Understanding success and failure in customer relationship management

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Abstract

Customer Relationship Management (CRM) systems can help organizations manage customer interactions more effectively. Like many new technologies, CRM has been accompanied by vendor hype and stories of implementation failure. Work on critical success factors (CSFs) should encourage more appropriate implementation practice; however many CSF studies conclude with a list of factors but provide little further guidance. In particular, there is a need for stronger theoretical models of the entire CRM innovation process which can be used by managers to understand better the underlying causes of success and failure. This paper adopts a novel approach to this problem by firstly developing a conceptual model of CRM innovation and then converting this model into a dynamic simulation model. Some early simulation results illustrating changes in CRM benefits and organizational support over time are presented together with a discussion of the underlying causes and suggestions for how managers can counteract potential innovation failure.
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1. Introduction

The work presented here arose from concerns that the large and growing literature on critical success factors was not providing practitioners with the tools to enable more effective interventions in major systems implementations such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM). Large-scale integrated systems are by definition complex and difficult to implement. The systems have the potential to "join-up" organizations both internally (spanning functions) and externally (linking to suppliers, partners and customers) with the promise of more efficient communications and transactions and, in the case of CRM, greater customer insight and targeting, improved service and increased sales. But many instances of ERP and CRM have been criticized regarding the excessive time, cost and disruption of implementation and the sometimes limited benefits once the systems become operational. In response to this, a number of

studies have proposed critical success factors, largely for the longer-established ERP technology, but latterly for the newer CRM too. Whilst such studies are welcome, providing a list of CSFs is only a partial aid to the manager tasked with implementing CRM successfully.

The work described in this paper addresses the next stage in improving understanding of large-scale information systems implementation in general, and CRM implementations in particular. Drawing on the long-established field of simulation, a new model for CRM innovation is developed and some early simulation results presented. The value of the model as a practical tool to aid managers faced with maximizing the benefits of CRM for their organizations is discussed.

2. Customer relationship management

CRM has developed as an approach based on maintaining positive relationships with customers, increasing customer loyalty, and expanding customer lifetime value (Blattberg & Deighton, 1996; Brassington & Pettit, 2000; Ahn, Kim, & Han, 2003). Understanding the needs of customers and offering value-added services are recognized as factors that determine the success or failure of companies. Kotler (1997) pointed out

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Table 1
Top ten ERP CSFs

ERP CSF	Mean score (out of 5)
Top management support	4.29
Project team competence	4.20
Interdepartmental cooperation	4.19
Clear goals and objectives	4.15
Project management	4.13
Interdepartmental communication	4.09
Management of expectations	4.06
Project champion	4.03
Vendor support	4.03
Careful package selection	3.89

that CRM principally revolves around marketing and begins with a deep analysis of customer behavior. Chaffey (2003) presents a three-stage model of CRM which shows how customer relationships can be managed. His model proposes that customers are first acquired via clear communication of a powerful value proposition. They are retained via good service; and the relationship extended via the delivery of tailored products/services to clearly defined customer segments. This view means that CRM uses information and communications technology (ICT) to gather data, which can then be analyzed to provide the information required to create a more personal interaction with the customer (Swift, 2001; Brohman, Watson, Piccoli, & Parasuraman, 2003; Pan & Lee, 2003).

From an operations perspective, Bose (2002) pointed out that CRM is an integration of technologies and business processes that are adopted to satisfy the needs of a customer during any given interaction. Whilst the potential benefits are attractive, CRM implementation must be managed carefully to deliver results. In order to successfully embed CRM, system users should be involved and expectations managed (Gefen & Ridings, 2002). Business processes need to be changed as well as technology (Swift, 2002; Goodhue, Wixom, & Watson, 2002; Campbell, 2003), with two interconnected processes, knowledge management and interaction management, seen as key by Zablah, Bellenger, and Johnston (2004). The former process uses marketing intelligence to build and maintain a portfolio of profitable customer relationships, feeding into the latter process which leverages the intelligence to ensure the quality of individual exchange episodes.

3. Success and failure

Like ERP before it, CRM implementations have often proved problematical:

"Customers complain that more than 50% of their CRM projects have failed — and the majority will underestimate costs by between 40% and 75%, according to Gartner" (Everett, 2002, p. 25).

The Gartner industry survey mentioned above identified over-selling of the technology coupled with underestimation of the organizational changes involved in becoming a customer-centric organization as being of particular concern. Success and failure are well-established areas of study in the information systems literature where a number of generic success models

have been developed and tested in recent years (Davis, 1989; DeLone & McLean, 1992; Seddon, 1997; Rai, Lang, & Welker, 2002). More specifically, ERP implementations have been the subject of a number of studies aiming to identify CSFs (Holland & Light, 1999; Somers & Nelson, 2001; Akkermans & Van Helden, 2002; Hong & Kim, 2002). Somers and Nelson (2001) asked US executives to rank the ERP CSFs — producing a "top ten" in terms of the mean score (from 1 = low to 5 = critical) (see Table 1).

The ERP studies have been followed, more recently, by CRM CSF studies which are summarised using Wilson, Daniel, and McDonald's (2002) CRM lifecycle stages in Table 2.

These studies indicate a degree of consensus around a core set of CSFs, shown in Table 3.

Clearly there are similarities between ERP and CRM implementations and between their respective CSFs. Both are large-scale integration technologies, often packages supplied by large software vendors. Differences arise in terms of the back-office focus of traditional ERP versus the front-office focus of CRM. Whereas ERP is used by back-office staff (e.g. finance, HR and manufacturing), CRM is used by front-line staff (e.g. call centre, sales and marketing). And, by definition, an effective CRM system should enable an organization to gain greater insight into customer behaviour and preferences, whereas ERP analytics are more likely to focus on supply and demand for key resources and materials. In terms of the respective CSFs, comparing Table 1 with Table 3, there is common ground in areas such as the need for top management support and the importance of interdepartmental cooperation, communication and data sharing. Differences arise in terms of the significant emphasis placed on the competence and management of the project team in ERP, an aspect not so strongly identified in the CRM work. Similarly the ERP CSFs cover features related to the vendor and the software — an area that CRM CSFs tend not to address. In contrast the CRM research highlights the importance of knowledge management, culture change to develop a customer-oriented organization, and technological readiness — areas not so strongly highlighted in the ERP findings. Essentially CRM is about customer interaction and about learning about customers' needs and preferences in order to provide more appropriate products and services to customers in the future, whereas ERP has a stronger focus on making routine internal processes more efficient. This may suggest that the challenge facing CRM initiatives, that of engendering a significant culture change in many organizations, is greater than the (not insignificant) process changes heralded by the introduction of ERP.

Alongside, and complementing the work on success factors, is the body of work on information systems failure (Sauer, 1993; Keil, 1995; Sauer, Southon, & Dampney, 1997; Lyytinen & Mathiassen, 1998; Lyytinen & Robey, 1999; Irani, Sharif, & Love, 2001). However, the two streams differ in that the failure work is usually located in a wider theoretical setting. Sauer (1993) developed a model of information system innovation which emphasises the importance of the organizational context into which the system, developed by the project organization, is being introduced and the need to manage expectations and

Table 2
A summary of CRM CSF studies

CRM lifecycle stage (after Wilson et al., 2002)	Wilson et al. (2002)	Goodhue et al. (2002)	Croteau and Li (2003)	Siebel (2004)	Chen and Chen (2004)
Determine the INTENT	Gain champion/sponsor	Top management support	Top management support	Clear communication of strategy	Champion leadership and internal marketing
	Ensure market orientation	Vision			
	Define approval procedures which allow for uncertainty				
	Gain board awareness of strategic potential of IT	Vision (again)	Technological readiness		Business-IT alignment
Assess the CONTEXT	Identify need for business system convergence			Back-office integration	System integration
	Organise around customer	Willingness to change processes	Knowledge management capabilities		Knowledge management
	Address culture change	Willingness to share data			Culture/structure change
Describe CONTENT	Involve users in system design				
	Design for flexibility		Technological readiness (again)		
	Manage IT infrastructure				Business-IT alignment (again)
	Leverage models of best practice			Software customisation	
Construct intervention PROCESS	Rapid strategy/action loop to experiment				
	Prototype new processes				
MANAGE intervention process	Manage for delivery of benefits				

system evaluations to ensure support is maintained. Sauer's model can be used to structure the list of nine CRM CSFs presented in Table 3 as follows:

- Context: knowledge management capabilities, willingness to share data, willingness to change processes, technological readiness.
- Supporters: top management support.
- Project organization: communication of CRM strategy, culture change capability, process change capability, and systems integration capability.

Sauer's constructs: context, supporters and project organization serve to connect the CRM CSFs to the extant body of knowledge on information systems success/failure and to provide a higher level of abstraction to the CSF list. They also suggest a set of high-level relationships between the CSFs. Finally Sauer's model includes outcomes which are produced by the project organization and evaluated by the supporters. The outcomes also serve to change the organizational context via a feedback loop. This suggests that a clear specification of outcomes and how they relate to the CSFs is necessary in order to construct a fuller model of the CRM innovation process. Sauer also provides a useful definition of information systems failure as a process whereby support is withdrawn over a period of time and eventually reaches a point where the project organization can no longer sustain development. This moves the definition of failure away from the commonly used concepts of time and budget overruns and defects, and suggests failure has a strong social dimension.

4. A conceptual model of CRM innovation

In this section a conceptual model of CRM innovation is proposed (see Fig. 1). The model draws upon the preceding discussion by combining the CSFs identified for CRM with Sauer's IS innovation model which provides high-level constructs and relationships and includes explicit consideration of outcomes.

CRM outcomes are split in two: development outcomes and operational outcomes. The former are drawn from the work of Abdel-Hamid and Madnick (1990) on software project management; the latter from Chen and Chen (2004). Chen and Chen define both tangible and intangible benefits arising from CRM, based on a survey of firms (see Table 4).

The two outcome areas are combined in the right-hand section of Fig. 1. Fig. 1 also shows that the supporters, the project organization and the CRM users are influenced by the organizational context in which they operate. Supporters support

Table 3
Critical Success Factors for CRM

Top management support
Communication of CRM strategy
Knowledge management capabilities
Willingness to share data
Willingness to change processes
Technological readiness
Culture change/customer orientation
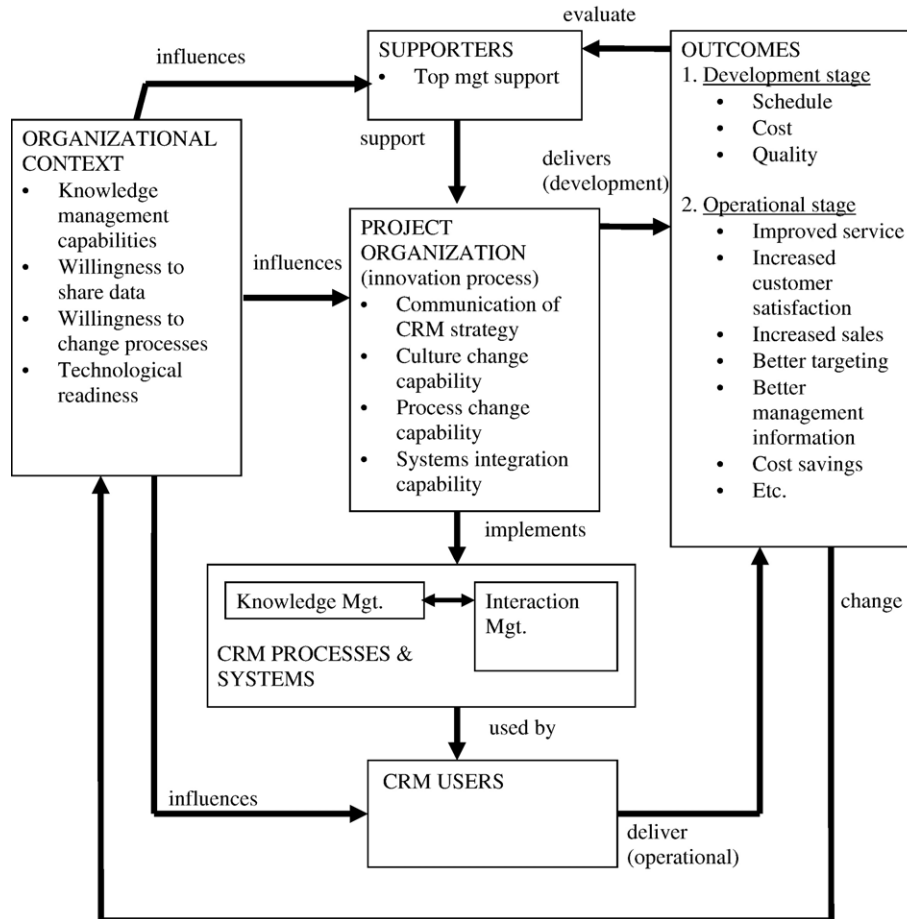Process change capability
Systems integration capability

Fig. 1. A conceptual model of CRM innovation.

the project organization which is tasked with implementing the new CRM processes and systems (Zablah et al.'s (2004) concept of CRM comprising of knowledge management and interaction management is used here). As the processes and systems are implemented they become available for use by the CRM users. Initially the outcomes relate to the development stage and arise directly from the activities of the project organization, but once the processes and systems "go live" operational outcomes occur. These outcomes arise from the activities of the CRM users using the new systems and processes. Hopefully the operational outcomes are positive, such as improved customer service or increased sales. If so, the supporters continue to give their support to the project organization's endeavours. However, if the CRM innovation takes longer than expected or runs over budget, or if the desired operational outcomes are not realised the supporters are likely to reduce their support, gradually depriving the project organization of the resources it needs to continue. Whether the outcomes are positive or negative, they are likely to change the organizational context in some way. For example, a successful CRM implementation should increase knowledge management capabilities and willingness to share data etc. Similarly, an unsuccessful implementation may lead to the opposite effect making staff more reluctant to collaborate or to use the new technology.

5. Deeper theoretical perspectives: social capital and social exchange theory

Fig. 1 depicts the set of relationships as essentially linear or two-dimensional. Supporters, the project organization and the CRM users are shown as somehow separate from the organizational context which would include the various departments and functions involved in marketing, sales and customer service. In reality they are likely to be embedded to a greater or lesser extent within the departments. The web of

Table 4
CRM Benefits (after Chen & Chen, 2004, p. 338)

Tangible benefits	Intangible benefits
Increased revenues and profitability	Increased customer satisfaction
Quicker turnaround time	Positive word-of-mouth
Reduced internal costs	Improved customer service
Higher employee productivity	Streamlined business processes
Reduced marketing costs	Closer contact management
Higher customer retention rates	Increased depth and effectiveness of customer segmentation
Protected marketing investment with maximised returns	Acute targeting and profiling of customers
	Better understanding/addressing of customer requirements

social relations constitutes a third, hidden, dimension to the two-dimensional model shown in Fig. 1. A deeper understanding of these relations can help explain why top management is supporting the project, why the project champion(s) wish to devote time and energy to promoting CRM and why departmental users might support (or resist) the change. Two theories that encourage a deeper exploration of these drivers are social capital theory and social exchange theory.

Social capital is defined as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal, 1998, p. 243). Social capital theory has been developed to explain the importance of networks of social relationships which are developed over time and provide the context for social interactions within and between organizations and across communities (Jacobs, 1965). It is seen as comprising of three dimensions: a relational dimension (including trust, social norms of behaviour and obligations), a cognitive dimension (including shared representations, language and narratives) and a structural dimension (including formal organizational structures, and informal personal social networks) (Nahapiet & Ghoshal, 1998). Increases in social capital are seen as likely to engender improved social outcomes (such as access to knowledge and expertise and an increased motivation and capacity to collaborate) which, in turn, are likely to lead to improved operational outcomes, such as greater creativity, innovation and collaboration (Cohen & Prusak, 2001; Hatzakis, Lycett, Macredie, & Martin, 2005). Applying a social capital perspective to the dynamics depicted in Fig. 1 encourages further exploration of the underlying relationships between the participants; for example, is there a history of trust between top management and the departmental users? or between the marketing and sales departments for example? Shared obligations based on successful past collaborations could well increase willingness to share data and to change interdepartmental processes. With regard to the cognitive dimension, do the project team members "speak the same language" as the departmental users? Have they perhaps "gone native" and, through close and regular contact with CRM vendor staff and consultants, become inculcated with the vendor's language and beliefs about the inherent superiority of the new system over the existing ways of working? This would have the effect of increasing social capital between the vendor staff and the project organization, at the cost of decreasing social capital between the project organization and the departmental users. Thirdly, it may be that the formal organizational structure discourages interdepartmental communication and collaboration and reduces willingness to share data and to change cross-functional processes. Departments may not be co-located, and may be constituted with different objectives, work processes and technologies. These structural differences will amplify the relational and cognitive differences over time, as physical and organizational separation leads to weaker obligations, fewer opportunities to collaborate and thereby to build up trust, and separate histories and narratives of sales won, deadlines met (or missed) and (glorious?) failures. The net outcome of the above dynamics could be low levels of social capital residing in the relationships between departments, low levels between top management and the departments, increasing levels between the project organization and the vendor, but reducing levels between the project organization and departmental staff.

Social exchange theory also seeks to explain what motivates actors to behave as they do (Thibaut & Kelley, 1959; Blau, 1964; Kelley & Thibaut, 1978). Social exchange theory "… views interpersonal interactions from a cost-benefit perspective, much akin to an economic exchange — except that a social exchange deals with the exchange of intangible social costs and benefits (such as respect, honor, friendship, and caring) and is not governed by explicit rules or agreements. Like economic exchange, social exchange assumes that individuals take part in an exchange only when they expect their rewards from it to justify the costs of taking part in it." (Gefen & Ridings, 2002, p. 50). Gefen and Ridings describe a "quasi-experiment" whereby they contrasted the outcomes of two CRM implementation projects. In one project, the CRM project organization reacted rapidly and constructively to users' request for bug fixes and software changes, in the other project the response was slower and less helpful. Their hypothesis was that this "perceived responsiveness" would lead to increased "cooperative intentions" on the part of the users which, in turn, would increase software "configuration correctness" leading to greater "user approval" of the CRM system. The experiment results supported this hypothesis – namely that the social exchanges between the users and the project team were more positive, from a user perspective, in the first project – the project team were seen to "care" more for their users and to be providing them with a better-customised solution than in the second project. The users, in turn, repaid this care by providing greater support ("approval") to the CRM project. In the language of CRM CSFs, the project team in the first project could be viewed as having a greater technical capability which stimulated a greater willingness to cooperate in the users. Social exchange theory suggests that the level of support and co-operation is likely to fluctuate over time as different social exchanges take place. For example, top management will meet with CRM vendor staff and will be seeking assurances that the software will meet their needs at a cost they can afford. They will be judging the vendor staffs' responsiveness in much the same way as Gefen and Ridings' users judged the CRM team: do they answer our questions quickly and clearly? Do we believe their responses? Are their staff knowledgeable and credible? Are we important clients to them?

Underlying all social exchanges is a degree of exposure: often one party is more vulnerable than the other, sometimes both are equally vulnerable. Top management may feel vulnerable in their dealings with vendor sales staff. Management are unlikely to be familiar with the software or to have used it before. They may not comprehend fully the degree of organizational change implicit in the adoption of the new system. Similarly, the project champions, key figures in the communication of the CRM strategy, will be asking of top management: what are the explicit and implicit rewards being promised for our commitment to this (time consuming) role? Are you genuinely supportive of the project? Will you be actively involved or will you leave all the "fire fighting" to us? And, as Gefen and Ridings showed, the departmental users will be having social exchanges with the project organization and asking: how responsive are they? Do they really understand our

concerns? Do they fulfill their promises to us? Whilst formal contracts can be drawn up to address some of these concerns, the sheer complexity of social relations surrounding an organizational innovation as large and as complex as a new CRM system means that all stakeholders are likely to be exposed at times to unsatisfactory social exchanges and to deficits in social capital.

6. Making the conceptual model dynamic: a simulation model

To convert the model in Fig. 1 into a simulation requires further steps including taking account of the dynamics described in the previous section. A closer inspection of Fig. 1 reveals three major dynamic processes:

1. The CRM project is being undertaken by the project team and user representatives.
2. As the CRM modules, such as marketing campaign management, sales force automation and helpdesk support,

gradually "go live" they begin to be used by the users (the "roll out") — this can be viewed from the standpoint of diffusion or technology transfer of the CRM innovation across the organization.
3. Both processes are, to an extent, controlled by the supporters — who monitor progress and adjust their support according to their own agendas, previous histories and perceptions of the benefits (or drawbacks) flowing from the new systems and business processes.

One approach to modelling a project is to view the project in terms of work being accomplished; in this case the work is to introduce new or improved CRM processes and systems into the organization. The project team's task is to take an initial pool of work to be done and to convert this into completed work whilst satisfying time, budget and quality constraints. Secondly, diffusion of innovations has much in common with the spread of diseases, a field often modelled via simulation. A disease is seen to "convert" a healthy pool of people into an infected pool over
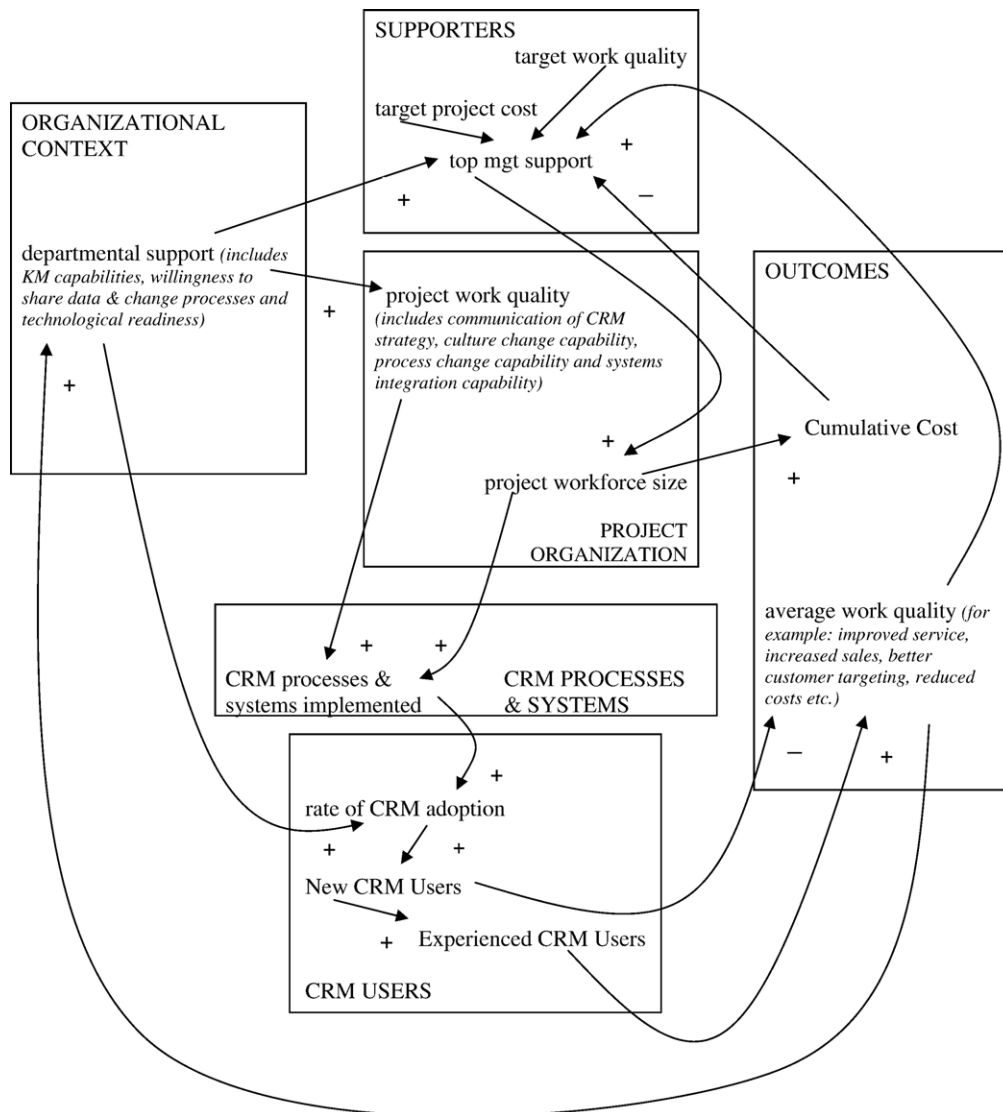

Fig. 2. The dynamics of CRM innovation.

Table 5
Mapping variables to constructs

Simulation model variable (Fig. 2)	Conceptual model construct (Fig. 1)
Project work quality	Communication of CRM strategy
	Culture change capability
	Process change capability
	Systems integration capability
Top management support	Top management support
Departmental support	Knowledge management capability
	Willingness to share data
	Willingness to change processes
	Technological readiness
Average work quality	Improved service
	Increased customer satisfaction
	Increased sales
	Better targeting
	Better management information
	Cost savings etc.

time. Similarly an innovation spreads, converting non-users to users over time. It could reasonably be expected that as people become more experienced users of an organizational innovation such as CRM their work quality improves: customers are targeted more accurately, more sales leads are converted, more helpdesk enquiries are answered "right first time". As non-users (and their managers) see the improved quality of work being produced by those individuals using the innovation they are encouraged to take up the innovation too. This creates a virtuous cycle which accelerates the diffusion of the innovation. Similarly, an innovation that worsens the quality of work being produced will make non-users wary of adoption (although they may have no choice in the matter). Fig. 2 shows a model of how the concurrent dynamics of the CRM project and the diffusion of the new CRM systems and processes across the organization might work together. Clearly a variety of models consistent with the theoretical stance advocated here could be generated depending on the selected modeling methodology. In this case the mapping technique of Causal Loop Diagramming (CLD) has been chosen. An arrow with a plus sign shows that an increase in the value of the input variable, such as top management support, will lead to an increase in the value of the output variable, such as project workforce size. A minus sign denotes the opposite effect. For example, an increase in the value of Cumulative Cost will lead to a decrease in the value of top management support.

The key variable determining the rate of progress of both the project and the diffusion of the CRM innovation is average work quality. In this initial simulation model, this variable is used to represent all of the benefits (or drawbacks) arising from the operational use of the CRM system. As shown in Fig. 1, the CRM outcomes not only affect work quality, but are also monitored by the supporters and can strongly influence the ongoing support for the CRM innovation. This dynamic is represented in Fig. 2 by the variables top management support and departmental support. The two support groups have been modelled separately to illustrate their different motivations. The model shows top management to be interested in both the cost of CRM and the work quality impacts, whereas departmental management and staff are more strongly influenced by the latter.

As support for change rises more staff can be hired to speed the work of the project team, increasing project workforce size. Similarly, more (or better quality) user representatives may be seconded to the project team – thus improving project work quality – and the rate of adoption may also be increased due to stronger championing of the change by both top management and departments — thus increasing the rate of CRM adoption in the model. Naturally the reverse cycle is also possible with negative outcomes leading to a fall in support and resources, leading in turn to slower implementation and user adoption. Table 5 shows how the variables in the simulation model map onto the constructs (CSFs and operational outcomes) in the conceptual model.

To keep the model portrayed in Fig. 2 simple, constructs have been grouped together at this stage. A more sophisticated model could be envisaged that represents each construct in Fig. 1 as a separate variable in the simulation model but this would greatly increase model complexity — and reduce its utility.

7. Model calibration and validation

A more detailed simulation model based on the CLD model has been developed using the Systems Dynamics approach (not shown here). The Systems Dynamics model must be calibrated to produce valid output appropriate for different scenarios. A review of the academic and practitioner literature revealed typical ranges for key variables (see Table 6).

In contrast to the variables in Table 6, many of the other variables in the model, particularly those corresponding to the CSFs, do not have reference values in the literature beyond the qualitative descriptors good/bad, high/low etc. These variables are given values between 0 (low) and 1 (high) for simulation purposes.

A widely-reported phenomenon in the information systems literature is the "dip" in business performance during the first year or so after the introduction of a new system due to users coming to terms with new ways of working. Shang and Seddon (2002) show this graphically in their perceived net benefit flow graphs for the operational benefits and organizational benefits arising from the use of enterprise systems. After a year or two performance typically picks up and, in the case of successful systems, eventually exceeds pre-implementation performance. Fig. 3 shows the graph of the variable average work quality over a simulated 5 year system lifecycle, together with the changes in

Table 6
Model calibration

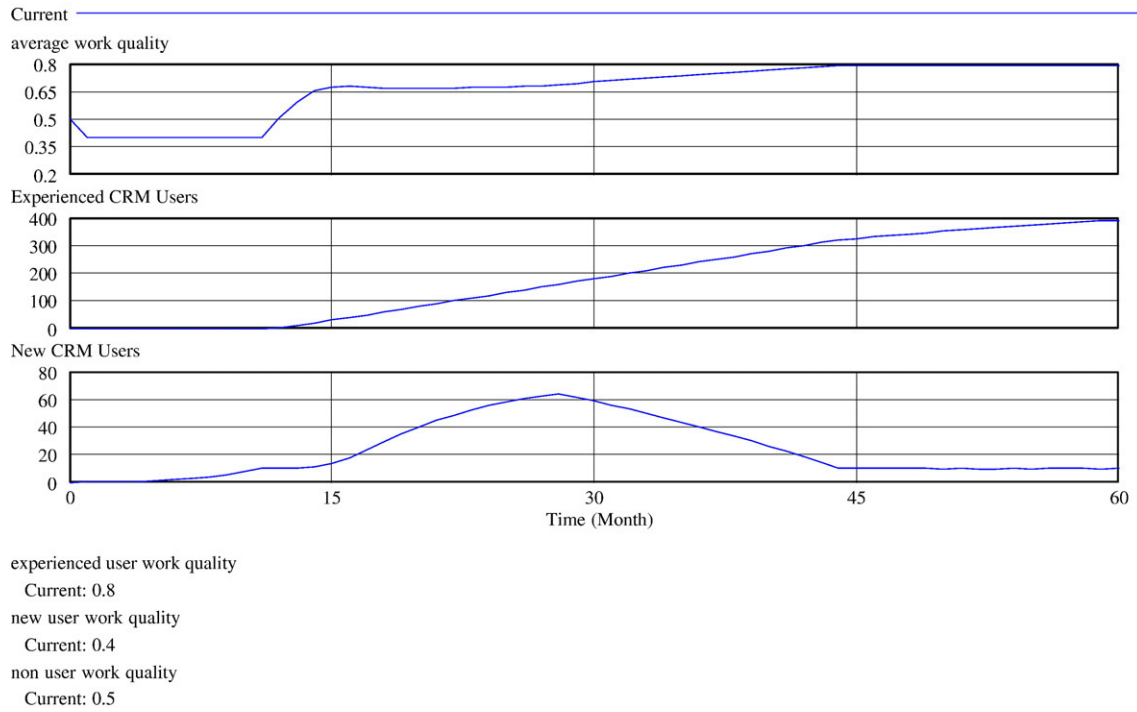| Aspect of CRM	Typical values
Number of business processes covered	10–80
Number of end users	20–2000
Implementation time	6 months–3 years
Size of project team	3–30 staff
Operational life	7 years
Cost of implementation	$300,000–$70 million
Financial benefit	Up to 75% RoI
Percentage of projects "judged unsuccessful"	55%–75%

Fig. 3. "Causes Strip" for average work quality.

the number of new users and experienced users over time. Non-user work quality is set to 0.5, new user work quality to the lower value of 0.4 and experienced user work quality to the higher value of 0.8. As non-users become new users, performance drops. But eventually new users become experienced users, and their performance improves considerably. The characteristic "dip" is clearly evident in the behavior of average

work quality in Fig. 3, providing an initial confirmation of model validity through displaying this reference mode behavior.

Fig. 4 takes the story further by showing how departmental support follows a similar curve to average work quality as users and managers observe and respond to the impacts of CRM. The variable departmental support is used here to account for the department-related CSFs knowledge management capabilities,
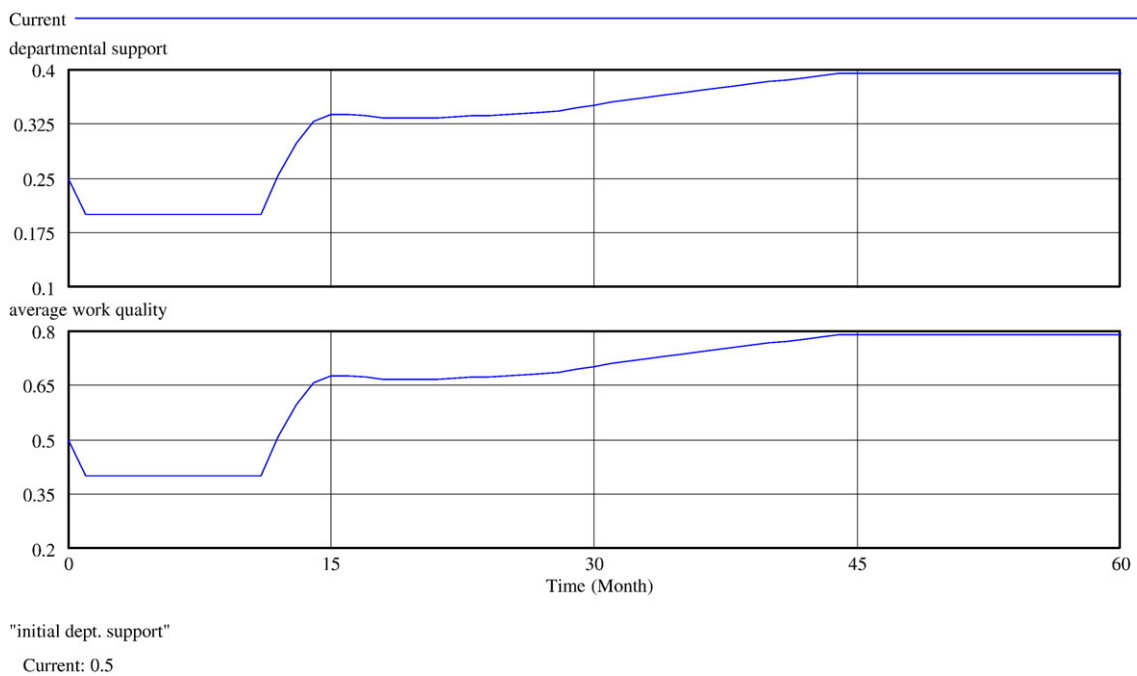

Fig. 4. "Causes Strip" for departmental support.

willingness to share data, willingness to change processes and technological readiness.

Fig. 5 shows how top management support also tracks average work quality and is increasing until around the 30 month point when it falls suddenly because the cumulative cost of CRM has now exceeded the target project cost (of $1 million), resulting in serious concerns at board level.

8. Using the simulation model

Fig. 2 shows that far from being static and unrelated, as they are often portrayed, CSFs form part of a complex, dynamic innovation process. Four of the nine CSFs listed in Table 3 relate to the delivery of the CRM project, four more to departmental context and support, and one to top management support. The model can be developed further by representing the contributions of each of the CSFs separately. This could then enable more specific scenarios to be explored. For example, a fall in willingness to change processes would require the project organization to increase its process change capability in order to deliver the process improvements expected. An alternative scenario could see little willingness to share data between departments leading to problems with systems integration between departments which weakens the front-line staff's ability to deliver improved service to customers. These are examples of Akkermans and Van Helden's (2002) "vicious" cycles. Similarly, "virtuous" cycles could be explored such as an increase in top management support encouraging departments to assign more senior staff to the project organization. This enables the project organization to better understand the cultures and agendas of the different departments (increasing culture change capability and process change capability). This, in turn, enables more effective and appropriate

process improvements to be introduced which feedback into improved knowledge management capability and willingness to share data across the organization.

Scenarios have important practical applications, for example the use of scenario planning in strategic management. The scenarios envisaged here focus specifically on CRM implementation and use. One practical use of the simulation model is as a tool for illustrating to CRM users, managers and project staff a number of vicious and virtuous cycles. These can be viewed as archetypes against which the organization's own situation can be compared. Data describing the organization's current situation would be gathered by way of a survey of staff involved in CRM. These data would provide initial values for the model variables including project work quality, target project cost and target project quality, initial departmental support and the three levels of user work quality — non-user, new user and experienced user (for simplicity, only some of these variables are shown in Fig. 2). The simulation would then be run forward in time to show how the CRM innovation might proceed. Traditional measures of success such as meeting cost and time targets can be monitored, along with more subjective measures such as improvements in work quality and departmental support. In cases where failure is predicted, participants will be encouraged to explore courses of action to bring about more successful outcomes, such as setting more realistic targets, improving the quality of the project team, addressing departmental concerns about CRM or improving the training of new users.

A key purpose of simulation is to explore possible outcomes using a realistic model of a situation without incurring the cost of "doing it for real". By exploring different outcomes, the appropriateness of different courses of action can be evaluated and compared, thereby leading to improved practice. But there
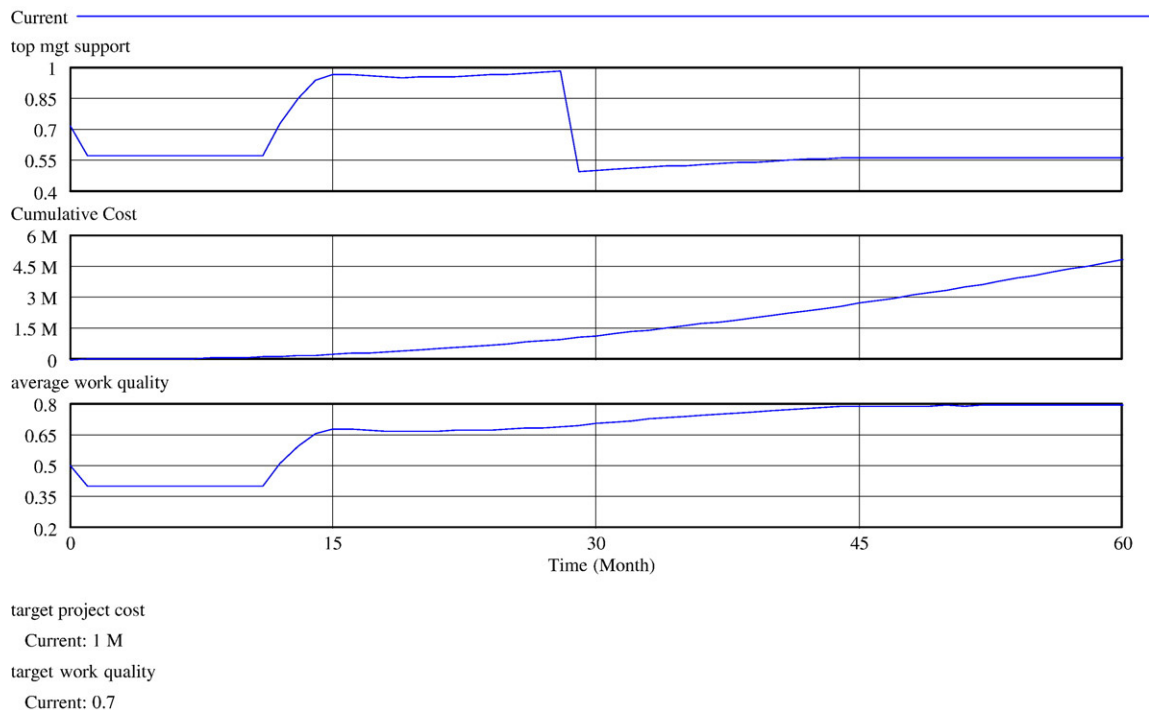
target project cost

  Current: 1 M

target work quality

  Current: 0.7

Fig. 5. "Causes Strip" for top management support.

are also benefits to be gained from the process of constructing the model. The model suggested here encourages participants in CRM innovation to consider the CSFs and how they interrelate. In particular, the examples of vicious cycles highlight some of the negative patterns of behaviour that are often not addressed in the planning and actual implementation of complex systems but which can have a significant impact on the end result.

9. Model limitations

This paper has presented simulation as an under-explored technique which can help improve understanding of complex systems innovation and therefore, to an extent, address some of the concerns voiced by Robey, Ross, and Boudreau (2002) regarding the lack of compelling theoretical models to help explain why large-scale systems implementations succeed or fail. The model presented in Fig. 2 has been kept simple. It is an initial model, and certainly further variables and greater complexity could be added. For example, more CSFs could be included, such as user training and system customization for example. Project costs are simply a function of the number of staff employed on the project, and take no account of software licence fees, hardware or training costs for example (yet alone the cost of change incurred by the organization). And operational outcomes are simply represented by one variable: average work quality. In contrast Chen and Chen (2004) define fifteen CRM benefits (see Table 4). And further connections between variables could be shown. This may lead to greater authenticity in terms of simulation results, but would be at the cost of ease of understanding. Given that one of the key attributes that model builders aspire to is simplicity we have decided to keep the model as simple as possible.

A more fundamental criticism that may be made is that simulation is inherently positivistic. This model assumes there are CSFs and benefits and that these can be measured in some way. It assumes causal relationships exist between variables. It assumes there are single values for such complex concepts as top management support and project work quality. Fig. 2 assumes the former is based upon a rational comparison of project costs and work quality impacts against target values. In practice, this may well be part of the calculation senior supporters undertake in order to determine their level of support for CRM, but many studies have shown that supporters also have less overt agendas and are motivated by other factors including their past experiences with ICT and their career ambitions. The preceding discussion of social capital and social exchange theory indicates that organizational life is not so simple. In short, "actors" and their motivations are complex and possibly unknowable. Our response to these criticisms is not to deny that there are alternative, valuable perspectives on CRM innovation, but to propose simulation as a further technique with which to explore complex innovation processes.

10. Conclusions and future work

Organizations face considerable challenges in implementing large-scale integrated systems such as ERP and CRM. The promise of internal and external integration is understandably attractive in a world where service excellence, innovation and efficiency are relentlessly pursued. There exists a large body of work identifying and describing critical success factors for information systems in general and ERP in particular, and a small emerging literature on CRM CSFs. The vast majority of this literature focuses on "static" CSFs which are generally not explicitly linked to outcomes, nor are they treated as interrelated (see Table 1 for example). The work presented here moves this line of thinking forward by creating a conceptual CSF model (Fig. 1). Outcomes are explicitly included in the model, as are causal relationships. To simplify the model and ease understanding, Sauer's model of information systems innovation is used to group the factors together and to add a higher level set of relationships emphasising the role of organizational context, support management and evaluation of outcomes in particular. The conceptual model provides the foundation for a simulation model (Fig. 2). The model has been calibrated and an initial validation undertaken by comparing outputs with those reported in the literature.

The model draws on thinking in marketing, information systems and simulation and addresses the call of Zablah et al. (2004) to "… develop measures and conceptual models that help unravel the, thus far, enigmatic phenomenon known as customer relationship management." (p. 487). The model is intended as a framework which managers can use to consider the dynamics of CRM innovation. A number of virtuous and vicious cycles have been presented in the paper. These can be used to prompt thinking and debate amongst those tasked with implementing CRM and, crucially, amongst those whose work will be affected by CRM too.

The model is currently under development and will be validated more precisely via interviews with key stakeholders in CRM-using organizations. The simulation model will be used for further research into CRM implementation and benefits, and for management education, where different scenarios will be posed for groups of managers to explore the consequences of their actions. A questionnaire is under development to enable all the stakeholders involved in CRM in a particular organization to contribute to validating the CSFs. The results of the questionnaire will provide data such as initial values for the CSF variables in the simulation model. Using these initial values and other established parameters, the simulation can be rolled forward in time in order to explore different scenarios and the consequences of different decisions. This will provide managers with a new and powerful tool with which to exploit the potential of CRM for organizational success.

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