**Abstract (Summary)**

Although the discipline of information systems (IS) development is well established, systems' failure, abandonment, and dissatisfaction with functioning systems remain widespread. This has generated a considerable amount of literature investigating the factors seen to contribute to IS success and failure. However, little attention has been given to the possible relationships among the factors most influential in IS success and failure. Therefore, we examine the development of a successful system and compare the factors associated with the system's success against the factors most reported in the literature as being associated with systems' failure. Project management practices may be affected by knowing whether success and failure are two sides of one coin or different in nature. The results of our exploratory study showed that four of the six factors identified by the participants in our chosen system as being the most influential in the success of the system were directly related to the factors identified from the literature as being most associated with IS failure. Although more research needs to take place, these results would suggest a considerable relationship might exist between IS success and failure factors. [PUBLICATION ABSTRACT]

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| ABSTRACT |
| Although the discipline of information systems (IS) development is well established, systems' failure, abandonment, and dissatisfaction with functioning systems remain widespread. This has generated a considerable amount of literature investigating the factors seen to contribute to IS success and failure. However, little attention has been given to the possible relationships among the factors most influential in IS success and failure. Therefore, we examine the development of a successful system and compare the factors associated with the system's success against the factors most reported in the literature as being associated with systems' failure. Project management practices may be affected by knowing whether success and failure are two sides of one coin or different in nature. The results of our exploratory study showed that four of the six factors identified by the participants in our chosen system as being the most influential in the success of the system were directly related to the factors identified from the literature as being most associated with IS failure. Although more research needs to take place, these results would suggest a considerable relationship might exist between IS success and failure factors. |
| Keywords: information systems failure; information systems success |

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INTRODUCTION

The information systems (IS) profession has long been plagued by the failure and abandonment of a large number of IS projects despite the vast monetary and human resources they are regularly afforded. A report by the Standish Group (2001) found that only 28% of IS development projects are considered a success while budget and schedule overruns continue to occur at an unsatisfactory rate. These failures regularly cause businesses of all sizes financial loss and damage to staff and customer morale. Attention to the perceived causes of these failures has produced a slow improvement in the overall success rates of more recent IS development projects (Standish Group, 1999); however, the improvement has been incremental at best.

As well as the extensively documented examination of IS failure (e.g., Beynon-Davies, 1995; Ketchell, 2003; Law & Perez, 2005; Montealegre & Keil, 2000), work has also been done on factors associated with the success of systems, notably the DeLone and McLean model (2003) which has been applied to many cases over the decade since its first publication (DeLone & McLean, 1992).

Despite the widespread research investigating IS success and failure, little research has investigated the possible relationships that may or may not exist among the factors most influential in IS success and failure. This leads us to ask what factors are associated with a successful IS and how do these factors relate to the factors identified in the literature as associated with systems failure? Is success and failure two sides of one coin or are they different in nature?

This article reports on an exploratory study of one organizational case of stakeholders' experiences of a successful IS, and compares factors identified as being associated with the success of the system against a set of factors identified in the research literature as being associated with systems' failure.

This research is important because little previous research has looked at the relationships that may, or may not, exist between IS development success and failure factors. It is also important given the limited research investigating IS development within a regional Australian context. This research could provide important insight for both practitioners and educators on the relative importance of significant development factors both in the success and failure of IS. For example, negative levels of top-management commitment might be a very important factor in the failure of IS, while positive levels of top-management commitment might only be moderately important in the success of IS.

LITERATURE REVIEW

Perceptions of Systems Success and Failure

There is a fundamental difficulty in defining exactly what constitutes IS success and failure. Over the years researchers have identified several perspectives on the term "failure" within the IS context. Sauer (1993) defined a system to have failed if "development of operation ceases, leaving supporters dissatisfied with the extent to which the system has served their interests" (Sauer, 1993, p. 4). He described this definition as being more forgiving than most, given that many authors consider factors such as user-resistance or missed targets and so forth, to be sufficient grounds for describing an IS as a failure. The Standish Group (1994) defines failure as either a project that has been cancelled, or a project that does not meet its budget, delivery, and business objectives. Wilson and Howcroft (2002) showed that given the multitude of descriptions developed by researchers relating to IS failure, almost any project could potentially be considered a failure of some description.

Conversely, IS success can also be seen in a number of ways. Taylor (2000) defined an IS to be a success if it delivered to the sponsor "everything specified to the quality agreed on or within the time and costs laid out at the start" (p. 24), whilst the Standish Group (1994) view an IS to be a success if it meets its budget, delivery and business objectives. Wilson and Howcroft (2002) found that a single stakeholder's perspective of success or failure could vary tremendously over a period of time. They found that a system that was, at one time, considered a success could be reconstructed to a view of failure for reasons beyond just those of the technology involved (e.g., politics).

DeLone and McLean (2003) have taken six major categories of measures of success which are seen to form an integrated whole. These measures are system quality, information quality, use, user satisfaction, individual impact and organizational impact. This model can be used to relate and evaluate reported studies of IS success, focused on the component measures (DeLone & McLean, 2003).

Many authors (Dix, Finlay, Abword, & Beale, 2004; Garrity & Sanders, 1998; Seddon, Staples, Patnayakuni, & Bowtell, 1999; Wilson & Howcroft, 2002) have shown that one of the key reasons for the difficulty in defining IS success and failure is that different stakeholders view the system in highly varying ways and thus "different measures are likely to be needed to assess the impact of effectiveness of a system for different groups of stakeholders" (Seddon et al., 1999, p. 19). A stakeholder can be defined as "a person or group in whose interest the evaluation of IS success is being performed" (Seddon et al., 1999, p. 5) and can include users, top-management, IS practitioners, and external entities. Dix et al. (2004) have further defined stakeholders to fall into four categories where the priority of stakeholder needs diminishes as you go down the categories. These categories are (1) Primary: the stakeholders who actually use the system, whose needs are usually predominant; (2) Secondary: stakeholders who do not directly use the system, but receive output from it, and provide input for it; (3) Tertiary: stakeholders who do not fall into either of the first two categories but are directly affected by the success or failure of the system in some way; and (4) Facilitating: stakeholders who are involved with the design, development, and maintenance of the system.

A good example of the highly differing views among different stakeholders within an IS is described in Linberg's (2000) review of a failed IS intended for the use of medical practitioners during medical procedures. Although management had condemned the system, Linberg found that five of the eight team members involved in the "failed" project deemed it to be the most successful project they had ever been involved with, while the remaining three members nominated it as their second most successful. Reasons reported for this were that (1) the project was a theoretical challenge; (2) the product worked in the way it was intended to work; and (3) the team was small and high performing (Linberg, 2000). This is a good example of how a system that one group viewed as a failure could still be viewed by others as a success.

Another problem is the great reluctance of many organizations to talk about their own experience of IS failure for fear of appearing to have made poor and/or costly decisions (Cole, 1997; Oz & Sosik; 2000). Cole (1997) found in a follow-up investigation into runaway projects that there had been a considerable change in the business climate since his initial study in 1989. He found that there was "great reluctance on the part of many organizations to discuss their experiences" (Cole, 1997, p. 3).

Another important question is when should we measure an IS to determine if it is successful or not? Studies have shown that IS success and failure can be measured in terms of the short-term or immediate impact, as well as the long-term or indirect impact (Garrity & Sanders, 1998). A study of an IS at the short-term stage may give a different view of its success from a study of the same system conducted at the long-term stage.

The level at which IS success is measured is yet another important consideration. Garrity and Sanders (1998) defined three levels where an IS could be measured. These three levels were (1) firm or organizational level measures of success; (2) function or process level measures of success; and (3) individual measures of success. At the organizational level, IS success can be measured primarily using measures related to organizational performance. This includes increased market share and/or profitability, operating efficiency, operating cost, and return on equity and stock. At the function or process level the IS can be measured in terms of the efficient use of resources and by the reduction of process cycle times. This measure includes the operating efficiency of functional areas, reduced costs, and processes that are well integrated. Finally, at the individual (or user) level the IS can be measured in terms of the users' perception of utility and satisfaction. This stage is defined by user satisfaction, user IS satisfaction, and utility of system (Garrity & Sanders, 1998).

Contrary to Garrity and Sanders' (1998) scheme, Sauer (1993) believes that measuring the performance of an IS against a set of metrics such as these will "generate useful evaluations but they do not constitute the very essence of failure" (p. 18). The idea being that although we may have a certain set of measures relating to some of the factors that contributed to the failure of an IS, we still do not have a fuller, deeper understanding about the underlying phenomena that caused the system to fail. This is because a set of measured facts and figures on paper can never give a true account of the intricate web of social, political, and technical phenomena that can occur in IS.

Despite all this, more recent studies have shown the success rate for IS projects are starting to gradually improve. The Standish Group (2001) found that in the space of five years the success rate of IS, as measured by their CHAOS research, had risen from 16% in 1994 to 28% in 2000. Even more encouraging has been the quite rapid improvement of projects within large companies (companies with profits of $500 million or more) where success rates rose from 9% in 1994 to 24% in 1998, with the average cost of projects dropping from $2.3 million to $1.2 million (Standish Group, 1999).

As demonstrated in this section, the problems associated with determining IS success and failure are complex and many and there is no single trigger that causes an IS to fail. Failure can be caused by many diverse factors that each impact on one another (Taylor, 2000).

Failure Factor Matrix

Based on the review of the literature we have identified six items that appear to be the most regularly cited risk factors associated with IS failure. These factors are, in diminishing order of importance, (1) lack of effective project management skills/involvement (e.g., Beynon-Davies, 1999; Doherty & King, 2001; Jiang, Klein, & Discenza, 2002; McGrath 2002; Wallace, Keil, & Rai, 2004), (2) lack of adequate user involvement (e.g., Al-Mashari & Al-Mudimigh, 2003; Chung & Peterson, 2000,2001; Wallace et al., 2004), (3) lack of top-management commitment to the project (e.g., Irani, Sharif, & Love, 2001; Koenig, 2003; Standish Group, 1999), (4) lack of required knowledge/skills in the project personnel (e.g., Jiang et al. 2002; Oz & Sozik, 2000; ), (5) poor/inadequate user training (e.g., Das, 1999; Taylor, 2000), and (6) lack of cooperation from users (e.g., Baskerville, Pawlowski, & McLean, 2000; Roberts, Leigh, & Purvis, 2000).

To derive these factors we used a slightly modified version of the 29 ranked risk factors list of Schmidt, Lyytinen, Keil, and Cule (2001), counting citations of the risk factors and selecting the 6factors most often cited in the literature. The slightly modified risk factor list we used consisted of the original 29 ranked risk factors with the addition of the risk item "poor/inadequate user training" that was added due to its absence, in any form, in the full risk factor list and its frequent occurrence as a critical factor in the literature. The wording of the risk item "lack of effective project management skills" (Schmidt et al., 2001, p. 16) was also modified to "lack of effective project management skills/involvement". The modified list therefore comprised a total of 30 risk items on which this section of the literature review is based.

METHOD

Research Questions

As discussed earlier, little or no research has explored how the factors most influential in IS failure relate to those most influential in IS success. Therefore this study assesses the factors considered by the participants to have been influential in a successful IS developed by a leading regional Australian-based organization. These success factors are then analyzed to see how they relate to our previously defined matrix of IS failure factors. The research questions are (1) Which factors are associated with a specific successful IS within a leading regional Australianbased organization? (2) How do these factors relate to the factors identified in the literature as being associated with systems failure?

Study Design

A descriptive qualitative research approach was taken in this exploratory study using a convenience sample of five members of a leading regional Australian-based organization. These people were one member of the project's management; two of the project's senior analyst/programmers; one current user who was not involved in the system's initial development cycle but was later involved as a business consultant over a period of approximately six months; and one current user who was involved in the system's development as a business project manager.

Data Collection

Data for the study was collected via one questionnaire and a series of five indepth semi-structured interviews. The questionnaire's purpose was to collect background information about the system prior to conducting the interviews. This information included details about the system's objectives, requirement changes, organizational departments involved, previous management and personnel experience, the methodology used, and the project's planned and actual timeline and budget figures.

The second and main stage of the data collection process involved a series of five in-depth semi-structured interviews to explore the interviewees' personal experiences of their involvement in the system's development as well as how, if at all, they believed the pre-determined matrix of IS failure factors related to the success of the system. Each of the participants was asked a different series of questions based upon their role within the system with the exception of the two senior analyst/programmers who were both asked the same questions.

Data Analysis

The emphasis of the analysis in this study is on drawing out the main themes associated with the successful IS, and how these themes relate to the previously defined matrix of failure factors. Therefore, transcripts of interviews were first analyzed to determine perceived success factors for the system and then analyzed again against the failure factor matrix.

RESULTS AND DISCUSSION

The first two sub-sections (About the system and Why did the participants consider the system a success?) of this section give an overview of the investigated system as well as examining why each of the study's participants regarded the system as a success. These issues provide a framework on which to base the results and discussion of our research questions.

In the following discussion the participants will be known by the IDs outlined in Table 1.

About the System

The IS project of this study is a large Internet-based financial transaction service that was implemented in May of 2003 by a leading regional Australianbased organization. The system is used by approximately 5,000 to 6,000 users each day generating somewhere in the order of 30,000 log-ons. The systems users cover a broad spectrum of skill levels and frequency of use.

The new system replaced an existing system used by the organization. The objectives of the new system were to (1) replace the existing system with technology aligned with the organization's strategic direction; (2) cater for future growth for a minimum of five years; (3) develop an architecture that provided failover and redundancy; (4) provide a re-use code base that would lower the cost and reduce delivery times of related future development efforts; and (5) train staff in the organization's new application platforms. Of these five objectives, one, three and five have been fully achieved by the implemented system, with objective four being partially achieved. Objective two, cater for future growth for a minimum of five years, is not yet assessable but at this stage looks likely to be fully achieved.

The project's development was planned to take a total of five months and two weeks to complete at a significant monetary cost to the organization. In reality the project took approximately 17 months (an increase of approximately 325%) to complete (see Table 2) at a budget increase of approximately 84%.

The project's development team comprised of 30 people with 2 of these in a managerial role. The current project manager (PM) took over approximately eight months into the development of the system. A business project manager/sponsor was also appointed at that time to co-manage the project. Prior to this, a single project manager was in charge of developing the system. The project's personnel had previously been involved in a combined total of approximately 550 projects and the management in a combined total of approximately 170. A number of organizational departments were involved in the project's development including IT, on-line solutions, operational risk, audit and business service.

During the project's development a number of significant requirement changes were made including (1) giving the system's interface a totally different look and feel; (2) making several functional changes relating to business service; (3) creating a totally different organizational hardware and network infrastructure; and (4) implementing a number of system fixes.

The system is now fully operational and is universally regarded within the organization as being highly successful. The organization has also received extensive positive feedback from customers since the systems implementation

Why Did the Participants Consider the System a Success?

As previously discussed in the literature review an explicit definition of what comprises a successful IS can be very hard to reach given the various stakeholder perspectives from which it can be assessed. Therefore, it is important to examine why each of the study's participants regarded the system as a success.

All participants as well as the members of upper-level management considered the system to be highly successful. All study participants were asked in their interviews to describe their perceptions of the system's success. AP1 thought it was a success because the system has very little downtime and when there are problems they are easy to fix. AP1 also referred to the amount of positive customer feedback received by the organization in relation to the system. PM reported that it was successful because it was received well by the customers and although the project's delivery date had slipped the system provided the organization with a lot more functionality than they had expected at the outset. PM also thought the system was successful because the client was extremely happy with it and once the system was turned on there was no system failures within the first two months. AP2 thought that the system was successful from his perspective because it worked well upon installation and he personally learnt a lot during the system's development. IU2 said he regarded the system as a success because it had been great for the organization and the new system's take-up rates are excellent.

Research Question 1 - What Factors Are Associated with the Success of the Chosen System?

In this section we examine the factors reported by the participants as being contributors to the success of the system. Analysis of interview transcripts produced 10 factors (shown in Table 3).

Of the ten factors mentioned by the participants as being influential in the success of the system, five were mentioned by multiple participants. These five factors can therefore be seen as those viewed by the participants as being the most influential in the success of the system and are examined in further detail.

(1) Top-Management Commitment

This was reportedly the most influential factor in the success of this system and was mentioned by all interview participants as being significant in the project's successful outcome. This factor may have played a particularly important role in this case given the project's significant cost and schedule overruns, which in many cases would have led to the cancellation or failure of the project. However, because the project was viewed as strategic by the organization the philosophy was that the system was to be completed successfully regardless of the financial cost ("because it's a strategic path we were going to put it in no matter how much it cost" - AP1), and regardless of the initial time estimates ("everyone [who was] involved perspective [was], including the business, was we simply can't put it out until it's right and we don't care how long it takes" - PM).

PM felt one reason for this strong level of commitment from top-management might have been the project management techniques he used to keep the members of upper-management informed. These techniques included sending out weekly status reports and regularly talking to the different managers who had a stake in the project in an effort to foster and maintain their commitment.

(2) Project Team Commitment

Project team commitment was another factor that reportedly had high importance in the success of the system. It could be argued that the high level of commitment displayed by the project personnel was most likely the product of some of the management techniques used (high level of communication, etc.), the level of commitment from top-management, and the overall professionalism of the members of the project team. This project team commitment coupled with the top-management commitment appears to have been a considerable force in the success of this system. The combination of these two factors appears to have negated many of the problems that could have led to the failure or cancellation of the project during the development of this system.

(3) Effective Project Management

This case has provided a persuasive example of how project management can have a significant effect on project outcomes. The project manager who was appointed at the beginning of the project's lifecycle already had many other operational responsibilities entrusted to him. This meant that he could not give the project his undivided attention creating a situation where he was essentially working on the project part-time. Although it is not entirely clear from the interviews, it would be reasonable to assume that this situation may have contributed at some level to the significant cost and schedule increases the project experienced early in its development lifecycle. This situation was rectified by the appointment of a fulltime project manager approximately eight months into the development. PM felt that the point where he became involved was a lift in the respect that there was now someone dedicated to the project fulltime. PM also requested that a business project manager/sponsor be appointed to co-manage the development of the system. PM commented, "...between the business project manager and myself I think it had a very positive impact [on the project's outcome]".

(4) Project Personnel Knowledge/Skills

It is interesting that project personnel knowledge/skills was a key contributor to the success of the system given that at the beginning of the system's development many members of the project team had little or no knowledge of the technology that was to be used to develop the system. These team members had to be trained in many areas including J2EE and Web development. The main portion of this training occurred largely during the first 12 months of the project and generally consisted of on the job training as well as some more formal training for approximately 3 to 4 weeks prior to the project's commencement.

It was however noted that despite the initial lack of skill and knowledge in some areas, on the whole, the team comprised some of the best people who were working in IT at that time. This, together with the team member training resulted in a project team that became extremely fluent in all aspects of the technology involved allowing the turnaround times on system functions to dramatically reduce as the project reached its maturity.

(5) Enlisting of External Contractors

Although not regularly cited in the literature as a key factor in the success or otherwise of systems, enlisting the expertise of external contractors was one of the most highly reported reasons for this system's success. One reason for this could be that, as previously discussed, the project was developed using technologies unfamiliar to many members of the project team. By enlisting these external contractors the project team was able to not only be trained but also have the assistance of the contractors in the development of the project.

External contractors were also employed to assist in the redevelopment of the system's user interface in order to incorporate into the project's development people with a unique, but temporarily required, skill set that the organization could not justify employing on a fulltime basis. IU2 thought "engaging the external Web designers and psychologists was definitely a very wise move for us". It helped the organization to develop a user-interface that required little or no user training, which was very important given the number of people with varied skill levels who would use the system.

Without the assistance of these external contractors it is still likely that the project would have been completed given the commitment of all those involved. However, this would have most likely occurred at a much higher time and budget cost to the organization.

Research Question 2 - How do the systems success factors relate to the factors identified in the literature as being associated with systems failure?

In the following section, the six previously defined critical failure factors are examined in order to provide insight into how, if at all, they relate to the factors previously determined as being the most important in the success of the system.

(1) Lack of effective project management skills/involvement

The literature revealed that having a lack of effective project management skills/involvement was the factor that most frequently contributes to the failure of IS. Conversely, effective project management in this case was regarded by those interviewed as the third most influential factor in the success of the investigated system.

One reason for this could be that the members of project management were involved for the entire duration of the project's development. The failure of project management to become adequately involved in the entire development process was one of the key contributors to the appearance of project management in lists of failure factors as outlined in the literature review (Liebowitz, 1999; Standish Group, 1999).

The interviewed project manager also appeared to possess many of the skills identified in the literature as being important in the establishment of effective project management. For example, Schmidt et al. (2001) found that having an improper definition of roles and responsibilities within the project team was one of the key predictors of poor project management. The project manager in this case made it a priority to ensure that all involved in the development had a clear idea of their roles and responsibilities.

Having good communication skills was another key skill that was cited in the literature as being important in effective project management (Avison & Fitzgerald, 2003). This was a skill that was used frequently by PM:

So basically almost my entire role was communicating with people, going around and seeing where they were up to and feeding that information to other people.

Avison and Fitzgerald (2003) also found that effective project managers should be capable of getting people working together, getting them committed to the change and building confidence. This was another skill PM found to be a particularly important aspect of the job.

(2) Lack of adequate user involvement

As this system is an internet based system that would have potentially many thousands of users each day with highly varying skill levels, it would be reasonable to assume that user involvement would play a particularly important role in its development. However, user involvement was not mentioned by any of the participants as being a factor in the success of the system.

The success of the system, despite the absence of user involvement, does however have a logical but somewhat unusual explanation. The basis of this explanation is the system's main objective, which was to replace an existing system with technology aligned with the organization's strategic direction. Therefore, the mandate for the new system was essentially to copy the old system into the new programming and infrastructure platforms. This meant that a large proportion of the required user involvement had already been conducted during the previous system's development, therefore making it a factor of much lower importance in the development of the replacement system.

However, users were still involved during the development of the new system. The organization ran focus groups with selected customers where they were asked to perform a series of predetermined tasks whilst their actions were recorded and analyzed. This prompted the organization to make some very slight changes to the interface before it was implemented. A series of prototypes was also tested on members of the organization's call center staff who comprised a second user group. The organization reasoned that if the call center staff were unable to understand various aspects of the system then the customers would be unable to also.

(3) Lack of top-management commitment to the project

This factor was the third ranked factor identified from the literature as being associated with IS failure, while the inverse of this factor was regarded as the most influential factor in the success of the investigated system.

When top-management are committed to a project they will do whatever is necessary throughout all stages of the system's development and implementation to ensure that the IS solves all the required problem areas (Ginzberg, 1981). This was clearly an important facet of this project's development. Top-management werecommitted for the entire duration of the project andwere forthright in their allocation of additional financial resources as well as allowing significant extra time in which to complete the project. This is indicative of the de-escalation in commitment to failing courses of action that top-management can generate as reported by Keil and Robey (1999).

As mentioned earlier, one way to assist in maximizing top-management support is to incorporate an executive sponsor into the project's development team (Oz & Sosik, 2000). In this case, one of the PM's first steps was the appointment of a business sponsor who also acted as a second project manager. PM regarded this step as being critical in the development of the system.

Finally, as in the CONFIRM car rental and hotel reservation system case (Beynon-Davies, 1995; Oz, 1994; Standish Group, 1994), PM also noted that too much top-management involvement can have a detrimental effect on project success and cited several techniques that can be used to effectively manage this problem. These techniques included collectively developing a project development charter and a team charter that details what each person or groups boundaries are and what they are accountable for. PM felt this was critical to a project's success.

(4) Lack of required knowledge/skills in the project personnel

A lack of required knowledge/skills in the project personnel was found to be the fourth most influential factor in the failure of IS projects during the review of the literature. Conversely, the high level of knowledge and skill possessed by the project team responsible for the development of the investigated system was reported as the fourth most influential factor in the success of the system.

However, the project team involved did still suffer from many of the challenges inherent in the process of selecting project team members. Some of these challenges included the initial problem of inexperienced staff and the combining of team members from different departments and organizations (Cash & Fox, 1992).

The first of the aforementioned problems (i.e., the inexperienced staff) was one of the driving forces in the initial schedule and budget problems. PM felt that one of the fundamental mistakes that they made was the introduction too many new technologies they were not familiar with which led to downstream cost and schedule delays. This problem was eventually overcome through training in the new technologies both before and during the system's development, as well as the integration of external contractors whose roles were to assist in the development of the system and provide additional training to staff members.

The problem of handling the integration of people from different departments and organizations (the second of the aforementioned problems) was largely overcome via processes implemented by the project manager. These included gaining the support of a business sponsor, generating a constant flow of communication between the departments, making sure people had a clear idea of their roles and responsibilities, and the publication of key project dates.

(5) Poor/inadequate user training

Although poor/inadequate training was cited as being one of the key causes of IS failure within the literature, the requirement for user training did not play a role in the success of the investigated system. This is to be expected given that the system is Internet based making it impossible to formally train every user.

However, the organization did put in place processes to assist customers prior to, and after, the new system was implemented. Prior to the system's implementation the organization issued a demonstration version of the new system linked from the current system so that users could become familiar with the new system's interface and features. They also used the organization's Web site to keep users informed about the benefits and features of the new system, as well as details of when it would be implemented.

Users also had the option of using the system's online help facility or contacting the organization's call-center staff if they had any difficulties with the system. Also, whenever the organization releases a new version of the system they include a "What's New" section to acclimatize the customers to any changes that have been made.

It is reasonable to assume that these efforts to counteract the absence of any formal user training have, at least to some degree, been successful given the extremely small amount of negative feedback that the organization has received about the new system.

(6) Lack of cooperation from users (user resistance)

User resistance was the sixth and final factor identified in the literature as being associated with IS failure. Although user resistance was not explicitly mentioned by any of the study's participants, frequent references were made to the positive feedback received from a large number of satisfied customers. It would not be unreasonable to conclude that this tends to confirm the absence of any user resistance towards the project.

CONCLUSIONS

The aim of the research was to survey one organizational case of stakeholders' experiences of a successful IS, and evaluate factors identified as associated with the success of the IS against a set of factors identified in the research literature as associated with IS failure. It was hoped that some parallels between these two sets of factors would be developed to give some insight into whether failed and successful systems are affected by the same factors or are different in nature.

Results for the first research question showed that the factors reported by the study's participants as being associated with the success of the investigated system were (1) top-management commitment; (2) project team commitment; (3) effective project management; (4) project personnel knowledge/skills; and (5) enlisting of external contractors.

This set of factors would appear to be consistent with those regularly reported in the literature as being associated with IS success with the exception of item five, enlisting of external contractors, which is seldom cited in lists of success and failure factors. This would suggest, although considerably more research still needs to take place, that the factors critical to the success of systems like the one surveyed are comparable to those regularly cited as contributing to failure in the world-wide literature.

It is also worth noting how the combination of top-management commitment and project team commitment appears to have had a considerable influence in the successful development of the investigated system. Both these sets of stakeholders had significant buy-in to the project and were not prepared to see it fail. This combined commitment appears to have rendered irrelevant many of the problems that affected the development of this system; problems that in many cases may have led to the failure or cancellation of the project. This high level of project commitment by both parties appears to have been influenced by the communication techniques used by the project manager. These techniques included regularly issuing status reports as well as personally going and talking to various people involved in the system's development. This helped promote and then maintain the high level of project commitment displayed by each of these stakeholder groups.

The results for the second research question suggests that the factors most influential in IS success are closely related to the factors most influential in IS failure. Of the five factors mentioned explicitly as being critical to the success of the investigated system, three directly correspond to the factors identified in the literature as being associated with IS failure. Add to this "user acceptance" that was reported implicitly by many of the study's participants and the number of direct matches increases to four of six (see Figure 1).

This is particularly promising, especially given the Internet based nature of the IS which, as previously discussed, largely rendered irrelevant each of the user related factors in the identified failure factor list (i.e., lack of adequate user involvement and poor/inadequate training). Only item two, project team commitment, and item five, enlisting of external contractors, from the success factor list failed to correspond in some capacity to any of the previously identified failure factors.

The absence of any correlation between these two success factors and the set of failure factors can be explained given their unusual nature. Project team commitment and the enlisting of external contractors are factors that seldom appear in the literature in regard to being influential in the success or otherwise of IS. In particular, the importance of "enlisting of external contractors" appears to have been somewhat unusual. As previously discussed, this factor was important because of the initial lack of skills possessed by many members of the project personnel.

This research, although relatively small in scope, has provided some useful insights into some areas of IS research that have received little previous attention. It is hoped that this research may inspire, and provide a basis for, future study within the presently investigated areas of IS success and failure.

The results of this topic of research may be useful for managers and other IS professionals through the identification of the factors that carry a similar high level of importance in both the success and failure of IS development projects. These identified factors can then be more closely monitored and managed in an attempt to foster success and avoid failure. For example, if factor x is found to be extremely influential in both the success and failure of IS development then it may be more closely monitored and managed than factor y which is generally only moderately influential in IS failure, but hardly influential at all in IS success.