Managing B2B eCommerce: A Project Management Approach

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Abstract:
Despite the significant literature in strategic I.S. planning and software project management, less is known about the issues involved in developing eCommerce projects. This paper introduces a new strategy for managing business-to-business (B2B) eCommerce projects. We identify the specific needs of eCommerce application development and show how 'traditional' project management techniques can be modified to optimise the creation and implementation of e-commerce applications, making use of a real-world case study of an eCommerce pioneer to highlight the issues under discussion. We argue that the suggested approach enables not only the more effective development of such projects, but also improves their chances for success, while being more cost-effective and transparent.

Keywords:
B2B, eCommerce, Project management, Process model, Information Systems

1. INTRODUCTION

As any project manager knows, getting involved in IS projects can be a bleak experience. Research by the Standish Group has shown that more than 40% of projects are cancelled before completion and 33% of the remaining projects face overrun in time or budget (the "software crisis"). As more and more IS developments move onto the World Wide Web (the Web) the implementation and management of eCommerce projects becomes an increasingly important part of any software project manager's role. E-Commerce developments are amongst the most challenging of all software projects because of their integrated and inter-organisational nature – as well as their faster development cycle time – and there is a pressing need to find an effective strategy to deal with this problem [21, 24, 25]. The many differences existing between "traditional" software projects and eCommerce projects make it clear that there is a need for a paradigm shift away from the traditional techniques for IS implementation [16] towards alternate management principles.

B2B eCommerce is an integrated information system used by two or more participant organisations [28] which agree to exchange their business information and processes electronically. In the earliest days of inter-organisational systems (IOS), relationships tended to exist primarily between long-term partners (usually suppliers and customers), although the rise of Internet-based eCommerce has led to the development of a wider variety of eCommerce relationships, of which the two major types are business-to-business (B2B) and business-to-consumer (B2C)[1]. While both these eCommerce types are important and evolving, this paper focuses on B2B eCommerce, which represents over 80% of all eCommerce [23] and provides significant benefits such as reduced order cycle times, and reductions in clerical errors and inventory, as well as more strategic benefits such as closer relationships with customers.

Chan and Swatman [5, 6, 7, 8, 9] suggest that success in implementing B2B eCommerce projects depends to a very large extent on the way the organisation handles the implementation. These authors believe that factors such as organisational attitudes and the business context are just as important as rapidly changing technology in terms of the directions taken during the implementation process. They note that the process of B2B eCommerce implementation, in particular, is evolutionary rather than revolutionary – and is dependent upon dynamic changes in both the implementing organisations themselves, and in the technology and applications used by these organisations. This dynamic, 'network' approach can be contrasted with traditional project management, which is often looked upon as a series of sequential tasks to be finished consecutively, rather than being planned and worked on in a continuing and dynamic way.

This paper discusses the appropriateness of project management theories currently used in traditional IS implementation for the management of B2B eCommerce implementation. We initially describe the characteristics of B2B eCommerce projects and make use of the case of a major B2B eCommerce

[1] *Government-to-Business (G2B) and Government-to-Citizen (G2C) relationships are subsumed within the B2B and B2C eCommerce sub-types in this paper for ease for discussion.*

implementation to highlight the multi-project nature of the activities involved. We then propose a new approach to managing B2B eCommerce projects, arguing that this synthesised approach can lead to better handling of B2B implementations.

2. PLANNING AND MANAGING B2B E-COMMERCE PROJECTS

One of the issues which are only just beginning to attract attention from authors in the eCommerce domain is the planning process for information systems. Three critical factors have been suggested as contributors to successful planning (though not necessarily always in relation to eCommerce systems):

- Management involvement [17, 12, 6, 7, 8] ;
- A broader view of the approaches used [11, 18];
- The alignment of the project planning with the organisation's overall strategic planning [14, 18, 37, 15].

While these factors are widely recognised in the planning process, they are often neglected in the implementation process itself. In many ways, managing B2B eCommerce projects is similar to managing any other type of project, such as building a bridge, with the result that many of the recognised project management principles can be applied to this 'special case' of system project. B2B projects, however, have characteristic requirements which evolve from the specific nature of eCommerce and which require consideration over and above these 'traditional' project management concerns.

Kulik and Samuelsen [24] have identified 3 categories of eCommerce projects:

A Dynamic Business and Technology Environment

"Internet technology today is like having a 2,000-piece Lego set and no instruction manual, with pieces continuously morphing into new shapes"[22]. The eCommerce project team members must constantly learn new technologies and tools – and the need to deal with new and rapidly-evolving business models during the project's life-time imposes continuous change during the implementation process.

Research-Like

Research projects frequently carry high risk factors. eCommerce projects can be seen to fall within the category of research projects because of the continuous changes which occur in the project environment. Such situations dictate "loose" project management to adapt to environmental change.

Mission Critical

Although eCommerce projects are research-like in nature, their implementation becomes more complex when they are also required to be of high quality and to have minimal defects. In these situations their integration with other business applications involves both internal and external linkages and constitutes a critical success factor for the business's ability to compete effectively.

These three characteristics suggest that managing a B2B eCommerce project may be (and often is) more complex than managing other types of IS project.

We therefore chose to take a closer look at those issues which have a significant impact on the success of B2B eCommerce projects and on the way in which they are managed – bearing in mind that, by definition, B2B eCommerce relates to more than a single business. Table 1 summarises these issues.

These characteristics are not mentioned in the Strategic Information Systems Planning (SISP) literature. Although SISP has a solid pedigree and can boast a wide literature and exemplary base, its application to eCommerce is still in its early stages – possibly because, as Finnegan *et al.* [15] suggest, this is still a relatively new field. However, these authors believe that empirical data are needed to avoid problems associated with developing guidelines for IOS implementation based exclusively on intra-organisational system examples. They believe that organisations currently investing in IOS tend to implement a system on an *ad hoc* basis without adequate planning – and those few organisations involved in IOS which do make use of IS planning techniques usually rely on traditional IS planning approaches such as McFarlan and McKenney's [32] strategic grid.

Applegate *et al.* [1 extend this concern, noting that an information technology planning approach which is suitable at one time may not be suitable for another time when the position of the company in the grid has changed. In terms of eCommerce implementation, Plant [33] believes that organisations implementing eCommerce must be agile in their eCommerce strategy. He suggests that seven key drivers of change (see *fig* 1) influence the development of the eCommerce strategy; and that adjustment to that strategy may be necessary in accommodating these drivers.

Figure 1: The seven key drivers for change [33]

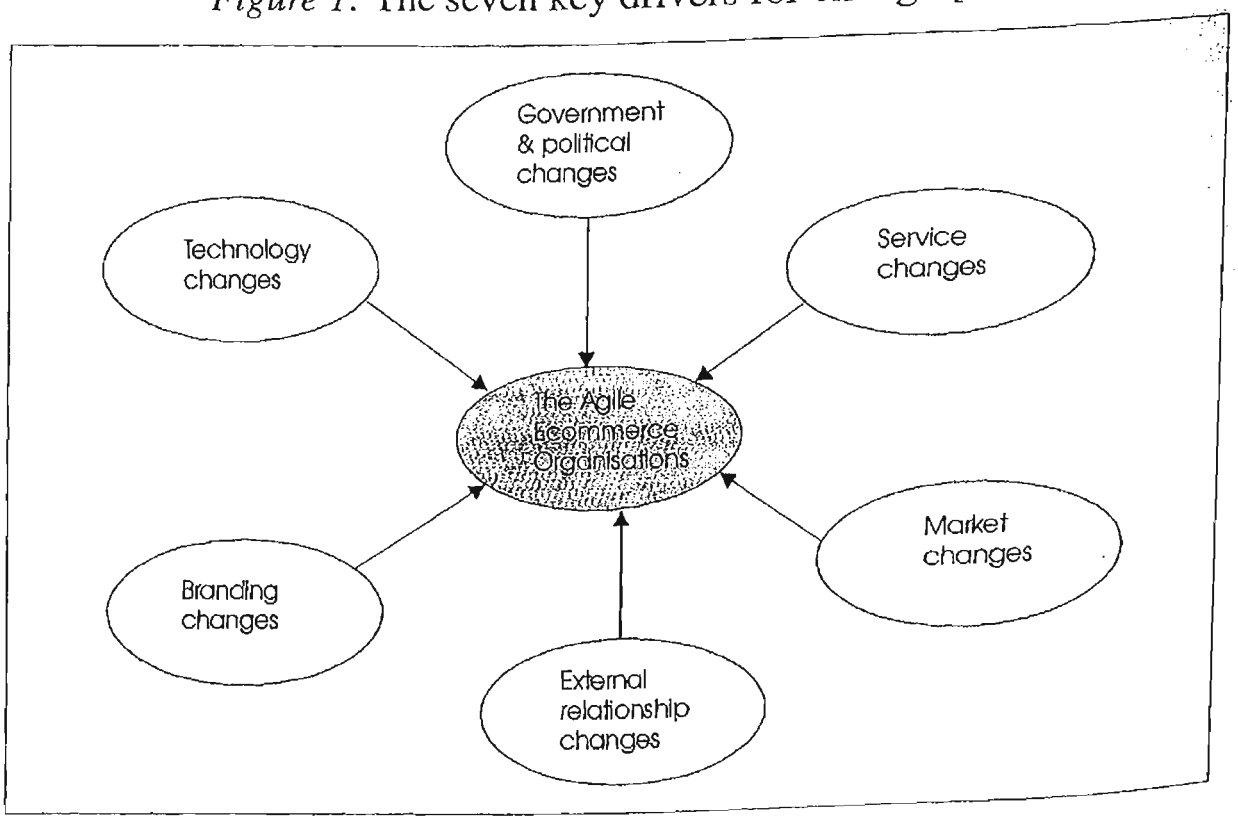


Table 1: B2B eCommerce project issues and management approaches

Factors affecting B2B eCommerce project success	Ways of managing B2B eCommerce project success factors
Project size	Traditional IS projects are relatively large software size in terms of lines of code, function points, use cases etc. With B2B eCommerce projects this size can vary considerably, depending on actual demand. Carney [3] also notes that the frequency of releases and the total number of cycles within eCommerce Projects tend to be considerably greater than in 'traditional' projects.
Business exposure and usability	B2B eCommerce projects necessarily cause a business to expose details of the organisation to the outside world, because of the requirement for increased interaction with related trading partners. This requires an early involvement by all relevant parties with the project [21], resulting in an increased iterations because of the need to develop the most appropriate and best possible interface.
Project management	Closely associated with Business Exposure and Usability, B2B eCommerce projects require a high level of management involvement to formulate new business strategies for the business environment.
Outsourcing	B2B eCommerce project skills are rarely internally acquired by an organisation, and are generally only needed for a relatively short period of time during implementation, necessitating outsourcing [21]. Raths [33] rightly argues, however, that the project management itself should not be outsourced because of the essential internal knowledge required.
Business processes	It is possible for an eCommerce project to trigger dramatic changes in business strategy, with consequent changes to associated business processes. While this is not unique to eCommerce projects, these changes usually necessitate direct inter-organisational links which, in turn, require recurrent business process reengineering [43].
Technology impact	The technology impact of B2B eCommerce projects is far greater than that of traditional IT projects. This wide integration of technology and the need to deal with unproven technology adds great complexity compared to traditional IT projects [38].
Implementation speed	B2B projects, while not as speed-dependent as B2C projects, still require greater speed than the majority of 'traditional' IT projects, to maintain a competitive advantage. Because the application might be up and running while many parts are still at the discovery stage, planning is vital to decide which functions are core and which can be added later.
The B2B eCommerce project team	The combination of adopting new technologies, while at the same time developing business strategies, requires new skills. Since team members are frequently very young (particularly those involved in the technical side of the implementation), it is even more important to focus on effective collaboration and communication within B2B eCommerce projects.

3. B2B ECOMMERCE PROJECT MANAGEMENT IN PRACTICE – BHP STEEL

We can see how these theoretical views of the differences between 'traditional' and eCommerce project implementation work most effectively by taking a real-world case example. A long-term study of a major Australian eCommerce innovator, BHP Steel, provides us with a particularly good opportunity to gain insight into eCommerce strategy development (see [8] for a detailed description of the BHP Steel case).

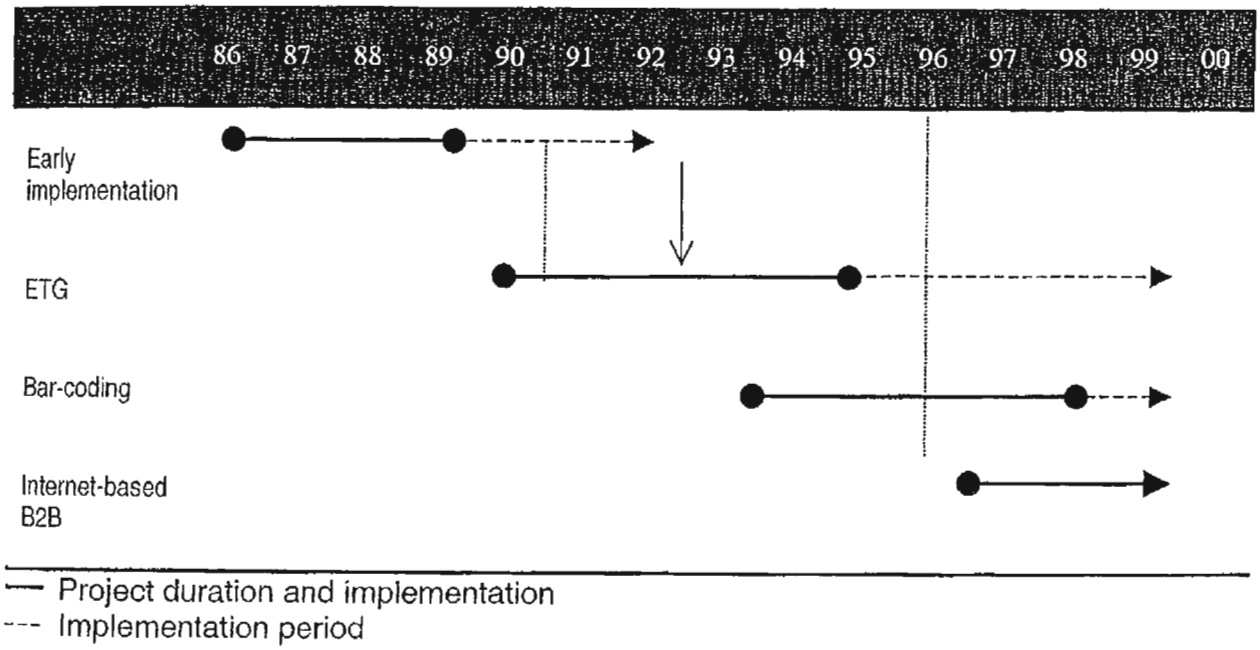
BHP Steel, a subsidiary of the giant BHP group and itself one of Australia's largest companies, was a pioneer in the use of eCommerce both within the organisation and across corporate boundaries (inter-group and inter-organisationally). The original concept of an electronic purchasing system arose from the level of competition existing within the steel industry. This concept was translated into a prototype system, which was initially developed in-house and then tested during a pilot implementation stage. Starting with only one electronic document, a purchase order, the initiative was expanded to include a number of business documents (order-status requests, requests for inspection, and despatch advices). In about eight months, the number of trading partners showed a consistent increase from the initial 12 suppliers to a total of 96 suppliers, which formed the largest trading network in Australia. After three years of operation, the electronic supply system was merged into a more sophisticated eCommerce system, the electronic trading gateway (ETG). A further enhancement of the ETG involved the use of bar-coding of steel products and the integration of this automated data capture with the eCommerce software. The growing popularity of the Web led to the development of a fourth eCommerce implementation which provided much of the ETG's functionality for smaller customers and suppliers via a Web-based interface.

As *fig* 2 makes clear, these four eCommerce implementations were each treated as an entirely separate project and managed independently of one another.

1. **Early implementation** was the first eCommerce project in the organisation, starting in 1986 and ending in 1992, when this project was merged with the later company-wide EDI project known as the Electronic Trading Gateway (ETG).
2. **The Electronic Trading Gateway (ETG)** was the largest eCommerce project implemented by BHP Steel, in terms of both efforts and resources. It commenced in 1989-1990 when the early implementation had already been running for some time. Formally, this project ended at the end of 1994, but the diffusion and expansion of this initiative continues with new applications, documents and business units, as well as trading partners, still being added.
3. **The Bar-coding project** was introduced after an extensive study undertaken in 1993, which suggested that compounded benefits could be achieved through the integration of EDI and bar-coding.

4. An **Internet-based eCommerce project** commenced in 1996 with the widespread commercial use of the Internet. Starting from a pilot implementation with some of the company's closest trading partners, further development of this internet-based initiative is on-going.

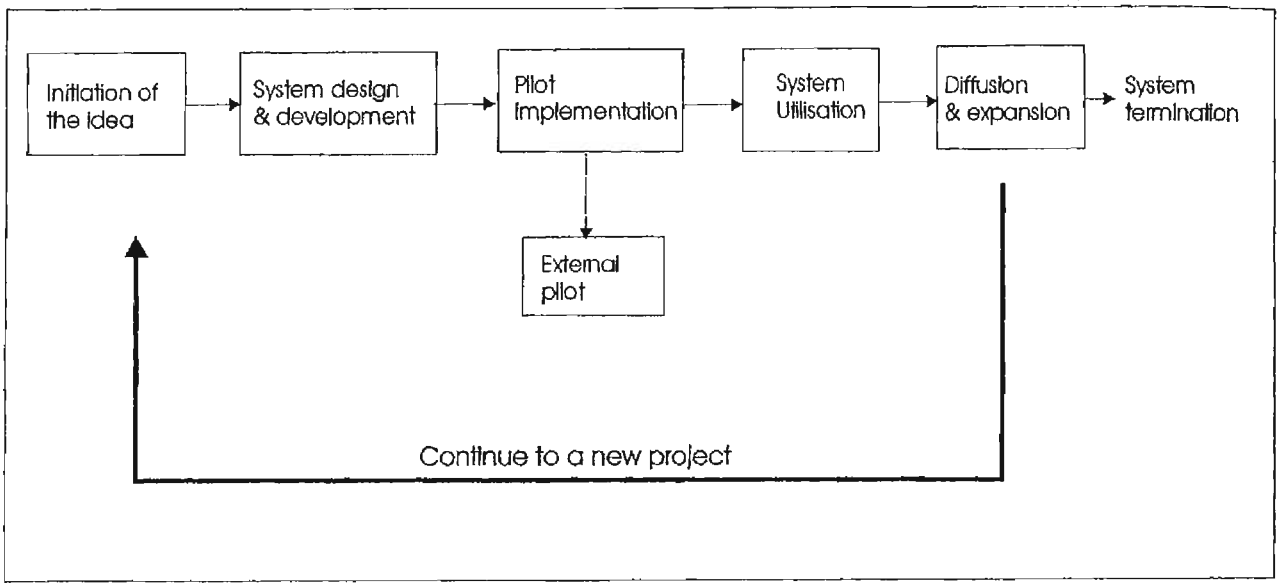
Figure 2: BHP Steel major project duration and period of implementation



E-Commerce implementation within BHP Steel was not just a single, straightforward project which steadily developed into a mature concept. The organisation was involved in four different eCommerce projects, each having a different genesis and each driven by different forces. Lessons learned from the earlier projects were incorporated into later projects wherever possible – but the 'newness' of the field meant that some of these lessons could only be learned as they happened. One particularly important example of this was the fact that the ETG, while a significantly better-designed and managed project than the Early Implementation, was actually less successful in terms of numbers of users, because in this case BHP Steel was a supplier rather than a customer – and customers are the drivers and controllers of almost all B2B projects of this type. Such a lesson could only be learned from experience – and provides support for our view that B2B eCommerce project management must take a different path from the traditional, SISP-based approaches.

The process of change in eCommerce implementation within BHP Steel can be divided into six stages, as illustrated in *Fig 3.*

Figure 3: Six Stages of eCommerce implementation in BHP Steel



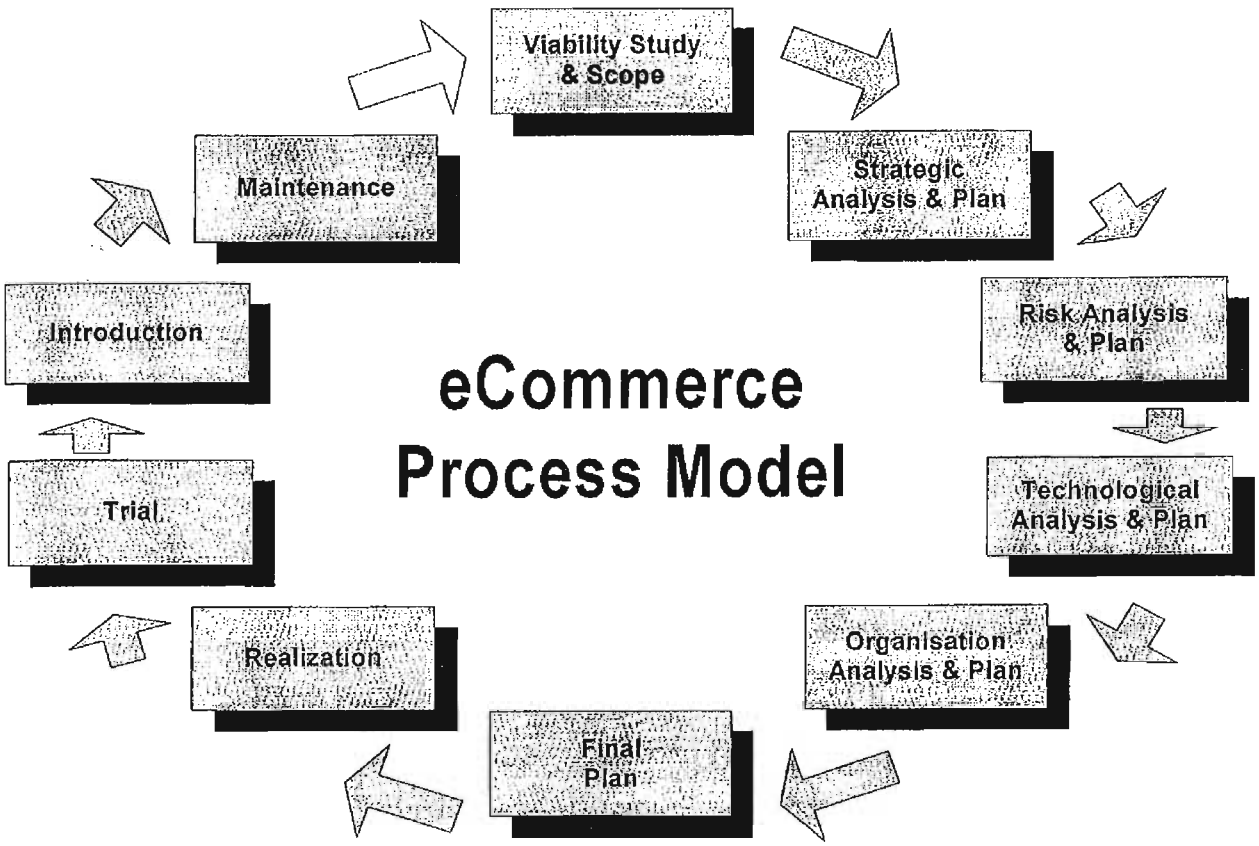
After the in-depth study of BHP Steel, Chan and Swatman [9] broadened their study of B2B eCommerce implementation to 10 further Australian eCommerce innovators and are convinced that eCommerce implementation should not be seen as a single project, having a discrete start and end, but rather as a series of projects or, indeed, as a dynamic process. In most of the cases studied, when the initial efforts are successful, the organisation will move on to other eCommerce initiatives – a process which can take many years or even decades. As a consequence, managing eCommerce implementation might require the continual revision of the implementing organisation's strategies, including the consideration of various internal and external issues surrounding the implementation.

4. PROPOSED PROCESS MODEL FOR MANAGING ECOMMERCE PROJECTS

The experience of BHP Steel provides an insight into the complex dynamics of eCommerce projects and the implications eCommerce has for the project manager suggesting that many of the rules for traditional IS projects have to be altered to facilitate effective eCommerce project management. This can even go as far as needing to change the definition of projects in the eCommerce context – with an eCommerce project in many instances not having a defined ending but rather being a dynamic process which needs ongoing refinement.

Drawing on both the experience of the BHP Steel case study and the extant project management literature we have developed a preliminary process model (see *fig.*4), which identifies principles for the successful implementation of B2B eCommerce projects.

Figure 4: Preliminary Process Model for eCommerce Projects



This preliminary process model will assist in supporting faster, but high quality and cost effective eCommerce application development. In order to derive the most benefit from this model it is necessary to identify the requirements and dynamics of eCommerce projects and understand the roles of the stakeholders and other individuals involved.

4.1. B2B eCommerce project requirement principles:

Define the project scope clearly:

The start of any B2B eCommerce project must be the definition and acceptance of a project "idea" by the management. Once this has been finalised the project manager takes over, clearly defining the project objectives and project scope to identify the requirements for achieving those objectives.

The scope of a B2B eCommerce project should include the following 4 elements:

Financial resources: to define the required budget in order that the eCommerce project can be accomplished successfully.

Personnel resources: The project manager needs to define the expertise required, the in-house availability of the required skills, and the need for a consultant.

Equipment: The project manager needs to assess the available infrastructure, hardware, software, networking etc. as early as possible in order to identify the required equipment and tools for the project.

Change procedures: No matter how perfect the planning, things will happen during the life of the project which requires the project manager to make changes. Providing for change by advance planning is the project manager's responsibility.

Identify risks

Assessing risks within projects at early stages in order to alter plans for reducing risks constitutes another important duty of the project manager. The aim here is to set expectations before the start of a project and thus minimise unpleasant surprises.

Selecting appropriate technologies

The project manager should look for technology that is suitable for the project in hand, rather than necessarily using the very latest technology. Being aware that B2B eCommerce projects frequently require innovative and sometimes unconventional technologies and solutions, project managers should follow certain guidelines in choosing the appropriate technologies, for example:

Scalability: The platform for the e-business should be scaleable and able to support exponential growth for the demand of the e-business services.

Security: Security is a critical element that needs to be addressed carefully when implementing B2B projects. Technologies chosen must support all security levels.

Centralised management: technologies chosen should provide an option for centralised management in order to reduce the cost of management and operation thus increasing the operation efficiency for e-business [38].

4.2. B2B eCommerce project team principles

Focus on individual knowledge and innovation

In B2B eCommerce projects, the project manager should emphasise the value of each individual, the knowledge and skills and the exchange of the skills and knowledge among project team members. B2B eCommerce projects, in particular, require innovation and creative thinking from all team members.

Create an efficient communication environment

Project managers need to promote an efficient communication environment in which team members feel comfortable to report the real status of the project and not what they assume appropriate at the time. Furthermore, project manager should define a communication standard to avoid any miscommunication.

Development teams

As part of the management process it is advisable for large B2B eCommerce projects to be subdivided, so that sub-projects can be run in parallel. Every team should ideally consist of an analyst, a designer, a programmer and a user to come up with a quality outcome. Small development teams of 6 to 10 individuals and programming methods such as pair programming [16] promote teamwork and increase communication efficiency and quality, in addition to reducing implementation time.

Motivating team members

A project manager's main objective is to complete the project successfully [44]. Therefore the project manager must eliminate any negative attitude or non-constructive activity and take measures in order to re-build team spirit.

4.3. B2B eCommerce project implementation principles

Adaptability

Adaptability is probably the most powerful "technique" for dealing with uncertainty. Being able to adapt experiences, new approaches and learning from mistakes or accepting change etc. develops a flexibility level necessary for success in B2B eCommerce projects, eg through the adoption of techniques such as Extreme Programming.

Using iterative development and prototyping techniques

Iterative development in conjunction with iterative prototyping is effective in developing applications based on wide-ranging, high-level requirements. Iterative development helps in producing a high-quality solution since errors may be detected and corrected at an early stage. Prototyping minimises time taken, and the application can be improved and enhanced later [16].

4.4. Business case

Business resources are scarce and it is thus crucial to clearly define the objectives of a project before its implementation. It is equally important to avoid projects which cannot be effectively implemented, or which are likely to lead to futile results.

4.5. Technology selection

The technologies used in B2B eCommerce projects are complex, innovative and sometimes turbulent; therefore it might be helpful to base any decision on the following:

Scalability: The size of a B2B eCommerce project is difficult to identify before implementation and project managers should ensure that the technologies selected can be scaled to accommodate future needs.

Security: Because B2B eCommerce applications frequently offer an insight into businesses processes and depend on accurate date and time information, it is essential that the project manager identifies security issues and addresses them when selecting appropriate technology.

Risk management: eCommerce projects are particularly liable to crises, because of the time pressures involved in their implementation. To minimise these crises, it is necessary for the project manager to analyse and identify potential risk factors well in advance, and to have realistic procedures in place to deal with them.

4.6. Trial

As with most software projects the testing period before introduction is of considerable importance. We call this test period a 'trial' because, in an eCommerce context, testing is more than just a technical test. Because of the external orientation of a B2B eCommerce solution, there are additional issues to be taken into account.

It is necessary to get all the internal and external users of the eCommerce application involved, to ensure that it serves the purpose and that the necessary coordination has occurred in all aspects of the project. It is important that everybody feels

comfortable with the interface and that there are no ambiguities which could cause difficulties once the system is used. In addition, the integration of the application with other systems of the implementing organisation – as well as with other systems of all other potential users – must be tested as thoroughly as possible, to ensure that the processes triggered are sufficient and adequate.

5. CONCLUSION

In this paper we have discussed the differences between 'traditional' software development projects and B2B eCommerce projects, suggesting that their inter-organisational nature, speed of development and the need for ongoing modification – as well as their dependence on technologically-innovative approaches – makes them less suited to traditional software project management approaches. Managing B2B eCommerce projects requires, then, more than simple planning – it requires an understanding of the characteristics of the system, its users and its likely usage patterns. The characteristics of B2B eCommerce and the implementation issues arising should be considered when planning such projects to avoid disappointments and possible delays. Basing our argument on both the literature and a real-world case study, we have argued that because success depends so much on the process of managing the project, there is a need for a new process model for managing B2B eCommerce projects. This model offers an effective application of 'traditional' project management techniques to the special needs of eCommerce applications.

The tendency to see eCommerce projects as so urgent that time spent in project management or formalised system development is counter-productive has led to the creation of many sub-optimal Web-based applications. The model developed in this paper has the potential to avoid the waste of time and money involved in failed eCommerce projects. Such an approach is not only useful for large organisations like BHP Steel, but is possibly even more important in the case of small to medium enterprises, which have severely limited resources.

Although this model offers immediate assistance to the managers of all eCommerce projects, there are still a number of issues which need to be explored in the context of eCommerce project management – and we will continue to refine the process model to reflect the dynamic and demanding nature of eCommerce projects. Further research extensions will involve the application of the model to projects currently underway – and, in particular, the application of the model to smaller B2B eCommerce projects, to ensure that the rules apply as effectively in these cases as in the case of large companies such as BHP Steel.

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