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# Identifying Misalignment Between Strategic Vision and Legacy Information Systems in Organisations

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## Abstract

*Legacy information systems are usually defined from a technical perspective only. However, there is also a business dimension to the legacy information system problem represented by the organisation structure, business processes and procedures that are bound up in the design and operation of the existing IT systems. Legacy information systems have evolved over long periods of time in response to incremental changes in business strategy. Firms are now being forced to change more radically and quickly due to a changing business environment than was the case in the past. Evidence from case study research has shown that the legacy information system problem includes both business and technical dimensions, resulting in misalignment between the strategic vision of the business and the old business model embodied in the legacy. Understanding legacy information systems is necessary when forming new strategies to overcome the legacy problem and to realign IT with the new strategic vision.*

## Introduction

A traditional view of legacy information systems is purely from a technical perspective. There are a variety of definitions describing legacy systems, however a common impression is that a legacy system is typically a large, old piece of mission-critical software which has had enormous investment, is difficult and expensive to maintain and costly to replace (Adolph 1996; Bennett 1994; Slee & Slovin 1997). A legacy system is often written using old fashioned software running on out-of-date technology (Ward 1995) and modified heavily over its life span.

It is clear, however, that legacy information systems have a business dimension as well as a technical dimension. Components of a business, such as its structure, job designs, work flows and managerial approaches which affect how it operates can also be considered to be a 'business legacy'. Business and IT legacy are not separate problems since many components of a business, such as processes and procedures, are bound up in the design and operation of the existing IT systems. There is also recognition that business and IT strategies should be linked and a high degree of alignment created between them (Reich & Benbasat 1996; Niederman et al 1991; Henderson & Venkatraman 1991; Boynton et al 1992). All information systems are a potential legacy, a legacy problem exists, however, when the information system does not possess the required business functionality to fit the current and future business requirements and altering the system to achieve alignment with the strategic vision is an obstacle.

Legacy information systems are complex and represent a huge investment in both information technology and business processes, procedures and structure. It is necessary to understand the relationship between business and IT legacies in order to explain the evolution of legacy information systems, the misalignment created with the strategic vision and their influence on future strategies and business process change.

## Evolution of Legacy Information Systems

Both business and IT legacy have persisted over the years, with only incremental changes being made. Continual modification of information systems developed in the 1970s, 1980s and even the 1960s has degraded their structure to such an extent that they are now extremely complex and difficult to maintain and there is often little up-to-date documentation. The majority of expenditure on information systems is on maintenance and this increases over time. Eventually an organisation reaches the stage where it becomes impossible to enhance existing systems any further because it is too slow a process and uneconomic. Developments in IT exacerbate the problem further because technology has moved beyond traditional transaction processing and is now using client/server architectures and the internet to create new types of business solutions. Legacy information systems are unable to exploit features of this new, improved computing environment.

From a business perspective, legacy information systems present a serious problem because current operations depend critically on existing information systems. However, these work processes and operations, preserved by existing information systems, have very often not kept pace with changes in business objectives. Rigid and sequential procedures where work is handed from person to person can cause delays and errors. Organisation of work like this can be traced back to the Industrial Revolution, when work was divided into narrowly defined tasks and the people performing those tasks were placed into

departments with managers overseeing the work. Improving the performance of these tasks was the main focus. The hierarchical structure that was adopted then has become entrenched within organisations and has not altered even though it may not be the optimum structure. According to Hammer (1990), an organisation's 'antiquated processes' may actually threaten business by affecting productivity, innovation, quality, customer service and ultimately the whole organisation financially. Incremental changes to individual tasks is not sufficient any more, instead radical changes are required in order to satisfy the current strategic vision. However, radical business process change is impeded by existing unwieldy, difficult to modify information systems.

### **Why Legacy Problems are Being Recognised Now**

Given the large investment in information systems it is understandable that managers have chosen to evolve them incrementally over time. However, in the past few years there has been an increased willingness to implement new IT infrastructures and business processes. There are several drivers which have caused this change in strategy, which can be classified under technical and business pressures.

From a technical perspective organisations have realised that their legacy information systems are not year 2000 compliant and therefore something has to be done to prevent a possible disaster. Another technical problem, not so widely publicised as the year 2000, is the single European currency which will affect, in particular, organisations who deal with European customers/suppliers. The complexity of legacy information systems is increasing the scale of this problem. In addition to date and regulation requirements, there are a range of business pressures to contend with which were not present to the same extent in the 1970's and 1980's when many information systems were first developed. One major factor causing business legacy is the rapidly changing and complex business environment which makes traditional business models inappropriate. Globalisation, deregulation and new technology are all interrelated pressures which are changing the competitive environment for businesses. Competition is also a pressure in its own right and this environment can be examined using Porter's (1980) framework. The ability of an organisation to change its business model is impeded by legacy IT systems.

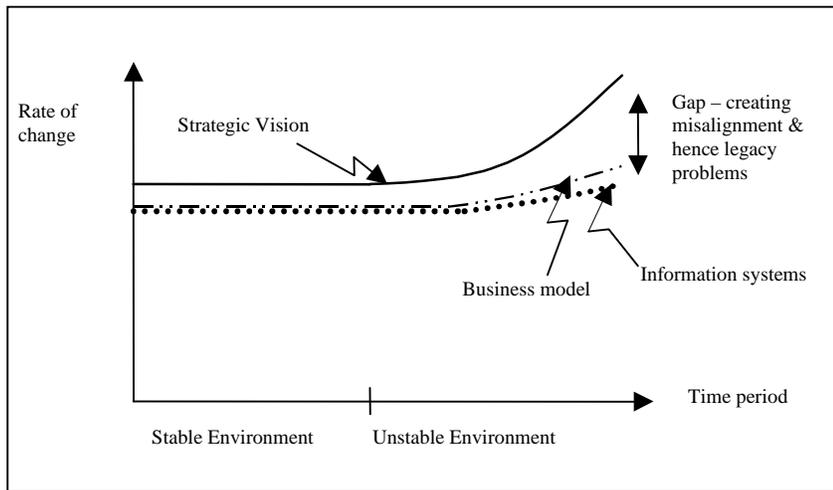
Henderson and Venkatraman (1991) argue that IT should not be limited to just supporting a business strategy, instead new technology should be directly influencing the strategic direction of organisations. Information technology is now a major cost component and most business innovations involve technology, e.g. electronic commerce, which create new competitive opportunities for organisations. However, organisations are realising that they are being restricted by their existing technology and cannot take advantage of new ways of doing business in today's unstable environment. If the business model is redesigned then changes must be reinforced by the information systems. If not, misalignment occurs.

### **Preliminary Findings from Case Study Research into Legacy Information Systems**

To explore the problem of legacy information systems and develop general models which explain their evolution and impact on business strategy, research into a number of international companies has been conducted across a range of industries. Case study research to build theory (Eisenhardt 1989) was the method used in order to understand the relationship between business and IT legacies, their alignment with strategic vision and the business environment within which these organisations operate.

The following diagram (figure 1), developed from cross case analysis, helps to characterise what is happening in these companies. During the 1970s and 1980s the business environment was relatively stable with incremental changes to the strategic vision matched with incremental changes to the business model and information systems. Some form of alignment existed between the business model, IT and the strategic vision. Many of the case study companies had bespoke, often fragmented information systems, developed in the 1970s/1980s which were continually modified. With the onset of the 1990s came an unstable business environment and companies started to realise that the strategic vision of the business required a dramatic change in their business models and IT systems to take advantage of new opportunities in order to maintain or strengthen their competitive position. These case study companies exhibited a change in strategic vision. Certain changes could be made to the business in line with the strategic vision, however these changes could not be reflected properly in their information systems. This started to create a misalignment between the business model (i.e. how they were now trying to operate) and IT. Some business changes (e.g. electronic commerce) were prevented by the existing information systems. A gap is created, a misalignment, between the strategic vision of the business and the route that is actually being followed. This gap is the legacy problem, characterised by both business and IT dimensions. Many of the case study companies identified that their information systems were not a good fit for business.

Giving examples from 3 of the case studies (out of a total sample of 12) provides individual company evidence of this situation. Company 1, a computer company decided to broaden their business scope from computer distribution to include IT services. Their old, bespoke, heavily modified information systems, which had initially been written for a computer distribution business had to be 'fudged' to include the new business functionality, creating misalignment with the new business vision. ERP software has solved this problem as well as enabling electronic commerce. Company 2, a threads company, wanted to adopt a pan-European view of the business, however their fragmented information systems impeded this integration. Their solution is a common information system to reinforce the new integrated organisation structure in Europe, with the aim of implementing it now through the company world wide. Company 3, a chemical company who operate in a highly competitive global environment, wanted to be global, however the different business units could not integrate fully because of the different



**Figure 1. Diagram to Illustrate Misalignment and Legacy Problems Created Over Time**

information systems. To get a global picture of the business, data had to be manually gathered from different sources. A common system implemented globally is solving this problem.

There are a variety of approaches that the case study companies are taking to realign the business model and IT with the strategic vision. These approaches have gone beyond technical solutions, which although they would eliminate the technical problems would probably not address the business issues so realignment would not occur. Instead these companies are utilising new technology, many opting for ERP software, combined with business process change to realign both the business model and IT with their strategic vision. A strong emphasis, with top management support, is being

placed on a business solution, with technical pressures (e.g. year 2000) being solved as part of this approach.

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