

literature to create a comprehensive yet concise list of risk factors for ranking in the questionnaire: A purchased mailing list of 5,000 names from a project management magazine will provide for mass distribution of the questionnaire to IT project leaders, managers and analysts.

### OUTCOMES AND EXPECTED SIGNIFICANCE

The occurrence of virtual software projects will continue to increase as society becomes more global. Virtual software projects will not escape risk; therefore, project failures will occur. Researching and identifying those risk factors most critical to virtual software projects can improve risk management in this new arena. This research seeks to create a validated list of critical risks for virtual software projects that can be used by project leaders to reduce or eliminate risks.

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# How are the Impacts of End-User Application Development Managed? A Case Study of End-Users and Their Managers

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### PROBLEM STATEMENT

End User Computing (EUC) has now become prolific throughout business due to the decreased cost of the available PCs and the introduction of "easy-to-use" software application generators. The most often used definition of EUC is one which incorporates the facts that end user computing involves the interaction of managers, professionals and operational level users with application software within their own working departments (Torkzadeh & Doll, 1993).

The research undertaken over the past 25 years has been particularly in the areas of end-user satisfaction with information systems, end-user computing in general, end user application development, and the identification of who end-users are and the organisational areas which are affected by end-users (Rockart & Flannery, 1983; Brancheau & Brown, 1993; Powell & Moore, 2002) together with issues that impact on end-user development but little regarding how this can be addressed in the current technological environment.

Over this period there has been a significant change in the available technology (hardware and software), the introduction of technology into pre-tertiary education and a change in the information technology culture within organisations (Rockart & Flannery, 1983; Brancheau & Brown, 1993; McBride & Wood-Harper, 2002). The review of literature has shown that there is a need for continued research into these areas.

The research question to be investigated is: *How are the impacts of end-user application development managed?* The research to be undertaken will explore the changes in technology, use of technology and its impact on organisations. The specific questions that will be addressed are:

1. What are the impacts of end user application development on:
  - the end users;
  - the managers?
2. How are these impacts managed by
  - the end users;
  - the managers?

### LITERATURE SUPPORTING THE RESEARCH

In the 1970s computing was identified with mainframe computers however the introduction of PCs in the early 1980s lead to EUC being reported as '...a rapidly growing and irreversible phenomenon' (Alavi & Weiss, 1985, p6). Rockart and Flannery (1983, p777-778) identified six classifications of end-users dependent upon their function within the organisation. These classifications were:

- Non-programming end-user
- Command level end-user
- End-user programmers

- Functional support personnel
- End-user computing support personnel
- Data processing programmers.

These classifications expanded upon those defined by the Codasyl report (1979, cited in Cotterman & Kumar, 1989) by being more prescriptive with their definition of how the end-users interacted with the technology. Early researchers (eg Rockart & Flannery, 1983) reported on a producer/consumer dichotomy when it came to describing end-users whilst other researchers (Wetherbe & Leithseier, 1985 as cited in Cotterman & Kumar, 1989) reported on the comparison between the end-user operator and the end-user developer.

Leithseier and Wetherbe (1986) amended their research to include a third component, that of the amount of control that the manager or user has over the computer resources. Cotterman and Kumar (1989) developed taxonomy of end-users based upon this research. It was already apparent at this early stage in the research into end-user computing that some end-users (ie non-IS trained users) were undertaking some application development. It was identified in their paper that it is imperative to understand who the users are to ensure that each class of user is treated appropriately and that the relevant training, education and management approaches are used to assist them in their daily tasks.

In the early 1990s, Brancheau and Brown (1993, p439) defined end-user computing as the ‘adoption and use of information technology by personnel outside the information systems department to develop software applications in support of organisational tasks.’ Their paper concentrated on the research into the management issues related to end-user computing and uses the Rockart and Flannery (1983) classification of users as a basis for the research.

Brancheau and Brown (1993) summarised papers published on the issues related to management of end-user computing and mapped then into the model shown in Figure 1. Their findings outlined two possible areas that required future research: EUC as a component of organisational computing; and EUC as a social learning phenomenon. They identified that ‘failure to build on prior EUC research and failure to rely on theoretical knowledge accumulated in key reference disciplines have been major obstacles to furthering our understanding of EUC management’ (Brancheau & Brown, 1993, p 477).

Chan and Storey (1996, p119) identified that EUC is an ‘important part of organizational computing today’ and stated that ‘end-user computing was the autonomous use of information technology by knowledge workers outside the IS department’.

During the mid to late 1990s as much of the literature published dealt with similar issues that had previously been reported. Research into this area is, however, very much back on the agenda with many reviews of past research appearing in the last couple of years (eg Powell & Moore, 2002;

Govindarajulu, 2003) and the introduction of research into end-user use and development of applications using new technologies becoming apparent.

Anecdotally, the increased availability of PCs within organisations together with the increased level of computer literacy being taught during the primary and secondary education programs leads the candidate to believe that there are more ‘end-users’ in employment. The personal productivity tools (like Microsoft Office, Lotus Office, etc) are being marketed as being more user friendly leading end-users to become creative within their everyday working requirements. The, so-called, wizards are giving end-users more confidence with the software without having to understand the programming language on which the spreadsheet, database, web page or presentation is based.

Other key authors in this field have looked into managerial techniques (Gerrity & Rockart, 1986), EUC success (Doll & Torkzadeh, 1989), structured design approaches to reducing errors (Janvri & Morrison, 2000), user control of EUC (McBride & Wood-Harper, 2002), and EUC quality issues (McGill, 2002).

Gerrity and Rockart (1986, p25) identified that the ‘dramatic increase in end-user computing...offers major opportunities for businesses’. They also outlined that, although this ‘phenomenon’ was bringing some major advantages for the organisation, senior management need to avoid a technology-based management approach and adopt of business-driven management strategy which they describe as a ‘Managed-Free Economy’ approach.

The literature investigated by Brancheau and Brown (1993) and continued by Powell and Moore (2002) identified numerous areas where there are gaps in the current knowledge base of end-user computing. The research of Powell and Moore (2002, p15) provided a valuable view into these areas given the ‘more recent organizational and technological developments (such as advancements in communications technology, outsourcing of EUC support functions, and the globalisation of companies)’. The areas from the Brancheau and Brown model that have been identified as future research areas are:

- cultural antecedents;
- organisational strategy;
- effective and ineffective organisational management strategies,
- organisational technology issues relating to new technologies and the interconnectedness of applications;
- end-user environment relating to skills, tools used and tasks; and
- the outcome based relationship between end-user computing and organisational performance.

**RESEARCH QUESTIONS**

It is obviously above the scope of this thesis to investigate all of the above areas however the researcher will introduce new knowledge into the field of end-user computing by answering the questions identified earlier:

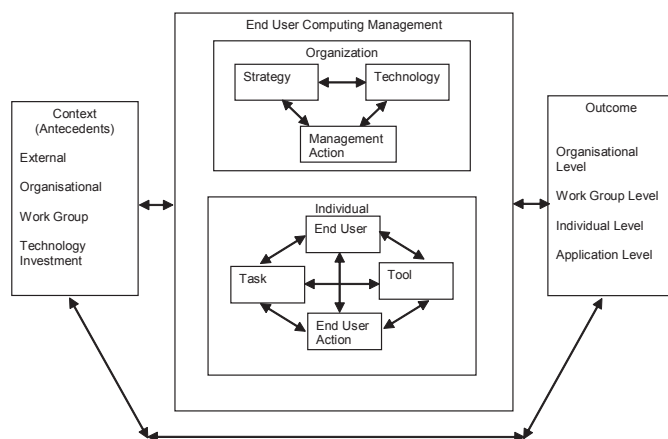
*What are the impacts of end user application development on the end users and their managers?*

The information obtained in response to this question will give insight into the outcomes of end-user computing relating to the relationship between end-user computing and organisational performance. It is important to understand this relationship as management strategies employed by an organisation have been influenced by the introduction of end-user computing and end-user application development (Gerrity & Rockart, 1986). By understanding the impacts of EUAD, organizations can be better equipped to control the issues and develop policies to work more efficiently and effectively within this end-user environment.

*How are the impacts managed by the end users and their managers?*

By investigating the issue of “what managers are doing” the knowledge area of organisational strategy and technology issues can be enhanced and updated as Powell and Moore (2002, p15) identified ‘...research needs to continue to examine how these factors relate to the practice and management of EUC in today’s environment’. The responses and information gathered here will help to determine the management approaches being undertaken and the success or failure of adopting such an approach. The personal experience of the researcher suggests that managers are utilising a Laissez-Faire approach to the management of the end-user developers and as such applications are being developed which are poor quality,

Figure 1. Model of the management of end-user computing (Brancheau & Brown, 1993, p441)



take significant time from the end-user's daily tasks and occasionally duplicate software applications already in use elsewhere in the organisation.

As part of the research some underlying issues will be identified. The main concentration will be on determining who the end users are in the organisation, what they do as part of the daily roles and what training, if any, they have been subjected to in order to enhance their end-user computing and end-user development skills.

It is important to note that all of this can be investigated but, as identified clearly by Cotterman and Kumar (1989), it is an essential part of any study into EUC that the users be clearly defined. To this end a thorough investigation of the Cotterman and Kumar model in terms of today's technology and user skill must be undertaken.

Many researchers have briefly looked at the strategies required to improve the end-user development of applications but to this point no researcher has investigated the implementation of these strategies and their impact on the individual and the organisation. The answer to this question will not only identify who the end-user developers are in the case organisations but also the tasks they are undertaking and the applications they are developing. By identifying issues such as cultural background and end-user environment it is expected that the researcher will develop an identification model to assist in the early detection of end-user developers giving direct line managers the capacity to implement management strategies more effectively.

#### TYPE OF STUDY

This study will be undertaken using an exploratory approach to investigate the questions posed by utilising a case study format. Qualitative research techniques of interview and focus group will be utilised in conjunction with an initial questionnaire to determine demographic and end-user classification information. The results of the qualitative and quantitative methods used will be analysed through an interpretive viewpoint. Interpretivism is 'concerned with approaches to the understanding of reality and asserting that all such knowledge is necessarily a social construction and thus subjective' (Walsham, 1993, p5). The interpretive approach can potentially 'produce deep insights into information systems phenomena' as it assists researchers in understanding 'human thought and action in social and organizational contexts' (Klein & Myers, 1999, p67).

Walsham (1993, p4-5) stated that interpretive methods of research are 'aimed at producing an understanding of the *context* of the information system, and the *process* whereby the information system influences and is influenced by its context'. The major criteria for being a case organisation in this study are that end-user application development happens to some extent within the organisation by at least two employees and that these employees report to a direct line manager. To analyse the impact of this development the most obvious approach will be to

investigate the *process* of the application development within the *context* of both the organisation and the end-user developer.

Brancheau and Brown (1993, p472) identified case studies would play an important part in the future research into EUC stating 'they are uniquely suited to open-ended, detailed investigation of EUC phenomena'. The case study approach has been identified as being one of the most appropriate methods for conducting Information Systems empirical research in the tradition of interpretation and generally involves the use of more than one case study in order to allow for comparison (Walsham, 1993). This approach will allow the researcher to investigate the impacts of end-user developed applications on the organisation by interviewing the users and their direct managers and thus developing a case based view of different organisations.

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# “...Some People Achieve Greatness...”: A Study Correlating Early Vocational Behaviour with Ultimate Vocational Achievement

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#### EXECUTIVE SUMMARY

Discovering the right people for the job, any job, is a complex, frustrating and often fruitless activity. In recruiting graduates, employers are not simply looking for someone to do a job, they are more likely seeking to take on candidates

who have the potential to rise to the highest ranks within organisations. They are seeking those candidates who, a decade hence, will be seen as high-achievers, but identifying such potential in fresh graduates has proven to be elusive. While the decision support role of Information Systems should be considerable

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