Information Systems Project Failure: A Comparative Study of Two Countries

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Many organizations, regardless of size, engage in at least one, and often many information system projects each year. Many of these projects consume massive amounts of resources, and may cost as little as a few thousand dollars to ten, and even hundreds of millions of dollars. Needless to say, the investment of time and resources into these ventures are of significant concern to chief information officers (CIOs), executives staff members, project managers, and others in leadership positions. This paper describes the results of a survey performed between Australia and the United States regarding factors leading to IS project failure. The findings suggest that, among other things, end user involvement and executive management leadership are key indicators influencing IS project failure.

INTRODUCTION

A growing number of companies are engaging in initiatives which combine the benefits of human skill with those of technology and business. In this information age, the role of information systems in leveraging businesses against competitors in the marketplace, while taking advantage of new opportunities, is steadily increasing. Information systems projects have become staples in companies seeking to fulfill their strategic objectives.

Despite this, the Standish Group International reports that at least 31.1% of information technology-related projects will be canceled before completion (Kapur, 1997). This statistic and many others, which report even higher percentages of information systems project failures, form the backdrop of a serious problem facing many organizations today. According to Vandersluis (1997), 61% of business functionality expected from an information system project actually makes it to the final version. And only 13% of the information technology systems projects are considered successful by the executives who sponsored them.

Conventional wisdom suggests that it is imprudent to initiate any sort of information systems project without first *fully* understanding the business functions within the organization, and how the information system is supposed to support them. Information systems projects are notoriously difficult to manage and too many of them end in failure. In 1995 alone, annual United States spending on software projects reached approximately $250 billion, and included an estimated 175,000 projects (Keil et al., 1999). Some of the more conspicuous and visible information systems project failures include: Denver International Airport's baggage claim system; Bank of America's Masternet trust business accounting system; the Confirm reservation system that was supposed to connect Hilton Hotels Corp., Marriott International, Inc. and Budget Rent-A-Car Corp.; the system that drove FoxMeyer Drug Co. into bankruptcy; the New Jersey Division of Motor Vehicles' car registration syste, and the Internal Revenue Service (Glass, 1998). The Internal Revenue Service stands out as an example of how arduous and expensive a failed IS project can be. Despite an annual computing budget of $8 billion, the IRS has managed a series of project failures that have cost taxpayers $50 billion a year, which is roughly as much money as the yearly net profit of the entire computer industry (Glass, 1998). It is no surprise with this rate, or similar accounts of information system project failures, businesses are anxious about how to successfully develop and implement information systems projects.

The key question explored by this paper is: *What are the key factors influencing IS project failure*? In studying two industrialized nations, such as Australia and the United States, it is hoped that this study can serve as a source of information and insight for executives, and others in leadership positions, to reference in their continuous effort to leverage the benefits of IS projects in their organizations. The remainder of the paper is segmented into several sections. A literature review on IS project failure is presented next, followed by the research method used for the study.

After the results are presented a discussion section is provided followed by a conclusion.

LITERATURE REVIEW

According to CMA Management (1998), at least three common areas for information systems project failure persist. They are:

1). **Poor project planning**–risk management was not addressed or project plans were weak.

2). **Poor business case** - in that the need for the system was not fully justified in ways that related **directly** to the organizations business requirements or priorities.

3). **Lack of top management involvement and support**. Jiang and Klein (1999) suggest that project size, technological change, novelty of application area and personnel changes are the key factors influencing information system project failure. It is not, however, uncommon to have many of these factors present concurrently during the course of a single information system project. Regardless of the technological platform, whether it be mainframe or network based, the menace and reality of failure persists.

Investigating whether such failures can be avoided, or at least reduced by some degree, is certainly a worthwhile effort. James (1997) suggests that most information system project disasters are avoidable. Many times, warning signals occur long before an information systems project has begun to fail. History has shown that software projects are far more likely to be successful if they are highly focused and built upon well-understood technology (James, 1997). The list of items below displays some other factors to be aware of during IS project management:

1) **End users**–Keeping users involved in the design, implementation, and testing of a new system is one of the best ways to guarantee project success.

2) **Lack of top management support**–Any significant project will require redefinition of job roles and responsibilities. Top management support is required to ensure this happens smoothly.

3) **Fuzzy business goal**–IS project should relate directly to business goals. Information at your fingertips does not necessarily translate into large productivity gains.

4) **Over dependence on consultants**–Time is the enemy of successful projects. Consultants usually invoice their time, and the more time they take to complete a project, the more profit they generate.

5) **Lack of contingency plans**–Unforecasted issues will arise. Having a plan to deal with issues not present when the project began is critical.

6) **Lack of testing**–Inadequate testing will usually create severe problems for a project. Exhaustive testing is the best way to avoid this factor from becoming an issue.

7) **Lack of training**–End users need to fully understand the system, its nuances and any other special conditions. Proper training for users is mandatory.

8) **Denial that IT project is in trouble**–Heavy investment into an IS project may lead the sponsors to deny that it is in trouble. Heeding the warning signs will help to take corrective action and avoid a costly IS disaster.

Some IS projects should be segmented into smaller sub projects to increase the likelihood of success. Pilots can be used in this case as relatively inexpensive methods to provide a "proof of concept" for an application before additional resources are allocated. This is especially useful when it comes to the use of new technology. Perhaps one of the biggest mistakes a company can make is using a new technology on a highly visible and large project. A $100 million project should not be started with any technology unless a $10 million project has used it first, and a $10 million project should not be conducted until a $1 million project has been completed (Glass, 1997). Bleeding edge technology is notorious for having software bugs and other anomalies. The problems should be reconciled on a small, low visibility project, where problems are easier to address before it is unleashed on a larger project. In addition, it has been suggested by Jiang and Klein (1999) that information system project managers avoid *unrealistic* schedules and budgets, incorrect user interfaces and functions, and a continual stream of requirement changes.

To keep a project manageable, periodic assessment, particularly as it relates to problems encountered during the project is crucial. Verifying that those responsible for implementing the information system project remain focused on the correct goals is also paramount. What is the source of poor performance in bringing information systems projects to a successful completion? The answers lie largely in the fundamentals of project management. Vandersluis (1997) suggests that an organization's chances of successfully implementing an information systems project are increased if they do the following:

1) **Get a plan**–Before a single line of code is written, create a schedule which matches the scope of the project. If uncertainty about areas of functionality exist, divide the project into phases which isolate the risk and authorize each phase individually.

2) **Track the progress of the plan**–Set up a weekly or monthly review of the schedule where the progress for each task is outlined and the impact on the rest of the project is identified.

3) **Close the loop**–Once the project is complete, learn from it. Ensure the lessons learned and any inconsistencies between the plan and the result are used to improve the planning and project control process.

4) **Choose tools with care**–They should be as strong in the project execution phase as in the planning phase.

In regard to the third notion of *closing the loop,* one study identified additional steps that can be performed to improve information system project success once the project has been completed (Mandell, 1999). They include:

- Analyze how and why the project failed (e.g., post-mortem analysis).

- Cite causes/reasons for project failure.
- Distribute these lessons learned to senior management, project management, and members
- Create new guidelines on system development practices and procedures (for use in future projects).

A subclass of information system project failures can be described as the "runaway" project. It is not considered a failure yet, due to the fact that the resources required for it to continue have not been terminated. However, a runaway project is usually a harbinger of a looming project failure. A significant portion of literature regarding information system project failure highlights that a major number of information systems projects are over budget and beyond the initial scope of the time allotted for completion. There are several actions companies use to address runaway projects. According to a survey performed by Glass (1998), the following actions were taken:

- 85% of companies extended the schedule
- 54% initiated better project management procedures
- 53% added more people
- 43% increased funding
- 38% increased pressure on suppliers, or vendors by withholding payment
- 28% reduced the scope of the project
- 27% added new outside help
- 25% initiated better development methodologies
- 20% increased pressure on suppliers by threat of litigation
- 13% changed technology used for the project
- 9% abandoned the project
- 9% performed some other action.

Extending the timeline for project completion is the most popular approach in confronting projects, which have begun to fail. This suggests that perhaps either the productivity of the developers and project manager have been too low or the original schedule was too ambitious from the beginning.

RESEARCH METHODOLOGY

Exploring IS projects from industrialized nations is perhaps one way to gather additional knowledge about factors relating to IS project failure. There is a need for the executives, project managers and others in line positions to fully understand the role of information systems projects as they relate to the short-range and long-term goals of the organization. The management cultures in many industrialized countries are interested in being able to account for the return of investments in technology for their organizations, and not simply in terms of dollars and cents. It is no longer palatable to incur procurement, development, training, consulting and other expenses related to IS project development without tying these activities to a plan that will be able to move the organization in a desired direction by a specific point in time. Executives desire more efficient utilization of resources, and process improvement in organizations that have a vested interest in information technology and its promise.

To describe and explore the notion of IS project failure further, a survey was distributed throughout Australia and the United States. About 1,000 surveys were sent in Australia, with 101 usable surveys returned for this study. This is a 10.1% return ratio. About 230 surveys were sent out in the United States with a total of 52 total usable surveys. This was about a 23% return ratio. One of the main limitations of this study is the sample size. However, a total of 153 organizations were still surveyed between the countries. We would have preferred a larger ratio from both populations. Another limitation of this research was, the majority of United States companies surveyed were from a central geographical location representing the east coast of the United States. A more robust and varied pool of participants, including several regions of the U.S. would lend further credence to the results presented in this study. The categories of companies surveyed included:

- Software Development
- Telecommunications
- Banking
- Government Agencies
- Health Services
- Chemical
- Insurance

These companies had a range of employees numbering from as little as 100 to over 1,000. The surveys were aimed towards management-level IT professionals, with several years experience in information system related projects. Our responses generally came from either first line managers, project managers or senior level management. The organizations possessed IT departments or offices dedicated to the development and delivery of information systems related projects. We were particularly interested in comparing the two countries and identifying any new information that may be useful in describing and exploring additional factors related to IS failure, as well as any patterns and similarities between the groups and current literature on the subject.

In order to fully appreciate Table 1 presented later in this paper, a sample of the survey instrument and the response variables used to formulate the frequencies and percentages have been italicized and provided in parenthesis in Figure 1.

Survey Results from Australia and United States

Table 1 displays 24 total variables represented by nine questions. All variables ending with suffix 'A' on the left-hand side of the table represent Australia . The variables on the right-hand side represent the United States. For example, the first variable, '*POSTA*', represents the first question: '*Which choice best describes your current position in your organization*'. 76.8% of Australian respondents indicated they were first line managers. 74.5% of the United States respondents indicated they were senior level executives.

Figure 1: Sample of survey instrument

Name of Company: ______________________________

With reference to an IS project that you believe was less than successful:

1. **Which choice best describes your current position in your organization:** *(POST)*

1 ___ first line manager
2 ___ division director
3 ___ senior executive
4 ___ other

POST Position
This first question was asked of respondents to determine which level of management most accurately represented their position in the organization. The majority of those that participated were either senior managers or project managers.

2. **Please rank the factors that may have contributed to your IS project failure (1=most important)**

*(PA)*___Project Accountabilities

PA Project Accountabilities
Assigning a person or group of persons responsibility for an IS project provides a single point of contact for specific deliverables, requests and requirements. Whether or not this assignment of duties has an impact on IS project failure as suggested by some literature is worth examining.

*(EPE)*___Establishing Project Expectations

EPE Establishing Project Expectations
This variable category seeks to reflect the level at which respondents felt that instituting expectations from the *beginning* of the project was important to the final outcome.

*(RM)*___Risk Management

RM Risk Management
Risk is an inevitable part of any IS project. There are certain tasks which will inherently possess more risk than other tasks. How risk and other unforeseen events are addressed during the life of the project is a measurable variable.

*(PMP)*___ Project Management –Planning

PMP Project Management - Planning
This variable category is akin to the other project management activities with the exception of a specific focus upon the planning activities. Many decisions about the direction of an IS project, tasks to be performed, and other duties are conducted by a method that rely on the planning skills of the project manager. These specific day-to-day skills are important to capture.

*(PME)*___ Project Management –Execution

PME Project Management - Execution
This variable seeks to identify whether any *specific* actions from the project management activities impact IS project failure. There are many assignments and duties within project management which occur during the life cycle of a project. If there are any particular combinations of tasks that lead to IS project failure, they should be uncovered.

*(TPT)*___ The Project Team

TPT The Project Team
This variable category relates to the proper assembly of team members to achieve the IS project goals. The proper skill match and quantity of individuals working together on a team is a factor relevant in IS projects.

Figure 1: continued)

*(TA)*___ Technology Architecture

TA Technology Architecture

The architecture that is used to deliver the information system may be varied. Whether the processing power of the mainframe, or convenience and portability of a network based architecture is more appropriate will make a difference in terms of a successful outcome.

*CC*___ Corporate culture

CC Corporate Culture

This category was available as an option to respondents to determine whether corporate culture plays any role in IS project failure. Some organizations have a very low tolerance level for project failure, while others maintain a much higher level of tolerance. The culture of an organization often has significant impact into how IS projects are initiated and managed throughout their life cycle. This may also be described as the corporate environment.

(O) ___ Other factors (please cite:____________________)

O Other

This category simply represents any other potential variables not expressed by other categories which may have some effect on IS project failure.

3. Did you overrun your budget by: *(BUDGET)*

1___30-49%
2___50-100%
3___more than 100%
4___ did not overrun our budget

BUDGET

This question sought to determine how often organizations exceed their initial estimate for monetary funding for an IS project. Many studies have shown that most IS projects have a difficult time remaining within the predetermined funding estimates. An effective allocation of funding is paramount for the project completion .

4. Did you overrun your schedule by: *(SCHED)*

1___30-49%
2___50-100%
3___more than 100%
4___did not overrun our schedule

SCHED

The question correlates with the BUDGET question mentioned earlier to determine how often organizations extend beyond their scheduling timeframe. It is not uncommon for a project that is over budget to also be beyond the initial time frame estimated for completion.

5. **The most important risks NOT addressed as part of the project planning process were:** *(RISK)*

1___Slippage from the schedule
2___Change in scope of technology, functionality, or business case
3___Cost overruns associated with one or more project components
4___Change in any key individuals
5___Other factors (please cite: _____ ____________________)

Figure 1: continued

RISK

This question was concerned with learning more about some of the potential items that were **not** addressed in terms of risk in project planning. Those intimately involved in the details of the project or management and of the day to day tasks would likely have an idea of the risk factors here.

6. The most common deficiencies in the project plans were: *(DEFICI)*

1 ___Incorrectly estimating durations
2 ___Incorrect assumptions regarding resource availability
3 ___Inadequate assignment of activity accountabilities
4 ___Missing or incomplete review and approval activities
5 ___Other factors (please cite:____________________)

DEFICI

Once a project plan has been developed, it is possible to have deficiencies that will cause delay and even failure. Recognizing the areas in a project plan that may require additional clarification, modification, and input is a worthwhile task. The project plan can be compared to a road map, or compass. If it is wrong, disastrous results may occur.

7. **The most likely factors that caused a weak business case were:** *(CASE)*

1___Business and operational changes needed to deliver the benefits
2___Not clearly understood deliverables
3___Not being able to quantify costs and benefits
4___Overall scope of project
5___Not properly assessing business and technology risks
6 ___Other factors (please cite:______________________)

CASE

This question sought additional insight into any factors which may have contributed to a weak business case. A key factor in implementing a successful IS project encompasses the use of technology to deliver business functions, and not the utilization of the technology solely because it is available in the market. Technology should be viewed as the mechanism or tool to deliver the business functions to the intended audience.

8. **Please rank (1=most important) your IS project success criteria:**

*(UI)*___ User involvement

UI User Involvement

The end users of the system need to be involved each step of the way in the development of an IS project. We wanted to learn how many of our respondents attribute the **lack** of user involvement as a factor in IS project failure.

*(EMS)*___ Executive Management Support

EMS Executive Management Support

Much of the background literature on IS project failure suggests that involvement, or lack thereof, by upper level management is a variable that should be available with any surveyed population.

*(CSR)*___ Clear Statement of Requirements

CSR Clear statement of requirements

Understanding the expectations and desired output from an IS project must come from somewhere, whether it be a group of users, or individual. Whatever the source, a statement of requirements is necessary to guide the IS project team toward the delivery of the desired information system. As a result, a clear statement of requirements is analogous to a set of instructions or requests that must be incorporated into the final version of the system.

Figure 1: continued

*(PP)*___ Proper planning

PP Proper Planning

There is an old adage which states: *If you fail to plan, you are planning to fail.* The importance of a comprehensive plan for an IS project rivals the requirement of competent staffing. This variable represents a more general and high-level view of planning than the specific activities described earlier. Planning is the method by which individual and group responsibilities are carried out. It is the process of setting objectives and determining what should be done to accomplish them (Shermerhorn, 1989).

Shermerhorn (1989) also describes planning as entailing three functions:

Forward thinking: Through planning, managers decide what to do and how before it must actually be done.

Decision making: Planning involves making decisions that identify desired future states of affairs, and define the actions required to achieve them.

Goal oriented: Planning targets activities needed to accomplish objectives and arrive at a desired end result.

This item in particular is concerned with the general high-level plan for the IS project. This is different from the project management planning or execution mentioned earlier. All of these items are part of the skill set IS project managers need during project planning.

*(RE)*___ Realistic Expectations

RE Realistic Expectations

An important part of any IS project is establishing expectations of the final system. This is especially important for the end users, or customers. Ultimately, the end users will determine whether or not the project meets their needs and is successful.

They should receive a system with functionality they expected from the initial system requirements.

*(SPM)*___ Smaller Project Milestones

SPM Smaller Project Milestones

The idea of achieving minor goals or milestones during the progression of a large-scale IS project may be a key impetus which contributes to the final product. After a series of milestones are completed, they, in fact, make up the large scale product.

*(CS)*___Competent Staff

CS Competent Staff

The importance of capable and skilled staff certainly would seem to have an impact on the success or failure of an IS project. Properly staffing an IS project with the correct level of skilled professionals and mix of talents may be the single most important variable relating to an IS project. This begins with the project manager and includes designers, programmers, users, validates and any other pertinent individuals, which are a part of the project team.

(CV) ___ Clear Vision and Objectives

CV Clear Vision

Vision in our case is the ability to see the unseen. Before any code is written or pilots initiated, someone should have a vision of the finished product and how to progress in a direction that will lead to that vision. The ability to guide others into seeing this vision is a skill widely sought in IS project management. Without a clear vision and the correct individual to communicate it to the remaining members of the team, the project may be in danger of stalling.

Figure 1: continued

(*HW*)___ Hard-Working, Focused Staff

HW Hard Working

Often times dedicated, determined and hard working employees can make the key difference between IS project success and failure. Of those organizations taking part in the survey, we wanted to identify how many thought that hard working, or focused staff made the difference between IS project success and failure.

(*O*)___ Other Factors (please cite:____________________)

O Other

This category simply represents any other potential variables not expressed by other categories which may have some effect on IS project failure.

9. **What could you have done differently to minimize the risk of project failure?**____________________

This question allows participants to include free form text describing any measures or steps they think they could have done differently to reduce project failure.

DISCUSSION

The United States and Australia are both industrialized nations with many private companies and public organizations engaged in information technology-related initiatives. The penchant for employing IS to realize strategic goals and take advantage of business opportunities is expected by many to continue. Some of the results presented in this survey reinforce current and past literature regarding factors that influence IS project failure. For example, the importance of user involvement and executive management involvement was cited by both groups as the most important success criterion in information systems projects. Australian respondents reported that at least a third of their information system projects were between 30% and 49% over budget, while the United States respondents reported only 23.1% of projects being 30% to 49% over budget. Both groups reported that change in scope of technology, change in key individuals and slippage in schedule were the major items **not** addressed as part of the project planning process. The Australian respondents were more concerned with establishing project expectations from the beginning of an IS project, while the US participants placed a premium on the planning process. One interesting piece of information which stands out from the U.S. participants is the fact that they reported over 50% of their IS projects **do not** run over budget, and that almost 33% do not run beyond the initial schedule. This contradicts the widely held notion that a majority of IS projects run over budget and beyond schedule. In fact, budget and schedule are two items often cited as primary causes for IS project failure by IT professionals. As evidenced by the results, many of the other variables captured and measured by the two groups in this study were statistically similar. Exploring the key differences between the two groups and perhaps other industrialized nations regarding significant factors impacting IS project failure are worth further study. The difference in perception of project failure between the two groups could be the result of cultural differences between the populations. A small sample survey from Great Britain was also performed as part of this study. The return ratio was not large enough to provide any general information about IS project failure in that country.

CONCLUSION

IS project failure can ultimately lead to success **if** it provides insight, and novel ways of thinking about a problem for members of the project team, and members of management ranks. How often have we learned lessons in the IT arena that served as invaluable experience and a framework for our next project or challenge? Glass in the November 1999 issue of *Communications of the ACM* alludes to this point in a review in the *Journal of Systems and Software* by Kurt Linberg. Lindberg confronted software developers on a failed project asking for viewpoints on the project. Even though the project was a failure, participants described it as one of the **most successful** they had been involved with. This sentiment may be echoed by the responses of the U.S. participants in this study. The criteria for a successful project involves more than resources such as scheduling and budget. The US participants are including other IS project factors, which offset the loss of other, more identifiable resources.

It may be particularly useful to examine why individuals on a project team or within a company label an IS project a success when it appears on the surface to be a failure. Is this solely a question of perception, or is there more to this concept than meets the eye? As suggested in the Glass (1999) article, participants in the Linberg study felt the failed project was a success for three reasons. The first was because the software eventually worked the way it was designed. Often times, the initial budget and time estimates are inadequate when an IS project begins. While it is paramount for CIOs and others in leadership ranks of the organization to demand excellence and

Table 1: Percentage representation of responses for Australia and the United States

Australia *Variable*		**United States** *Variable*	
POSTA	**PERCENT**	**POSTU**	**PERCENT**
First Line Manager	76.8	First Line Manager	2.0
Division/Office Director	11.6	Division/Office Director	9.8
Senior Executive	10.5	Senior Executive	74.5
Other	1.1	Other	13.7
PAA	**PERCENT**	**PAU**	**PERCENT**
Project Accountabilities	17	Project Accountabilities	11
EPEA	**PERCENT**	**EPEU**	**PERCENT**
Establishing Project Expectations	24	Establishing Project Expectations	11
RMA	**PERCENT**	**RMU**	**PERCENT**
RISK MANAGEMENT	1	RISK MANAGEMENT	5
PMPA	**PERCENT**	**PMPU**	**PERCENT**
PROJECT MANAGEMENT PLANNING	14	PROJECT MANAGEMENT PLANNING	36
PMEA	**PERCENT**	**PMEU**	**PERCENT**
PROJECT MANAGEMENT EXECUTION	5	PROJECT MANAGEMENT EXECUTION	10
TPTA	**PERCENT**	**TPTU**	**PERCENT**
THE PROJECT TEAM	4	THE PROJECT TEAM	7
TAA	**PERCENT**	**TAU**	**PERCENT**
TECHNOLOGY ARCHITECTURE	3	TECHNOLOGY ARCHITECTURE	5
CCA	**PERCENT**	**CCU**	**PERCENT**
CORPORATE CULTURE	17	CORPORATE CULTURE	6
OA	**PERCENT**	**OU**	**PERCENT**
OTHER	15	OTHER	9
BUDGETA	**PERCENT**	**BUDGETU**	**PERCENT**
30-49%	31.6	30-49%	23.1
50-100%	21.1	50-100%	21.2
More than 100%	10.5	More than 100%	3.8
Did not run over budget	36.8	Did not run over budget	51.9
SCHEDA	**PERCENT**	**SCHEDU**	**PERCENT**
30-49%	38.2	30-49%	38.5
50-100%	19.6	50-100%	26.9
More than 100%	21.6	More than 100%	1.9
Did not overrun schedule	20.6	Did not overrun schedule	32.7

Table 1: continued

Australia *Variable*		United States *Variable*	
RISKA	**PERCENT**	**RISKU**	**PERCENT**
Slippage from the schedule	18.0	Slippage from the schedule	11.5
Change in scope of technology functionality or business case	48.0	Change in scope of technology functionality or business case	61.5
Cost overruns associated with one or more project components	7.0	Cost overruns associated with one or more project components	7.7
Change in any key individuals	15.0	Change in any key individuals	13.5
Other factors	12.0	Other factors	5.8
DEFICIA	**PERCENT**	**DEFICIU**	**PERCENT**
Incorrectly estimating activity durations	40.4	Incorrectly estimating activity durations	36.5
Incorrect assumption regarding resource availability	28.3	Incorrect assumptions regarding resource availability	23.1
Inadequate assignment of activity accountabilities	13.1	Inadequate assignment of activity accountabilities	17.3
Missing or incomplete review and approval activities	9.1	Missing or incomplete review and approval activities	11.5
Other factors	9.1	Other factors	11.5
CASEA	**PERCENT**	**CASEU**	**PERCENT**
Business and operational changes needed to deliver benefits	25.6	Business and operational changes needed to deliver benefits	21.1
Not being able to quantify costs and benefits	40.7	Not being able to quantify costs and benefits	32.7
Overall scope of project	14.0	Overall scope of project	23.1
Not properly assessing business and technology risks	11.6	Not properly assessing business and technology risks	9.6
Other	8.1	Other	13.5
UIA	**PERCENT**	**UIU**	**PERCENT**
USER INVOLVEMENT	23	USER INVOLVEMENT	31
EMSA	**PERCENT**	**EMSU**	**PERCENT**
EXECUTIVE MANAGEMENT SUPPORT	23	EXECUTIVE MANAGEMENT SUPPORT	17

Table 1: continued

Australia *Variable*		**United States** *Variable*	
CSRA	**PERCENT**	**CSRU**	**PERCENT**
CLEAR STATEMENT OF REQUIREMENTS	15	CLEAR STATEMENT OF REQUIREMENTS	17
PPA	**PERCENT**	**PPU**	**PERCENT**
PROPER PLANNING	7	PROPER PLANNING	12
REA	**PERCENT**	**REU**	**PERCENT**
REALISTIC EXPECTATIONS	6	REALISTIC EXPECTATIONS	8
SPMA	**PERCENT**	**SPMU**	**PERCENT**
SMALLER PROJECT MILESTONES	1	SMALLER PROJECT MILESTONES	1
CSA	**PERCENT**	**CSU**	**PERCENT**
COMPETENT STAFF	6	COMPETENT STAFF	1
CVA	**PERCENT**	**CVU**	**PERCENT**
CLEAR VISION	6	CLEAR VISION	10
O A	**PERCENT**	**OU**	**PERCENT**
OTHER	13	OTHER	3

innovation, a miscalculation in the amount of time and resources required to complete the project will usually lead to failure. The second reason participants did not consider the project a failure was because developing the system had been a technical challenge to them. Without struggle and challenge, many of the IT wonders we experience now would have been difficult to achieve, if not impossible. Many organizations, both private and public have used an IS project failure as a method to improve the next iteration or version of software or on a completely different project. The key point to be made with this notion is: *If you lose with an IS project, do not lose the lesson.* In the case of NASA, many of the challenges and failures endured allowed the agency to improve its craft to the point where space flight almost seems to be a common experience. The third reason why the IS project failure was not construed as a failure in the Lingberg study was because the team involved was small in nature and high performing. Not every IS failure can be labeled as a "failure", especially if lessons can be learned and applied. Unfortunately, when a company's resources are involved CIOs and other executives typically measure success in monetary or other tangible terms. It can perhaps be difficult and unpopular to quantify the value of an IS project that has failed. If an IS project is delivered on time, within budget and with all of the appropriate functionality it is by no means deemed a success. In the case of this study, IS project success is perhaps relative. Other factors such as lessons learned during the life of the IS project, a sense of accomplishment, and a technical challenge may be equally important in the definition of IS project failure.

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