in response to new data and critique.

3. Research model and hypotheses
In this study, it is postulated that the likelihood of CRM technology being adopted and the extent to which it is adopted is dependent on management characteristics, organizational characteristics and management’s perception of CRM technology. This perception itself is dependent on management characteristics. The proposed model is shown in Figure 1.

3.1 CRM adoption process
The first dependent variable is the perception of CRM technology. It assesses the perception of the benefit and usefulness of the CRM application. The instrument to measure this was adapted from Cooper et al. (2005) and Davis (1989), and is on a scale of 1 to 5 (strongly disagree to strongly agree). The level of perception is calculated by averaging the scores of the responses. It is hypothesized to be dependent on the management characteristics variable. The second dependent variable is the likelihood to adopt CRM technology, which looks into whether the business is or is not proceeding towards adopting CRM technology; this variable is dichotomous. Following the example from Thong and Yap (1995), this variable is hypothesized to be dependent on positive perception of CRM, the management characteristics, IT resources and the firm’s characteristics. The last dependent variable is the extent of CRM implementation technology. The measurement of this variable follows Cooper et al. (2005). It is the extent to which CRM technology is being adopted. This measure indicates the degree to which CRM has been adopted by assessing the different CRM functionalities being used in the organization. Based on ten criteria of specific CRM features, using 1 for using and 0 for not using, the composite score was measured by totalling number of features that have been implemented in the firm.

3.2 Management characteristics
In SMEs, the structure of an organization is more centralized and the top management or owner-manager’s attitude, personality and values play a vital role in business decision making (Denison et al., 2004). Studies have been carried out to investigate the social behaviour and frames of reference of top management in relation to IT, and this would suggest that the greater their understanding of IT, the more likely it is that they will adopt IT, and the more successful that adoption will be (Bruque and Moyano, 2007). A major part of the literature focuses on top management or owner-managers’ characteristics and behaviour or social trait (Smith, 2007). Top management’s social trait refers to their behaviours and frames of reference. Studies have shown that in SMEs, the role of the top management or the owner-manager is crucial to the firm as their decisions affect all activities of the firm, both current and future. This also applies to the decision to adopt IT from planning to implementing and, afterwards, maintaining and upgrading the system. This is to make sure that it meets the requirement of current IT and satisfies the organizational goals such as to maximizing productivity and maintaining the quality of its products and services (Fuller-Love, 2006).
Management’s innovativeness is also related to accepting new IT. Research carried out by Thong and Yap (1995) indicates that managers who are highly innovative and have a positive attitude towards IT together with a competent IT background are more likely to be successful in adopting new IT. Moreover, they tend to pursue new IT for competitive purposes, which represent creativity and motivation to grow (Jones et al., 2007). Harrison et al. (1997) use the theory of planned behaviour (TPB) to explain and predict the decisions to adopt IT in small businesses. The TPB was used as a background theory to test and predict these decisions based on three variables of top management: attitude, subjective norms and perceived control. Their findings confirmed that executives decide to adopt IT for competitive purposes. From a similar perspective, Jones et al. (2007) refer to owner-manager’s sense-making and discursive resources as human capital, which plays a key role in SMEs knowledge environment and is part of cognitive social capital. Together with the factors of absorptive capacity and social capital, human capital is the foundation of growth, profit and survival.

In light of this, our first two hypotheses are:

H1. Management characteristics will significantly influence a firm’s perception regarding CRM technology.

H2. The more positive the perception of CRM technology by the management, the greater the chance that CRM technology will be adopted.

3.3 Organizational characteristics

While management or the owner-manager are the people who contribute to the success of the business in SMEs, employees' knowledge and the degree and form of their involvement contribute to the success of the IT adoption process (Anderson and Huang, 2006). The company characteristics are vitally important to the adoption of innovation. Ko et al. (2008, p. 67) suggest that large companies tend to adopt innovations more easily than smaller ones because they have many more resources, they manage risk well and have resilient infrastructures. In contrast smaller companies work in highly competitive environments, lack resources, suffer from cash flow issues and do not have the professional staff who have experience in adopting innovative systems.

Nevertheless innovative SMEs who are successful in adopting CRM have employees who understand the purpose behind the adoption, their role within the adoption and their contribution to the adoption (Nguyen, 2009). As a result SME management must nurture a culture which recognizes that employees are an asset, can make a contribution, can have a major impact on the organization, and are a resource that needs to be developed (Shum et al., 2008). Keeping employees informed of and engaged in organizational change is essential for the success of any new project, especially where IT is involved (Anderson and Huang, 2006; Igbaria et al., 1997). Preece (1995) contends that staff are the firm’s “human capital” and when engaged at all levels of the organization in new IT adoption can facilitate higher success rates. Regardless of the potentially positive outcomes of employee engagement in IT projects SMEs need to be aware of staff concerns (Bull, 2003). These have been articulated as doubts over job security, and the possibility that the new system will not improve the business or staff jobs (Anderson and Huang, 2006). It is important that SME managers are appraised of all of the issues around staff involvement in new IT innovations and choose a communications strategy specific to their own organization along with sufficient training and development to overcome the change management difficulties (Fuller-Love, 2006; Shum et al., 2008).
When considering the IT resources within SMEs the focus is on the IT abilities, capabilities and capacities of a firm. IT abilities refer to the skills, IT capabilities refer to the resources and strategies, and IT capacities refer to the ability of firms to absorb, process, and present the information that the firm holds (Guan et al., 2006). The key ingredients for understanding IT adoption in the small-enterprise sector are organizational competencies, organizational and technical processes, technical, managerial and business skills, and the allocation of resources within firms (Caldeira and Ward, 2003). IT managers should not only understand the reasons why IT needs to be implemented in their businesses, but also the importance of taking into account the needs of their suppliers and customers (Guan et al., 2006). As IT can assist firms in enhancing their business practices, it is important that the reason for pursuing new IT should be identified before any key decisions on IT adoption are made.

The IT capability of a firm comprises technology infrastructure, production, process, knowledge, experiences and organization, so it cannot be measured by a single dimension (Guan and Ma, 2003). It involves an articulation between internal experience and experimental acquisition, and includes a wide variety of assets and resources. Hence, the IT abilities, capabilities, and capacities of the organization play a key role in the IT adoption process (Nguyen, 2009), and hence with the CRM adoption process.

In terms of a firm’s characteristics, innovativeness of a firm as defined in Tajeddini et al. (2006, p. 533) is “the willingness and ability to adopt, imitate or implement new technologies, processes, and ideas and commercialize them in order to offer new, unique products and services before most competitors”. However, Shin (2006) argues that many SMEs lack the ability to adopt new technology and practices. Thus, it is suggested that innovation capabilities are crucial, especially when it comes to customer engagement technology and in particular CRM systems, as many studies have found that innovation outcomes can be obtained through integrating and embracing technological and organizational innovation (Edwards et al., 2005; Gray, 2006). In a closely related area, the way a firm perceives itself in the market (in relation with other companies within the same industry) plays an important role when it comes to new technology adoption. It is suggested that an SME is more likely to engage in CRM technology when it sees itself as a front runner (Ismail et al., 2007; Özgener and İraz, 2006). Hence, we formulate our third and fourth hypotheses:

**H3.** Organizational characteristics (employee, IT resources, a firm’s innovativeness, and how they see themselves in the market) influence the decision to adopt CRM technology.

**H4.** Organizational characteristics (employee, IT resources, a firm’s innovativeness, and how they see themselves in the market) influence the extent to which CRM technology will be adopted.

Much of the literature regarding IT adoption in SMEs acknowledges that the size of the firm and the industry sector are factors that play a role in the adoption process (Bruque and Moyano, 2007; Nguyen, 2009), and even more so in the case of CRM technology adoption (Shin, 2006). This is because, as firm size increases, the scale, scope, and complexity of the adoption increase (Peltier et al., 2009), and different industries have different requirements (Elmuti et al., 2009). Ko et al. (2008) suggest that there is much literature highlighting the benefits of CRM adoption and that these perceived benefits vary by organizational size, geographical location and industry sector. Their study...
found that size was significant factor, but it only looked at one industry sector. Cooper et al. (2005) found that whether size or industry was a significant predictor of adoption depended on the stage of development. However, studies by Peltier et al. (2009) and Sophonthummapharn (2009) suggest that firm size has no significant effects on the adoption of CRM. Since it is unclear whether size and industry affect CRM adoption in SMEs, we have included both size and industry type as control variables in our analysis, but not part of our research model.

4. Methodology
The study presented in this paper investigates CRM technology adoption by examining the relationship between organizational characteristics and the process of adoption in SMEs in California. The intention is to extend the work of Ko et al. (2008) who developed a framework of study based upon Rogers' (1983) innovation decision process.

4.1 Sample and data collection
The sample was taken from owners and managers of companies classified as SMEs in the retail, manufacturing and services (IT consulting, legal and law, financial lending, healthcare and logistic transportation) sectors in Los Angeles and Orange Counties in Southern California. After the initial contact with companies, 568 survey questionnaires were sent to those who agreed to participate. There were 156 responses, but only 126 sets of questionnaires were usable; 74 firms had adopted CRM (28.9 per cent) and 52 (16.7 per cent) had not. This gives an overall response rate of 22.2 per cent. Of the firms who responded to the survey, the industry breakdown is as follows: 33.3 per cent were from retail, 19.0 per cent from manufacturing, and 47.6 per cent from services. Table II shows descriptive statistics of overall sample. The data were tested for potential

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Values</th>
<th>Adopter (%)</th>
<th>Non-adopter (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>39.7</td>
<td>18.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>19.0</td>
<td>23.0</td>
</tr>
<tr>
<td>Age</td>
<td>25 or under</td>
<td>4.8</td>
<td>8.8</td>
</tr>
<tr>
<td></td>
<td>Between 26 and 35</td>
<td>5.6</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Between 36 and 45</td>
<td>22.2</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>Over 45</td>
<td>26.2</td>
<td>8.7</td>
</tr>
<tr>
<td>Education</td>
<td>High school diploma</td>
<td>0.8</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Associate degree or equivalent</td>
<td>6.3</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>College degree</td>
<td>8.7</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>Post graduate</td>
<td>28.6</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td>Professional certificate</td>
<td>14.3</td>
<td>7.9</td>
</tr>
<tr>
<td>Size (no. of employee)</td>
<td>10 or less</td>
<td>8.7</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>Between 11 and 50</td>
<td>17.5</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>Between 51 and 100</td>
<td>10.3</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Between 101 and 150</td>
<td>19.0</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>Between 151 and 250</td>
<td>3.2</td>
<td>8.7</td>
</tr>
<tr>
<td>Industry</td>
<td>Retail</td>
<td>20.6</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>Manufacturing</td>
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<td>9.5</td>
</tr>
<tr>
<td></td>
<td>Services</td>
<td>28.6</td>
<td>19.0</td>
</tr>
<tr>
<td>Market position (perceived)</td>
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<td>3.2</td>
</tr>
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<td></td>
<td>Medium</td>
<td>21.4</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td>17.5</td>
<td>29.4</td>
</tr>
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</table>

Table II. Descriptive statistics of overall sample
effects associated with the specific industry sector (retail, manufacturing and services),
and the results suggest that there are no significant differences in the responses.

4.2 Measurement
The management characteristics variable comprises gender, age, education
background, their innovativeness and their positive attitudes towards CRM (Kirton,
1976; Ko et al., 2008; Thong and Yap, 1995), while the firm characteristics variable
consists of IT resources, employee characteristics, the firm’s perceived market position,
and its innovativeness. The IT resources variable describes the IT abilities, capacities
and capabilities of the firm (Nguyen, 2009). The Employee Characteristics variable
covers the management’s view of their employee involvement, contribution and
acceptance of change (Davis, 1989). The perceived market position measures how
management and employees see the firm in relationship to other companies within the
same industry. The measurement of this variable is on the scale of 1 to 3 (market leader,
medium and small). Innovativeness measures the innovative capabilities of a firm,
which focus on continuously seeking improvement and investment into quality of
products and services that leads to business expansion and/or growth (Cooper et al.,
2005; Kirton, 1976; Ko et al., 2008; Peltier et al., 2009). The industry is on the scale of 1 to
3 representing each sector. In terms of size, this study used the generally accepted
measurement of a headcount of 100 or less to be small and between 101 and 250 to be
medium-sized, and data collected was the actual number of employees. The rationale
behind this classification of ranges for different size companies is because in the USA,
the Small Business Administration US gives specifications for what constitutes a small
businesses and it can go up to a 500 headcount and also involves their annual income;
this covers a very broad range of companies (US Small Business Administration,
2008). In order to carry out analysis of variance (ANOVA) using size as an independent
variable, we constructed a categorical variable with values 1, 2, 3, 4 and 5, with
each value representing a range of number of employees from ten or less to 151-250
(see Table II).

4.3 Validation of the scales
Exploratory factor analysis using principal component analysis with varimax rotation
was performed on the collected data to extract the factors that were hypothesized. The
Kaiser-Meyer-Olkin sampling adequacy measurement (Kaiser, 1958) is 0.824.
This is classed as meritorious (Hutcheson and Sofroniou, 1999), whilst Bartlett’s test of
sphericity is significant at 0.000, both indicating that the matrix is factorable, and so
the assumptions for carrying out factor analysis were met. Using eigenvalues greater
than one as the criterion, four factors were extracted. Two of the factors were as
postulated, with the items for management innovativeness and firm innovativeness
loading onto their a priori scales. For the other two scales, all items of the employee and
IT resources load onto their a priori scales with the exception of “IT application
usefulness to employee”. This was originally hypothesized to be part of the employee
scale, but loads onto the IT resources scale (see Table III). As the items from this
instrument were derived from previous instruments, it was necessary to test and
evaluate the reliability of the scales and examine the proposed factors. The reliability of
each factor was evaluated by assessing the internal consistency of the items within each
factor using Cronbach’s $\alpha$. The results show the reliability values range between
0.72 and 0.85, which indicates their internal consistency is reliable within each scale
(Cronbach, 1951; Nunnally, 1978).
5. Data analysis and hypotheses testing

One-way ANOVA was employed to test if there were any differences between industry sectors and firm size towards perception of CRM and likelihood to adopt CRM. The results indicate that there are no differences among the industry sectors in terms of how CRM technology is perceived or whether the technology will be adopted (see Table IV). Similarly, there are no significant differences in perception towards CRM technology when firm size is the control variable; however, the likelihood of whether CRM technology will be adopted is significant for firm size (see Table V). Post hoc test results indicate there is a significant difference between firms of size 151-250 and smaller size firms.

To test H1, multiple regression analysis was employed to examine the influence of management’s characteristics towards perception of CRM technology. The results

<table>
<thead>
<tr>
<th>Items</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management innovativeness ($\alpha = 0.72$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The management has his/her original ideas</td>
<td>0.785</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The management would something new than improve something existence</td>
<td>0.851</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S/he often take risk doing things differently</td>
<td>0.775</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The management are prepared to try new ideas or products</td>
<td>0.683</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee ($\alpha = 0.72$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our staff are well trained in their IT skills</td>
<td>0.758</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our staff are comfortable with their computer usage</td>
<td>0.724</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our staff are aware of the changes in IT applications</td>
<td>0.753</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our staff involve in the adoption process</td>
<td>0.586</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT resources ($\alpha = 0.84$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT applications help our staff to perform their duties better$^{b}$</td>
<td>0.594</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We invest in IT infrastructure (hardware/software)</td>
<td>0.600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have our own IT support team</td>
<td>0.801</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our IT applications involve all functions within our organization</td>
<td>0.809</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our IT applications meet/exceed industry standard</td>
<td>0.791</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm innovativeness ($\alpha = 0.85$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We always find way to improve the quality of our products and services</td>
<td>0.783</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We always find way to improve service to our customers</td>
<td>0.824</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We share ideas among our staff</td>
<td>0.770</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We collaborate with our vendors/business partners to share ideas and improve business process</td>
<td>0.724</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VE$^{c}$</td>
<td>32.41</td>
<td>18.92</td>
<td>7.12</td>
<td>6.63</td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>5.51</td>
<td>3.22</td>
<td>1.21</td>
<td>1.13</td>
</tr>
</tbody>
</table>

Notes: Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization. $^{a}$Rotation converged in seven iterations; $^{b}$originally part of the IT resources scale; $^{c}$variable explained in percentage

| Perception of CRM | 2.426 | 0.093 |
| Likelihood to adopt CRM | 0.477 | 0.622 |

Table IV.
One-way ANOVA results on industry sector as control variable
indicate that the overall model supports $H1$ that management characteristics significantly influence a firm's perception of CRM technology. However, for individual coefficients, only innovativeness and positive attitude towards CRM are significant whilst age, gender and education are not in terms of contribution to perception of CRM (see Table VI). The tolerance and variance inflation factor (VIF) were examined, and the results are within the cut-off points (above 0.1 for tolerance and under 10 for VIF) indicating that multicollinearity does not seem to be present in the sample (Tabachnick and Fidell, 2007).

This study examines the two groups of adopters and non-adopters of CRM technology; hence, discriminant analysis was carried out to test $H2$ and $H3$. This technique is most appropriate, as we are testing two groups with multiple independent variables simultaneously (Hair et al., 2007).

The results of discriminant analysis for management characteristics on likelihood of CRM technology adoption (Table VII) indicates the overall model was significant with Wilks’ $\lambda$ of 0.84 ($\chi^2 = 21.21$, df = 5, $p = 0.001$). In addition, the discriminate function correctly classified 67 per cent of the business in the sample. As the result, $H2$ is supported and it can be suggested that the more positive the perception of CRM technology by the management, the greater the chance that CRM technology will be adopted. Assessing the discriminant loadings, three interdependent variables Positive
Attitude, Innovativeness and Age of the management are significant in terms of relative contribution to the discriminant function (discriminant loadings ≥ 0.30) (Hair et al., 2007).

The results of discriminant analysis for organizational characteristics on likelihood of CRM technology adoption (Table VIII) indicates the overall model was significant with Wilks’ λ of 0.78 ($\chi^2 = 29.45$, df = 4, $p = 0.0005$). In addition, the discriminate function correctly classified 71.4 per cent of the business in the sample, which is much higher than the expected 62 per cent due to change. As the result, H3 is supported and it can be suggested that the organizational characteristics (employee, IT resources, a firm’s innovativeness, and how they see themselves) influence likelihood that CRM technology will be adopted. Assessing the discriminant loadings, all four interdependent variables are significant in terms of relative contribution to the discriminant function.

The last H4 regarding the extent of CRM implementation was tested using partial least square (PLS), which is a structural modeling technique, carried out using SAS version 9.3. Following Thong (1999), this last hypothesis is applied to adopters only. Since this is a simple model, according to Chin and Newsted (1999), our sample size is sufficient for applying PLS, as this technique allows simultaneous evaluation of both measurement model and structural model (Chin, 1998). Variables were tested for possible multicollinearity. The highest the squared correlation value in Table IX was 0.37, which indicates absent of multicollinearity among the research variables (Tabachnick and Fidell, 2007). Composite reliability and average variance extracted were also calculated. The results are acceptable with 0.70 and above for the former and 0.50 and above for the latter, respectively (Fornell and Larcker, 1981). PLS analysis was carried out to test the hypothesis and Table IX reports its results. The percentage of variance explained was 68 per cent ($R^2 = 68$ per cent), implying a satisfactory and substantive model (Chin and Newsted, 1999). All four standardized path coefficients were significant at either 1 and 0.5 per cent. The results support H4 that organizational characteristics (employee, IT resources, a firm’s innovativeness, and how they see

### Table VIII.
Discriminant analysis for organizational characteristics on likelihood of CRM technology adoption

<table>
<thead>
<tr>
<th>Variables</th>
<th>$F$-value</th>
<th>Significance</th>
<th>Discriminant loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee characteristics</td>
<td>7.853</td>
<td>0.006**</td>
<td>0.479</td>
</tr>
<tr>
<td>IT resources</td>
<td>17.761</td>
<td>0.000***</td>
<td>0.721</td>
</tr>
<tr>
<td>Culture of innovativeness</td>
<td>4.475</td>
<td>0.036*</td>
<td>0.373</td>
</tr>
<tr>
<td>Perceived market position</td>
<td>21.397</td>
<td>0.000***</td>
<td>0.823</td>
</tr>
</tbody>
</table>

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

### Table IX.
Correlation matrix for organizational characteristics on extend of CRM technology implementation (adopters only)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Employee characteristics</td>
<td>3.78</td>
<td>0.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) IT resources</td>
<td>3.65</td>
<td>0.95</td>
<td>0.513**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Culture of innovativeness</td>
<td>3.65</td>
<td>0.88</td>
<td>0.015</td>
<td>0.234*</td>
<td></td>
</tr>
<tr>
<td>(4) Perceived market position</td>
<td>2.04</td>
<td>0.80</td>
<td>0.333**</td>
<td>0.605**</td>
<td>0.111</td>
</tr>
</tbody>
</table>

Notes: *$p < 0.05$; **$p < 0.01$
themselves in the market) influence the extent to which CRM technology will be adopted (Table X).

6. Discussion and implications

Previous research indicates that CRM technology can provide firms with a business tool where personal relationships with customers can be developed and maintained, which can lead to future business success (Mazurencu-Marinescu et al., 2007; Ngai, 2005; Peltier et al., 2009). However, SMEs have experienced high failure rates when it comes to CRM adoptions, as it is not easy to integrate this business philosophy into everyday business (Shin, 2006). Our study, underpinned by the DoI theory, assessed how the management characteristics affect their perception of CRM technology (perception of benefits and usefulness of the CRM technology) and the likelihood that CRM technology will be adopted (whether the business is or is not proceeding towards adopting CRM technology). Our study also examined the role of organizational characteristics on the likelihood that CRM technology will be adopted and the extent to which CRM technology is being implemented. This was done for a sample of SMEs in Southern California in the retail, manufacturing and services industry sectors.

The findings from this study support the relationship between management's innovativeness and the degree of CRM benefits they perceived contribute to the positive attitude towards CRM technology. This is consistent with Anderson and Huang (2006) and Thong and Yap's (1995) studies. However, gender, age and education make no significant contribution to how management perceive CRM technology. Hence, instead of looking at the age, gender and level of education, the assessment for the management should be their innovativeness (Thong, 1999), their positive perception towards CRM applications (Ko et al., 2008), their ability to do things differently and better as well as the ability to find solutions to problems and perhaps, their preparedness to take risks (Buijs, 2007).

When it comes to the decision to adopt new IT applications, previous studies have indicated that factors such as management characteristics, employees’ involvement, IT resources adequacy and the firm’s characteristics should be all accounted for (Caldeira and Ward, 2003; Parker and Castleman, 2009). Discriminant analysis (Tables VI and VII) suggest that the firm’s IT resources must be adequate, as must the employees’ involvement, and there must be a positive attitude and support from innovative owners or top management. Here, the assessment is not only on whether the organization has appropriate IT resources to support the new application but also whether their employees have the appropriate skills. It is it is essential that employees understand the changes to be made and accept these changes as part of their role, and as part of the organization as a whole (Jones et al., 2007). This finding is in line with Anderson and Huang (2006) and Igbaria et al. (1997) that the involvement and

Table X.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement model</th>
<th></th>
<th>Structural model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Composite reliability</td>
<td>Average variance extracted</td>
<td>Path coefficient</td>
</tr>
<tr>
<td>Employee characteristics</td>
<td>0.74</td>
<td>0.50</td>
<td>0.419***</td>
</tr>
<tr>
<td>IT resources</td>
<td>0.78</td>
<td>0.53</td>
<td>0.792***</td>
</tr>
<tr>
<td>Culture of innovativeness</td>
<td>0.76</td>
<td>0.52</td>
<td>0.244**</td>
</tr>
<tr>
<td>Perceived market position</td>
<td>1.0</td>
<td>1.0</td>
<td>0.875***</td>
</tr>
</tbody>
</table>

Notes: $R^2 = 0.68$. **$p < 0.01$; ***$p < 0.001$
commitment of both management and employees contribute to the decision to adoption CRM technology. As suggested by Nguyen (2009) both management and employees have to commit and support the changes in the organization. As with previous studies (Harrigan et al., 2009; Ko et al., 2008; Ramdani et al., 2009), our findings support the influence of the innovative organization on the likelihood of CRM adoption, as it enables the use of more sophisticated business tools and technology that allows for the collection, analysis and dissemination of customer and competitor information. This view is reinforced by the significance of the perceived market position factor in terms of contributing to whether CRM technology is adopted (see Table VIII). The findings support Rogers’s (2003) DoI, which, in this case, implies that the likelihood of CRM adoption depends on the way a firm sees itself in the market. This could also be interpreted as a firm that is flexible to change and open to new ideas is more likely to adopt CRM technology (Edwards et al., 2005; Gray, 2006).

In terms of the extent to which CRM features are being implemented, PLS results in Table IX suggest all four components employee characteristics, IT resources, culture of innovativeness and how the company sees itself make significant contribution. This means that SMEs with a motivated workforce, with staff who are willing to accept new challenging activities and embrace a learning culture, and are able to recognize the strength of that culture are likely to advance innovation and gain advantage over their competitors (Denison et al., 2004). The results support Gray (2006) who suggests that the people within a firm are the drivers to innovation. This ties into the how the company sees itself in the market. Rogers (1983) refers to this as part of the DoI where the innovators have the knowledge and see the relative advantage in the subject area. The extent to which features of CRM to be implemented also require sufficient IT resources. In addition, our findings suggest that the firm should access its IT resources, which must include knowledgeable, highly skilled IT staff and the necessary infrastructure with the capabilities to acquire, process and manage information (Caldeira and Ward, 2003; Nguyen, 2009).

The results (Table III) of the ANOVA, using industry as control variable, indicate that industry is not significant when it comes to perception of CRM technology and the likelihood that the application will be adopted. This means that the likelihood of adopting CRM technology has little to do with the industry sector that the firm is in. However, for size, the results (Table IV) show that it is not significant on perception of CRM technology, but is significant on the likelihood that CRM technology will be adopted. This could be that the larger the organization, the more resources they have to invest into the technology (Peltier et al., 2009). This is supported by Ramdani et al. (2009), who suggest that the size of the firm is a significant determinant of adoption. The results also support the findings of Ko et al. (2008), who suggest that within SMEs, the larger a firm (over 150 employees, according to our results in Table IV), the more likely CRM will be adopted.

7. Conclusion and limitations
The results of this study have implications for CRM adoption in SMEs. More importantly, they suggest a framework (see Figure 1), which demonstrates the necessary linkage between organizational characteristics and CRM adoption process. Using the DoI model to understand the adoption process through the three stages of perception, likelihood of adoption, and extend of implementation, a firm must assess its organizational characteristics before adopting CRM application. Management regardless of gender, age or education level, must be supportive, innovative and have a positive attitude towards
the new IT application, as positive perception will likely lead to decision to adopt. In addition, there must be innovation within the organization and the firm must have the ability to absorb knowledge and to use it. There must be an availability of IT resources, both infrastructure and skills to support the change. These characteristics are important when it comes to the decision to adopt and the extent to which certain features of CRM application are being adopted. Finally, the size of a firm and how it sees itself on the market may also influence the adoption decision.

The findings from this study extend the understanding of CRM adoption in SMEs and help in building a greater understanding of the factors associated with the adoption of CRM, but being empirical, this study has limitations. First, the industries focused on were in retail, manufacturing and services. Second, the sample was geographically specific to Southern California. Third, the sample size in this study was relatively small, although it is within the testable range (Chin and Newsted, 1999). Replication of this study using a random sample would be of interest, allowing for the findings to be generalized to the entire population of SMEs with greater confidence. Finally, only one respondent was surveyed from each firm. As this study was specific to Los Angeles County and Orange County in Southern California, future research should now be undertaken to test the model by applying it in other SME contexts particularly, different locations and industries.

References


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