

E-Business Project Management: Managing The Planning Process

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ABSTRACT

This paper studies the strategic planning process of an electronic business project. In today's fast growing demand of electronic transactions, with more people accessing the internet worldwide, online shopping becomes an increasingly profitable but risky business. Selling online becomes a very competitive business and time is a critical factor in launching a web site for business. This paper identifies how risks can be minimized by proper planning and how planning is implemented. It also describes how to detect any changes in the marketplace so that effective measures can be made to avoid dropping out from competition. The emphasis is on the planning tactics, particularly in ensuring accurate tracking that is specific to the e-business start up process.

1. INTRODUCTION

In the past few years, “.com” establishments have flooded the information superhighway and there is a common goal to change the way consumers shop. The advantage brought about by e-business is obvious. The cost of running a business can be driven down significantly because location is no longer a concern, with the added advantage of not having to demonstrate physical products and to keep a large quantities of unsold stock. Consumers, on the other hand, are reluctant to change the way they shop for many reasons as discussed in the later part of this paper.

To succeed in the competitive market of e-business, a well-structured web site becomes a vital trading tool. The web site

itself can be very complex, depending on its functions, features, and more importantly, the level of security provided to customers. The worst scenario is to make the web site unnecessarily complicated that yields to undesired consequences such as incurring extra costs and making troubleshooting much more difficult. This is a consequence of not having a well-documented plan in place.

A number of factors that can influence the effectiveness and quality of the web site have to be addressed. The authors have summarized these issues based on actual e-business development. Effective planning at initial stages will be examined

2. PROJECT PLANNING: THE FIRST STEP TOWARDS SUCCESS

Project planning identifies uncertainties associated with the project. In order to ensure that a business is not only reachable by potential customers, it is often made visually appealing and easy to obtain information. Providing a reliable web site for trading is essential to compete in the marketplace. Project planning is therefore an important step to work on.

The commencement of a project takes off from gathering requirements that lead to a complete understanding of what the project entails, and a drafting of the detailed action plan of the e-business web site. It finishes with an end product that meets the objectives of the plan as a result of successful project execution. In between there are many factors that may affect the project such as time, risks, financial resources, human resources and access to certain necessary materials. All these are potential impediments of a project and must therefore be managed to minimize disruptions to project execution. Project management can

help forecast events that may affect the progress.

Unexpected delay can lead to devastating consequences in today's aggressive e-business trading market. Other competitors can enter the market at any time and seize a portion of the market share. Inability of increasing customer base automatically leads to closure of business. Goods that are stocked up can become outdated and may have to be sold below cost. Factors that may impact an e-business establishment as a result of time loss include:

- Technological obsolescence due to improvements in technology and performance
- Change in economic environments
- Change in consumer buying sentiments
- Change in legislative trade agreements
- Inappropriate management in risk prioritization
- Increase in operational costs

3. E-BUSINESS PROJECT VS. CONVENTIONAL PROJECT MANAGEMENT

E-business, by itself, is a term used to describe conducting business electronically. The most generic description of e-business is trading on the internet, buying and selling products and services online. There are three main categories of e-business functions: company-to-company (or business-to-business, B2B), company-internal and company-to-customer (or business-to-consumer, B2C), the latter being the most common means of internet trading.

In an e-business trading environment between business and customer transactions, customers obtain goods and services information from the internet and they place

orders by navigating on the internet and making payment electronically through the internet by electronic cash or sending credit card payment authorization online. Often products and services can be delivered without physical interaction.

3.1 Attributes making e-business project planning special

Although e-business projects share many common attributes with conventional software engineering development projects, Brooks [1] identified three distinctive differences between conventional engineering development projects and other engineering projects:

- Invisibility: There is no physical object to work with, the heart of the e-business web site consists of program codes. Observation of behavior is the only way to visualize the system. The response of a simple system as shown in Figure 1, $h(t)$, can only be deduced from both known input $x(t)$ and output $y(t)$. In an e-business trading system, its output may not be apparent and is subject to changes due to various conditions. The system response can therefore be difficult to predict in most cases.

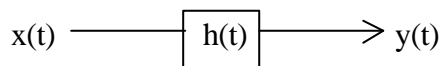


Figure 1. A simple system, characterized by $h(t)$, that generates an output when an input is fed.

- Complexity: Software products often contain more complexity than engineering works, the structure of an e-business web site can be complex with many links between various parts of the site.

- Flexibility: Any piece of software is made to adapt to change of its associated components, hardware, organizational structure, etc. An e-business project must therefore be developed in such a flexible way that it can adapt to any change in the operating environment. The implication is that an e-business project is likely to encounter constant change and these changes may lead to major consequences.

Conventional software project management techniques establish a foundation; yet there are limitations and divergence that exist and must be taken into consideration

3.2 Project Risks

Like any other engineering projects, there is no escape from risks when implementing an e-business project. First, due to the fast growing market environments, certain technology and related products may become obsolete very quickly. There are many external factors, often uncontrollable, such as economic recession, political instability, change in government regulations and regional trade agreements. All these may have significant impact to any project developments. Certain risks are inherent in an e-business project:

Inter-platform compatibility - certain technology may only be accessible by certain platforms. Thus, e-business web sites may be subject to certain limitation of features and performance.

Company restructuring - business alliances become increasingly more popular as they are often perceived to offer more effective modes of operation. Such company merger may impact the requirements and specifications of an e-business web site.

Security - data stored on the web site (web server) are not the only data that must be protected, all business transactions must also be protected in order to ensure that all transactions are carried out in a permissible manner. Security Electronic Transaction [2] is universally used in e-business. Security has, historically, been a major factor in e-business risk monitoring. Corporate networks commonly involve separation of an internet site for external trading and an company internal intranet site for sensitive company data.

Competition- there has been many innovative features offered by different operators. There are many web sites offering very similar or identical products and services. Customers in turn become the obvious key that distinguishes between success and failure.

Market saturation - the amount of business opportunities may not be proportional to the number of service providers on the market. Historically, the number of new trading establishments increases at a faster rate than the growth of online trading transactions. Risk transfer can serve as a means of risk reduction by offering a wider range of products and services so that business opportunities can be expanded. Section 5 describes how project planning can be affected by the market.

System reliability - customers demand an easy-to-use and reliable system. While security issues are closely related to reliability, providing a service that is available at all times is a necessity to provide round-the-clock services to customers worldwide. E-business trading has made business dealing globally fast and simple. Contingency planning is useful since certain risks are unavoidable and it reduces the impact in the event that the system fails or needs to be shut down for maintenance.

4. PLANNING

An e-business project can be considered as a sub-task of software development project. An e-business project involves more than writing a piece of software. The fundamental features of an e-business project includes all of the following factors:

- Electronic Data Exchange (EDI): it allows electronic data exchange between an e-business web site with its suppliers, business partners and customers.

- Security: data sent between an e-business web site and the outside world require a secure channel so that the risk of unauthorized acquisition of transaction data will be minimized or eliminated.

- Human-Computer Interface (HCI): it is a tool that allows users to make use of an e-business web site. The user friendliness and reliability of HCI has direct impact on whether or not customers will use this site.

- Response time: it measures how fast a business transaction can be performed by the system. When a user selects an option on the web site, one expects a fast and appropriate response from the site.

- Graphics: it makes an e-business web site look appealing to its users, and its effective use can also improve the site's HCI. The business also needs to provide access to customer visiting via different means or platforms.

These are all crucial components of any e-business project as they reflect upon whether the e-business web site can attract its target audience.

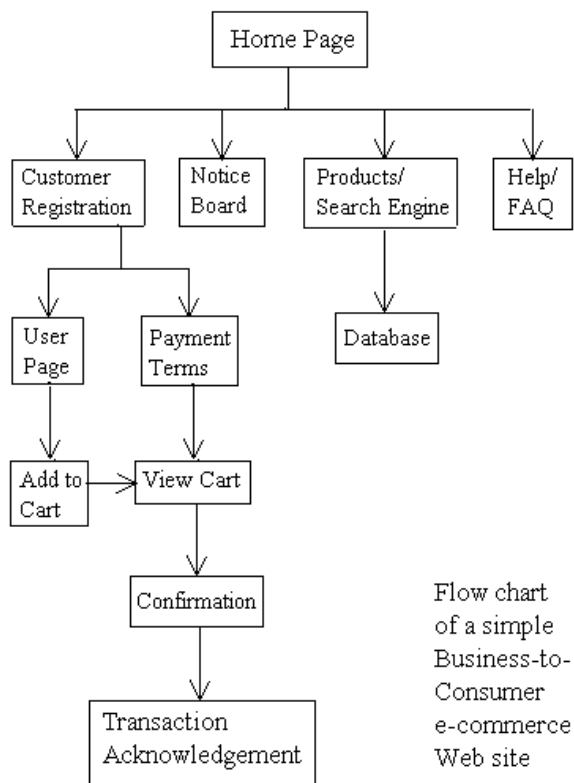
With the importance of thorough planning described, e-business project planning is discussed next.

4.1 Technical Planning

The first component a project needs is a series of web pages that deliver concise and appealing information including product or service descriptions and how purchases can be made. It is therefore necessary to gather user requirements before the web site is designed. A feasibility study has to be conducted to ensure that all set objects can be made with available resources.

4.2 Web Site Specifications

The format of pages on the web site can take a large variety of choices and a standard blank page template can be organized. A flow chart records details of the overall web site. Figure 2 shows a typical flow chart for a simple e-business web site.



Flow chart of a simple Business-to-Consumer e-commerce Web site

Figure 2 Flow chart of a basic e-business web site

The flow chart illustrated in Figure 2 serves as a tool for the project manager to visualize how the web site operates; hence planning and optimization can follow. The number of web pages that are necessary to provide the specified features as well as the complexity of each page can be deduced from this flow chart so that detailed planning on development can be performed.

4.3 Scheduling

A set of basic tasks can be identified for a B2C e-business project as summarized in Table 1. Table 1 provides a guideline for the project manager to fill in the details on the necessary tasks so that duration of the tasks can be construed and an estimated completion date can be deduced. Any necessary fine-tuning can be made to every detail of sub-tasks.

System Analysis Design Site Construction System Integration System Test Final evaluation

Table 1. List of project implementation phases.

A common methodology used by project managers for a wide range of development projects is to draw a Gantt chart listing all the activities involved in the project. It helps the manager to keep track of any progress made, as well as task dependencies. An accurate estimate of timing can therefore be attained at the planning phase. Control plan enables recognition of any possible unexpected deviations that may take place. Critical path method (CPM), can be employed at this point such that activities scheduled are derived with their respective start and end dates.

Also at this point, one may generalize an activity chart, and hence work out a Gantt chart that is used for tracking project progress by constant update as the project develops. A general task list is shown in Table 2 with all the tasks listed along with their respective subtasks. Once their estimated duration is evaluated, the start and finish dates can be updated and incorporated into the chart.

Tasks listed in the Gantt chart vary from web site to web sites and are often greatly affected by the site complexity. Table 2 captures the most commonly required tasks in this context. These fundamental tasks can be used as a template for e-business project planning.

Task	Duration (working days)	Start date	Finish date
Project Analysis			
Define user requirements			
Analyze web site requirements			
Cost and functionality analysis			
Acquisition of goods and services details			
Design			
Define standards for project			
Design web site structure			
Desktop/User interface			
Security features			
Prototyping			
System Development			
Web pages			
Graphics			
Database			
Style consistency inspection			
Unit/component test			
System Integration			
Link pages and images			
Link Database			
Overall System Test			
Page links			
User Interface			
Database access			
Exceptions handling			
Trial Trading			
Connection to the internet			
Transaction handling			
Linkage to financial institutions			

Table 2. Left columns of a generic e-business Gantt chart for progress tracking.

4.6 Network Modeling

Program Evaluation and Review Technique (PERT) is a commonly used method when evaluating risks to the schedule. It is a widely used tool in project management because it can be used for estimating the probability of meeting or missing scheduled dates. Using PERT as a network model, activities with their mutual dependencies can be realized graphically. In CPM it is most appositely done by representing activities as links in the plan. All activities may commence as soon as resources are available and allocated with a node as illustrated in Figure 3. So, each of these nodes does not depend on other nodes to complete before commencement.

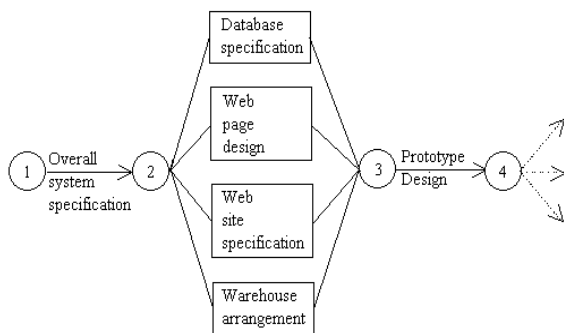


Figure 3 A simple e-business project activity in a CPM network.

When an explicit description of activity network is known, it is possible to predict the project duration [3]. The activity network can be generalized. PERT is used to estimate progress of various tasks and it can generate the degree of certainty expected in the task performance by taking the difference between the most pessimistic and optimistic estimates. This approach can be adopted to track each task independently when planning an e-business project.

4.5 Human Factors

Various factors determine the punctual completion of a project and every single individual involved in different stages of the project is accountable for the project implementation. People hold the key to project success and are closely related to risks analysis.

Project manager allocates tasks to individual project development team members. Some tasks may be interdependent with each other so that overall progress can be affected by an individual team member. Project progress requires a motivated team [4]. The Project Manager needs to be trained for the e-business business structure [5]. The chance of failing to estimate timing accurately can be eliminated this way. Managing conflicts and activities are major tasks performed by the project manager [6]

Staff movement can be another critical factor in time management. Team members may leave the project and new members can join and take up various development tasks. The project advancement can be greatly affected by staff movement of an organization. The skills of team members can be an unknown factor in a new project. The management of an e-business project needs to clearly define the role of each team member with reference to the tasks involved. Any disruption to the project due to staff movement can be reduced by clearly defining responsibility in activity units so that task re-allocation can be made relatively easily when necessary.

5. MARKET RESPONSE: IMPACT OF CHANGE IN ECONOMY

There is a huge difference in terms of spending power and buying sentiments in the macro economy. Production of some

merchandise can be done by unskilled labor in a low-wage developing country yielding a huge reduction in cost. Nonetheless, goods are often shipped from the origin of manufacture to a centralized location before distribution to final destination markets. E-business provides a simple way of directly shipping goods from its origin to customers worldwide. It has an added advantage of addressing the quandaries in terms of scarcity and consumer demand in a wider choice of products and suppliers.

5.1 Economic Analysis

Uncertainties with other industries in the past may change the way e-business models are shaped. Many approaches can be used to analyze environmental impacts. Some of them can be labeled specification techniques, aiming at organizing information about environmental impacts in a consistent manner. Evaluation in economic terms can be done in many ways. An e-business establishment needs to constantly revise the cost-benefit analysis so that any change can be detected as soon as they take place. Cost-benefit analysis is a coherent method to organize information about social benefits and costs. Benefits and costs are evaluated on the basis of an individual's willingness to pay for a particular type of product or service, as viewed through a social welfare ordering representing the performances of the relevant decision maker.

Application for Permits and Impacts due to Government Legislation

If the permits are issued once and for all the sources, but after that they are bought and sold on a market, the result will be similar to the result with an emission tax. The permits will then have an economic value and by adopting a new and cleaner technology, the e-business establishment can

sell some of its permits and make profit. If the price of the permits does not change because of the new technology, the result will be exactly as in the case of an emission tax. Nonetheless, if several companies adopt new technologies, the total demand for permits will fall and so will their price. The return from adopting new technologies will therefore drop and so will the incentives to develop new methods of project implementation. In general, permits that can be transferred from one company to another will give smaller incentives for technical development than a tax but larger than in a pure command and control policy.

These aspects on technical development are very important in relation to the long-term environmental targets. For discussion, suppose that the authority wants to eliminate the conventional way of project implementation involving release of pollutant to the atmosphere and replace it with a more environmentally friendly way at some date in the future. Then, the authority may impose new legislation stating that certain years from now, no projects involving discharge of such pollutant can be executed. In the event that no technical development has taken place and before the deadline comes, then offending projects will mostly be terminated. If the implementation of such project is not permitted, the consequences can impact a wide range of industries. Another possibility is to impose a tax on releasing such pollutant as a result of any project implementation.

Further, environmental regulation will reduce the return on the capital investment which in the long run may reduce the capital formation and thereby the economic growth. Studies of the United State's environmental legislation with the assistance of dynamic computable general equilibrium model [7] indicate that this effect can be substantial. It is clear that an emission tax will reduce the

return more than a pure command and control system, including a system with transferable permits. Therefore, one would expect an emission tax to reduce the growth of the economy still further. However, emission taxes are perceived as part of the much wider portfolio of different taxes on labor, capital and value added. It is possible to design the total tax system in such a way that the negative effects on capital investments from an emission tax can be offset by changes in taxes on profits. In fact, a part of a much bigger tax package may include reduction in capital taxes, reduction in labor taxes and increase in value added taxes. In economic terminology, the package takes away the effect of income of the emission taxes but retains the substitution effect by taxed pollutant. For a start, its overall profitability decreases due to the cost increases. This decrease in profits may have as an effect on reduction in output and therefore also in emission. This is the income effect. However, even if there is no income effect, there is the much more important substitution effect. It is less costly for a company to use environmentally cleaner technologies, including increased abatement and increased use of cleaner inputs. Thus, one could design a tax package including emission taxes that would have no income effect but still could give rise to substantial substitution effects. By this, one could increase the chances of sustained growth.

5.2 Continual Change

The growth in incomes of consumers over time has been sustained together with improvement in technology. Innovations

ameliorate quality of life. As such, ways of product designs have changed and consumers' demand on products increase proportionally. These technological advancements boost productivity and improve ways of how products function. Economical data [8] show a steady increase in average wages of a person over time while the labor productivity growth has shown a tendency to saturate since the 1970s with an average growth of approximately 3% in the 1960s dropping to under 1% during the 1980s. E-business establishments have to adapt to such economical changes so that every change is dealt with right from the initial planning stage in order to minimize the impact of changes to project development.

5.3 Globalization

Market economy has been shaped by globalization that has gained momentum since the late 1980s with the fall of the iron curtains and opening of market in some developing countries leading to a vast expansion of cross-regional trading. One of the major driving forces of globalization is the steep reduction in transportation and telecommunication costs in a large part due to technological advancement in internet access that directly benefits e-business trading. The cost of delivering goods around the world has dropped significantly while the amount of data transferred across the global information superhighway has increased extensively at the same time.

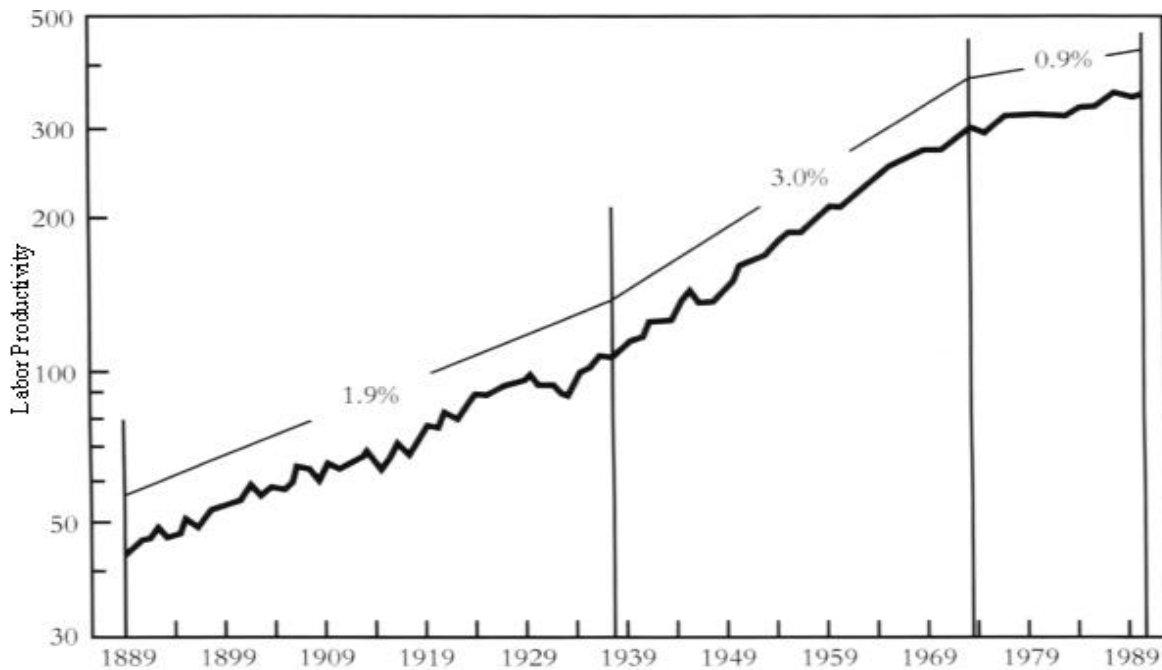


Figure 4 A century of increase in labor productivity [8]

6. CONCLUSIONS

This paper has illustrated some common steps necessary for managing e-business web site development projects. Certain risks are communal amongst all web site development projects. Progress tracking by means of a Gantt chart in conjunction with a network analysis model has been generalized for common e-business web site development projects.

Project delay can be caused by many uncontrollable factors such as people movement and technology advancement as well as non-standard platforms and otherwise means of access. Human factors and uncertainties of the initial web site system can increase the project risk that may require extra effort in hazard identification during the early stage.

Project development can be generalized and determination of control distribution in the design phase can be done to find out any subsequent changes to the project plan during development [9]. Significant changes can be expected at any stage of project development due to changes in demand and market circumstances. These changes very often take place much more rapidly and suddenly than for most other software engineering development projects.

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