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MODELLING NEW SUCCESS CRITERIA FOR PROJECTS IN THE ICT INDUSTRY

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ABSTRACT

With spending for computer and networking hardware, software and services projected to exceed a trillion pounds by 2005, the potential for greater involvement of ICT in the creation of organisation wealth could be hampered by an extremely high rate of project failures in ICT industry projects. The poor performance of the ICT industry in deploying its products has been demonstrated in numerous press reports.

This paper reviews general knowledge on ICT project failure and proposes a hypothesis. The hypothesis states that "*the high rate of reported failures of ICT industry has been caused by the industry continuing to measure its success and failure rates based on in-appropriate criteria which fails to consider the industry's peculiar characteristics and the impact of ICT on organisational strategy*".

A model that demonstrates this definition is developed from available literature.

Keywords: Success Criteria, ICT Projects, Failure

1.0 INTRODUCTION

As business needs change and Information, Communication and Technology (ICT) develops in line with these changes, organisations maximising the use of new technologies have found themselves dealing with projects that are difficult and expensive to implement precisely because they are innovative. Based on the work by Oz (2003) and reports in the CIO magazine (CIO Magazine, 2001) which suggest that huge investments in IT have not necessarily lead to massive gains in organisational productivity. We argue that the delivery of innovative ICT is failing to meet user requirements or bring a return on investment. This is primarily due to the belief that time overruns within ICT projects have significantly increased. For example, statistics by the Standish Group shows that the number of ICT projects that have demonstrated significant time overrun's rose from 63% in 2000 to over 82% in 2003 (Standish Group, 2003).

ICT in organisations offers various services that can influence business relationships in any market (den Hengst and Sol, 2001). It can also provide a strategic value to all parts of the business in addition to supporting the administrative infrastructure of the organisation (Fellows, 2002, Magdaraog, 2003).

Therefore, although with a spending power, exceeding £1 trillion, the potential for greater involvement of ICT in the creation of organisation wealth has been hampered by an extremely high rate of project failures in projects within the ICT industry. This means that failure of an ICT project may have a great effect on the ability of an organisation to meet its business objectives (Carr, 2003).

From the available literature, it has been possible to identify various conflicting reasons that influence the failure of projects within the ICT industry. These factors include current ICT practices of not linking business value to technical functionality at the requirement definition stage, unresolved technical uncertainties and inadequate customer needs assessment.

The main issue highlighted in this study relates to the extent of these failures in ICT industry projects and how the measuring criteria for success are set. Work on establishing the need for such criteria has indeed been emphasised by Wateridge (1998; 1995), de Wit (1988) and Milis et al (2003) who suggest that the impact of the triple constraints on the judgement of success is rather small

2.0 ICT USES AND ITS CONTRIBUTION TO RESEARCH

In order to address this issue (modelling new success criteria for ICT industry projects), research objectives were identified. The first involved a brief re-examination of current literature on ICT project failures. We then attempted to establish a multi-dimensional definition of success and failure. The next step in the model building involved setting a single and non- prejudicial measurement criteria. The next objective of the research included establishing wider variance of project success. The final research objective was to highlight the need for an appropriate measure based on strategic measures of product success as against project success over time.

With projected spending exceeding £1 trillion in 2005, a new study, sponsored by Microsoft found that world-wide ICT spending grew by more than 10 percent annually during much of the past decade, a pace faster than the global economy overall. These results provide evidence that ICT is of significant and growing role in the global economy. The acceleration in investment in rapidly advancing technology-based projects has also coincided with growth in the ICT industry and specifically telecommunications performance (Goldsworthy Report, 1997).

New ICT industry projects have considerable potential to raise organisational economic performance. This means that good implementation of projects and product delivery can provide a platform for many other innovations that undoubtedly will lead to improved products and services. At the same time, these projects will have a pervasive economic effect on the organisation's ability to provide products and services. For successful projects in the ICT industry, contribution to organisational performance can come from its ability to reduce the costs of storing, accessing and exchanging information.

The question however remains, how do we know that our ICT projects are successful and are in fact delivering strategic requirements? This case is being made because we believe that the current state of knowledge on establishing measurement criteria for ICT project success has not substantially progressed from the work carried out by Wateridge (1998; 1995), Milis et al (2003), Fowler and Walsh (1999) and de Wit (1988). It is being suggested in this paper, that notwithstanding the work done by Fowler and Walsh, Wateridge, Milis et al, and de Wit, no directed effort has been made to establish the appropriate criteria for measuring how successful or not ICT industry projects really are.

3.0 ICT INDUSTRY PROJECTS, OVERVIEW AND INFLUENCES

As previously mentioned in section 1.0, changes in business needs change results in organisations having to deal with complicated ICT projects which are on the forefront of technological innovation. These large industry projects such as 3rd Generation mobile technology (3G) are becoming more time consuming, costly and resource demanding than those previously deployed (Ojiako, 2004). Unfortunately, whatever the technology base, the perception of ICT industry projects is that they always go on for longer, and end up with less required features and functions making it to the released product, than was originally specified for by the customers (Standish Group, 2003). Although in some cases these occurrences might be regarded as unavoidable symptoms of progress due to the high risk and volatility of ICT, there is no doubt that these failures are causing intense financial strain on resources (CIO Magazine. 01/06/00). This is especially true as project failures within the industry are being estimated to be as high as £500M annually (KPMG, 2003).

4.0 CURRENT DEFINITIONS AND CRITERIA FOR FAILURE IN ICT INDUSTRY PROJECTS

The nature of how ICT industry projects are implemented and the techniques to be used depend on various factors and features including existing knowledge and ongoing organisational learning (Orr and Day, 2004), the existence of appropriate management of project information (Ball, 2002) and good project leadership (Covvey and MacNeill, 2002). Other factors include political prioritisation (Howard, 2001), the complexity of the design (Lee. & Xia, 2002; McAfee, 2003) and technology being employed. Additional factors including the organisation's approach to risk, project timescales and funding available to the project also need to be considered.

Deployment and implementation of ICT industry projects are also not simply a matter of using a technology that works. According to Kuruppuarachchi et al (2002) it involves a process of organisational change that requires conscious management attention. To ensure project success, ICT projects should be deployed to meet a specific set of business requirements as well as technical requirements. This is because it is the business requirements such as the increase in efficiency and the reduction of operational and business costs which are

perceived by management to contribute to functional success in the organisation. Hence, the challenge of management is to ensure that these projects meet identified business objectives. At the same time, issues, which can threaten the project succeeding, are identified, isolated and managed (Shenhar et al, 2001).

So much of ICT business focus has concentrated on how profitable organisations need to be, yet many organisations are continuing to neglect the impact of poor project implementation on their business strategy. Unfortunately for the industry, this is happening even with substantial evidence (Oz, 2003; Singh and Byrne, 2005) indicating that there is little or no positive relationship between investment in ICT and overall financial performance of most organisations. What matters is not how much is being invested in these projects, but what the rate of expected return on investment is.

The question then emerges. What does project failure mean and why the high rate of failures in ICT industry projects?

Baker et al (1983) who recommended the use of time, cost and quality measures as criteria for project success first introduced current studies of project success and failure criteria in studies. Within ICT, popular definitions of project failure relate to either the inability of an information system, technology, or communication project to meet detailed stakeholder specification and requirement (Gilb, 2004). Project failure can also be defined as the failure of such projects to meet defined requirements for team dynamics, functionality requirements, end use requirements (Rae and Eden, 2002) and legal arrangements (Morris, P and Hough, 1987).

Table 1.0 is taken is taken from Ojiako (2004) and shows a cross selection of various critical success factors (CSF's) that affect projects.

From the above cross selection of various critical success factors (CSF's) that affect projects, it is clear that there is no single and clear statement on the definition of project failure. In addition, the perception of project failure and success is usually based on unspoken and personal prejudices especially as this definition is dependent on a particular organisation's criteria. In a way, this means that project failure can be regarded as a judgement and not necessarily an objective state. According to Rad and Levin (2002), this explains the reason why different stakeholders will provide varying interpretation on their criteria of project performance based upon different data and evaluation methods. The researcher believes that this indicates evidence of perhaps conflicting views on

Table 1: Cross Selection of CSF's

Authors	Drivers
Ewusi-Mensah, 199	Volatile group dynamics Requirements for intense collaboration between stakeholders The conceptual and high capital intensive nature
Holland et al, 1999	Lack of top management support.
Godber, 2005	Poor design
Applegate, 2002 Button, 1997	Not determining managerial approach and managers dealing with too many projects. Over-assigned development resources
Chan et al, 2004	and a lack of resource prediction
Ives et al, 1993	Long development cycles and the risk that gaps will emerge between the business strategy and the ICT system that it was designed to support, if the development cycle is too long.
Sarker and Lee, 2000	Lack of strong and committed leadership at the top management level.
Wood, 1991	Constantly changing business demand.
Zhang, 2005	Lack of efficient procurement methods.
Chan et al, 2004	Non establishment and communication of a conflict resolution strategies
Chan et al, 2004	Ambiguous and confusing definitions of project roles and responsibilities.
Prager and Overholt, 1994 Hildreth, 2003	Inadequate appreciation of business needs.
McKersie and Walton, 1991	Poor project structure
Scott-Morton, 1991 Wilcocks and Margetts, 1993	Failure of integration between the development process and the larger organisational system.
Lyytinen, 1988	Serious budget overruns

what is perceived as criteria for ICT project success. The existence of such ambiguity in the definition of project failure is regarded as the most significant reason why difficulties exist in any possible measurement in success or failure. The effect of this is that if such criteria are not clear, then it becomes difficult to focus efforts of the project on delivering products which can actually contribute to long term corporate success. Kodak's Project Orion provides an example of

such an occurrence within ICT. The new photographic system was reputedly very well managed from a project management perspective (it won the 1997 Project Management Institute (PMI) International Project of the Year). However, since its deployment, Kodak's stock price has fallen 67%, in part because it failed to anticipate the accelerating switch to digital photography (Bandler, 2003). The basic question still remains for ICT projects. How can success or failure be measured if a single definition on what constitutes failure or success does not exist?

5.0 BASIC CONSIDERATIONS WHEN MODELLING THE ICT SUCCESS CRITERIA CONCEPT

Consideration of project failure and success concepts has featured consistently in project management research since it was introduced by Rubin and Seeling (1967). However, according to research by Belassi and Tukel (1996), Keefer (2004) and DeLone et al (2005), the definition of project failure still suffers from not only ambiguity, but also from an inadequate conceptual clarity of what failure actually means. The definition of project failure also suffers from a realisation that perhaps it is necessary to consider other success criteria. This is being driven according to Atkinson (1999) by management's desire to adopt new strategies that might improve success rates such as improved methodologies and tools.

The basic research problem being addressed by this paper is *whether the high failure rate of projects within the ICT industry has been caused by the use of inappropriate measures of success criteria*. In order to address this, a few points are discussed.

The first point is to ensure that the meaning of success in an ICT industry project is well established. In order words, it is important to ensure that when we are referring to success, it is clear what is meant. The need for clarity in success definition is because project success is a multi-dimensional construct that inevitably means different things to different people (Wideman, 2000). As a concept it refers to the ability of a product or service to meet key objectives of the project which forms part of a larger strategic objective of the sponsoring organisation. Based on Pinto and Slevin's (1986) view on the complex notion of project success definitions, we believe that in order to ensure success in the ICT industry, projects should be deployed to meet a specific set of business requirements as well as technical requirements. This is because it is the business

requirements such as the increase in efficiency and the reduction of operational and business costs which are perceived by management to contribute to organisational success. Hence, the challenge of successfully deploying and implementing any such project is to ensure that the main business objectives that will be delivered have been identified.

Successful projects are expected to involve the project's customer and stakeholders community basing their criteria on satisfaction with the project's deliverables. As successful projects are closely linked to opportunity and risk it is necessary for a set of acceptance criteria to be set. It is also important to note that success criteria can change with time. This means that certain objectives if not achieved at a particular time do not necessarily mean that the project should be regarded as a failure. This is a key view expressed by Greer (1999), when discussing his three dimensions of project success.

The measure of project success, in terms of product, should be defined at the beginning of the project as a basis for any project management decision-making and post-project evaluation. Project success also needs to be defined in terms of the acceptability of the projects deliverables such as scope, time, cost, and efficiency. Hence, without agreement on the project's success criteria, it will not be possible to measure its success. Classical project management principles suggest that success and how it is measured after the project has been signed off does need to be defined at the beginning of the project especially as such criteria provide a continuous basis for management decisions during the course of the project.

The second point we raise relates to the confusion caused by ambiguities in the establishment of project success criteria. We believe that ambiguities in the establishment of project success criteria exist because there is no single and clearly established statement on what failure actually means, and therefore how can it be measured. Success and its criteria are also based on prejudices. It also lacks standards mainly because variables are categorised based on subjective assessment that relies heaving on judgements, perceptions and bias of stakeholders (ranging from project and product owners and sponsors to those who might be marginally and critically affected by the project) and other project participants. Due to the political nature of most projects (expected as substantial amount of organisational capital is spent on ICT), the definition of success criteria can involve varying interpretation, data and evaluation methods. One point to note is that because projects can be measured in varying degrees of success, based on varying perceptions, then no project is ever a complete failure

or success, especially when different participants see the outcome of the same project in different ways. It is highly unlikely that a project will fail in every single category it is measured or by every stakeholder involved in the project.

The third point we discuss relates to establishing the reasons for a perceived narrow variance of project success in the ICT industry. ICT projects are part of a business process that is expected to drive organisational performance. This can be achieved by reducing the costs of storing, accessing and exchanging information. This means that to meet their strategic objectives, ICT industry projects have criteria for success, which are tightly defined because specific design and business requirements have to be explicitly met. Usually, these business requirements are met by the delivery of narrowly defined technical functionality. A problem however emerges in that once the strategic need for such a product is no longer required or changes, then the product becomes redundant as in the case of numerous abandoned ICT projects including the MoD's Project Trawlerman (abandoned in 1993 with cost of over £41 million). Other abandoned mainly public sector projects include the Cabinet Office's £83m True North Datacentre project and the £250 million Blackberd electronic patient record project. Coupled that within the industry, the opportunity for product re-use although on the increase is quite limited (Jacobson et al, 1997; Mili et al, 2002), it makes the need for very precise requirements questionable.

We believe that specific design requirements will meet business objectives if the variance for success is narrow and tightly defined. In our opinion, this only happens because ICT product functionality is usually proved in test environments before live deployment. Unfortunately, as test environments are really never accurately replicated to mirror all live situations because of set up cost, the unfortunate scenario is that the same results obtained in a test environment will be manifested in live.

The fourth point that is discussed involves setting measures of success appropriate to the peculiarities of the industry. As mentioned earlier, current criteria for project success and failure criteria have been based primarily on standard time, cost and quality measures. The authors accept that to include only time, cost and quality specifications (measures traditionally associated with construction industry projects where competition has traditionally been based on a narrow checklist) is too simplistic for the ICT industry. This is because the ICT industry although being a service industry like construction, is used as a *driver* for organisational strategy and wealth creation. The construction industry on the other hand is usually regarded as being *driven* by organisational strategy.

What is then required for the ICT industry is a definition of project success or failure, which includes measures of project success linked to *product* delivery and organisational strategy.

Establishing measures of success appropriate to the ICT industry should also be expanded to cover consideration of ICT industry peculiarities and the role of strategy. There is also a need to ensure that the project delivers a product that is linked to *stated* strategic objectives of the business. We believe that current measures of success have so far failed to consider the peculiar characteristics of the industry such as its focus on dynamic technology and constant innovation. Such characteristics mean that the emphasis of what is important to a project and how it is measured changes over time and from one phase to another. In other words, there is a constant need for change in when and how success is measured. This would suggest that it is probably appropriate to set up criteria for measuring a project, define its objectives, and then carry out an assessment against the project's achievement.

As project success and failure can only be measured by considering whether the project has met various objectives set for each phase of the project, such measures cannot realistically be expected to happen at the beginning of the project. Rather, it is our opinion that these measures need to be set at the beginning of each *project phase* but measured at the end (of each project phase).

The final and perhaps most important point that has emerged in our research involves examining the concept of product as against project success. Specifically, we believe that there is a constant and unconscious confusion between project objectives and product success.

We agree with de Wit's (1988) suggestion that the measurement of project success is an illusion. As a result, we believe that what continues to happen is that project progress is measured and then incorrectly referred to it as project success. Project success or failure is usually measured by considering whether the project has met various objectives set for each project phase at the end of the project phase. Such measures are for project progress as against success. On the other hand, it is successful progress in a project that ensures that a product is delivered to the established progress criteria. How successful or not a product is can then be measured at various strategic phases of the product lifecycle. What this implies is that because measures for strategic success of the product need to be set over the entire life of the product, initial assessments of these

measures are subject to projections of future criteria. In other words, success criteria must be dynamic and flexible in order to be aligned to constantly changing strategic priorities of most ICT companies.

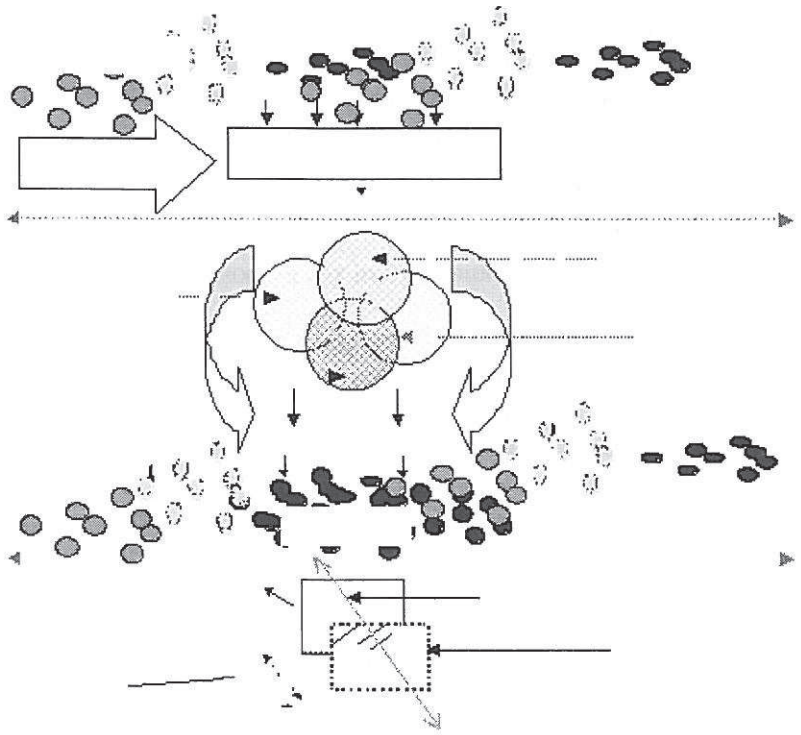

Figure 1: ICT Success Criteria Model

6.0 MODELLING THE ICT SUCCESS CRITERIA CONCEPT

The relationships that exist within the ICT success criteria concept is demonstrated in the ICT success criteria model (see Figure 1, above). The relationships are simple and flexible. By detailing these relationships, we have sought to ensure that the model finds ready resonance with the available literature on success criteria. The model is robust and can be summarised as being based on strategic measures of product success as against project success over time. The model is divided into three phases, which are described below.

The first part of the model demonstrates an acceptance that numerous and generic critical success factors (CSF's) affect ICT projects. In addition, it proposes that most ICT projects utilise generic project management methodologies for their deployment and implementation. This proposition is supported by avaliable literature detailed in table 1.0.

In the second part of the model, we re-enforce current measures of project progress based on time, cost and quality assessments. We also refer to the role of stakeholder perceptions in assessing project progress. The third phase introduces new success criteria for ICT projects which is measured by assessing achieved strategic objectives of ICT products as against what was required initially.

The model is based on the integration of four key propositions being put forward. These include:

a) Within the ICT industry, the definition of project failure still suffers not only from ambiguity, but also from an inadequate conceptual clarity of what failure actually means.

b) In order to ensure success in the ICT industry, projects should be deployed to meet a specific set of business requirements as well as technical requirements.

c) Because of their link to organisational success, ICT projects generally have a narrow variance of acceptability.

d) Assessing ICT projects on the basis of time, cost and quality is too simplistic for the ICT industry. ICT project measure should be based on how the strategic objectives of the product being delivered are achieved over the life span of the product.

7.0 FUTURE ENHANCEMENTS AND THE NEED FOR ITS VALIDATION

Although we have been able to put forward an ICT success model, it is clear that the model does exhibit some limitations which include:

- The research was deliberately limited to assessing project failure from only standard measures that includes considerations of time, cost and

quality. No attempt was made to assess the impact of other CSF's on project outcomes.

- Secondly, the model was developed for analytical purposes with differing characteristics regarded as constants. This meant that the general principle that all projects are different since they differ in scope, location, size, time, and location was ignored. The impact of these differing environmental factors on the research results has not been substantiated.

In order to address the above limitations, a future enhancement of the model based on a validation process is required. The proposals for the model validation is regarded as particularly important because it will not only increase the performance and reliability of the model, but also because it will test how well the model will serve its intended purpose i.e. of modelling the success criteria for ICT projects. Validation is also expected to promote enhancements of the model and to provide a clearer understanding of the model's strengths and weaknesses among management and future user groups. It is expected that future improvement of this model will concentrate on its simplification especially as the model might be regarded as too abstract for non-specialists to understand the underlying theory. The expectation is that the proposed exercises will transform the model into a more applicable decision-making tool, without disguising its inevitable limitations.

8.0 CONCLUSIONS AND CONTRIBUTIONS TO KNOWLEDGE

Generally speaking, since there is no clear-cut method of measuring success and failure, project failure is a difficult issue to discuss. Research on project success indicates that it is impossible to generate a universal checklist of project success criteria suitable for all projects. Success (or failure) criteria will differ from project to project depending on a number of factors including size, uniqueness, industry, complexity and the stakeholders involved. This means that it is difficult to see any advantage the ICT industry will draw on if it decides to adopt simplified success criteria (based on time, cost and quality measures alone). This does not mean that ICT project managers need to limit their objectives to meeting strategy objectives to the detriment of cost, time and quality criteria that the customers will demand. In fact there is one point which has to be firmly established. What really matters is whether the clients' or customers' strategic objectives are achieved. In fact to some extent, other stakeholders' point of view might simply be irrelevant (although welcomed).

The bottom line is that the customer needs to be satisfied that the product meets his overall strategic objective. Without this happening, the project process (that delivers the product) will cease to be supported. If this happens, the project is a failure. For the ICT project manager, this key issue needs to be taken into consideration when measuring project performance. On a more practical level, the major contribution of this work is that it has sought to introduce the need for a more appropriate measure of ICT projects. Such measurements should be based on an approach that separates project progress measurement and product success criteria, all within the context of the strategic objectives of the ICT *product* over time.

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