

The relevance of the MIT90s framework to benchmarking e-learning

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Executive Summary

The MIT90s strategic framework has been central to a number of JISC and related studies (including from DfES) on adoption and maturity. It was proposed in 2005 as a basis for benchmarking e-learning by the University of Strathclyde. However, that university took an institutionally-specific approach to benchmarking during the Pilot Phase. It is the purpose of this paper to take a more general approach – to assess the value of MIT90s to the issue of benchmarking e-learning across a wide range of institutions – maybe as a contribution to the area of benchmarking frameworks. However, the paper is discursive rather than prescriptive – it is for the “owners” of and user groups for specific methodologies to assess the relevance of the approach to them at a detailed level.

The MIT90s framework is nearly 15 years old, thus it pre-dates the Internet. Since education is rather good at adopting approaches long after they have fallen out of favour in the corporate world, some obvious questions need to be asked. This report is an initial attempt to answer these:

1. What is the MIT90s framework?
2. Where has it been used before to help understand e-learning?
3. What is the evidence that the framework is still valid?
4. Where are the gurus of this framework?
5. And finally: Can it still be used to inform benchmarking, and if so, how?

My conclusions are that the general idea of the MIT90s strategic framework seems still to have “legs”, and is still running. Admittedly there are variants of it, such as the organisational model proposed by Leavitt as far back as 1965 – with technology, structure, tasks and people – and the 7S model, but both are more or less precursors of the MIT90s work. Even the later work on strategic alignment (associated with Venkatraman) is a close relative, and indeed now a key analytic tool within it.

The value of the framework in higher education has been shown by a succession of papers over the years including from the “Australian school” (the DEETYA report in particular) and the work of Nicol *et al* on risks of e-learning. There are also some refinements of the framework including the work of Philip Uys and the group who adapted the ICL “OPENFramework” to higher education.

However, one should not over-egg this. As clearly demonstrated at length in the DEETYA report – and more crisply in the work by Nicol and by the Australian school (including Yetton, Segrave, Wills and others) – the value of the MIT90s strategic framework is as a *framework*, for analysis, reflection, etc – not as a theory from which detailed deductions can be made. To get value from the framework, much hard work and creative work has to be done, in some cases a complete PhD-full or bookful – it is not at all a question of quickly turning the handle.

In a companion paper derived from my work I have shown how a criterion-based benchmarking system such as Pick&Mix can be mapped into the strategic framework – and it is likely that by further human reflection on the framework (and on related issues such as alignment) any such criterion-based system can be improved. But the framework cannot automatically *create* the system.

In order to make the report self-contained, key references are mainly to material that can be downloaded from the public web. In a few occasions I had to go “beyond the web” to establish the relevance of material.

¹ I am indebted to the Higher Education Academy for partial support of this work under the Concordance Project.

Acknowledgements

The work is my own. I have checked a few key points with two trusted advisors who are in close contact with national e-learning policy issues. An early version was also read by my usual quality monitor. None of these wish to assert any moral rights and so their names remain confidential. Various drafts have been read by staff of and consultants to the Higher Education Academy.

I would particularly like to thank (in alphabetical order) Jonathan Darby, Anne Forster, Professor Chris Holland, Stephen Marshall, Som Naidu, David Nicol, Phil Poole, Philip Uys, Professor Sandra Wills, and Chris Yapp for assistance on specific points or in my detective work. All remaining errors, omissions and misinterpretations are mine alone.

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0. Introduction

The MIT90s strategic framework has been central to a number of JISC and related studies (including from DfES) on adoption and maturity. It was proposed in 2005 as a basis for benchmarking e-learning by the University of Strathclyde. However, that university took an institutionally-specific approach to benchmarking during the Pilot Phase. It is the purpose of this paper to take a more general approach – to assess the value of MIT90s to the issue of benchmarking e-learning across a wide range of institutions. Thus the paper could be regarded as a contribution to the emerging area of benchmarking frameworks. However, the paper is discursive rather than prescriptive – it is for the “owners” of and user groups for specific methodologies to assess the relevance of the approach to them at a detailed level.

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1. What is the MIT90s methodology?

The MIT90s methodology was developed by Michael S Scott Morton as part of the work of the “MIT90s” initiative which flourished at MIT in the early 1990s. Michael S Scott Morton is now Professor Emeritus at MIT in the Sloan School of Management. The work is cited under various names but diligent search and checking with Amazon reveals it to be correctly entitled *The Corporation of the 1990s: Information Technology and Organizational Transformation*, edited by Michael S Scott Morton with an introduction by Lester Thurow² (Oxford University Press, USA), published February 1991, ISBN: 0195063589.

I recommend the book as interesting and still relevant reading. The abstract states that:

It represents the fruit of an active collaboration between scholars from MIT’s Sloan School and ten major corporations – including American Express, Digital Equipment Corporation, Eastman Kodak, General Motors, British Petroleum, and MCI Communications – and two U.S. governmental agencies.

This highly readable, exhaustively researched volume describes how the rapidly changing global economy has placed new demands on corporations; at the same time, the contributors point to the exponential growth of IT in recent years – from electronic check-out counters at grocery stores to ATMs on street corners to the widespread use of electronic mail – discussing how this tremendous IT resource can be used to master the changing market. The authors also present a wealth of real-life examples of organizations that have used IT effectively and profitably.

This looks interesting enough, but the research work is all prior to the web and several of the exemplars are now absorbed, shrunken or otherwise much changed. Nevertheless, it is quite possible that the ideas are still of relevance to universities – in particular, many would argue that most universities are still in the 20th century in terms of radical use of IT, and that business theories have a longer lifetime than IT systems.

² Then Dean of MIT’s Sloan School of Management.

With respect to MIT itself, there is virtually no trace of the MIT90s initiative on the MIT web sites today.³ This strongly suggests that (to no general surprise) the ideas of MIT staff have moved on well beyond that era.

It is not commonly realised that there were at least two outputs from the MIT90s initiative that have been considered by e-learning analysts: the *business transformation levels* (which I shall call the *transformation model*) and the *strategic framework*. These are very separate constructs.

1.1 The business transformation levels (transformation model)

The concept of “business transformation levels” was developed as part of the MIT90s programme and so cited by a variety of UK e-learning reports. Other sources, including current teaching notes in Information Systems, indicate that the author of this concept was “N Venkatraman” (some misspellings on web sites confuse matters), now clearly identified as Professor N Venkat Venkatraman, Professor of Management at Boston University School of Management (and also a visiting professor at London Business School) who was at Sloan during the period of relevance.⁴ His work on “IT-Induced business reconfiguration” is Chapter 5 (pages 122-158) of the MIT90s book.

The Venkatraman thesis is that business use of IT passes through five levels, differing in both the degree of business transformation and in the range (and amount) of potential benefits. The levels are:

1. Localised exploitation
2. Internal integration
3. Business process redesign
4. Business network redesign
5. Business scope redefinition.

Levels 1 and 2 are called evolutionary levels – levels 3, 4, and 5 are called revolutionary levels.

In passing, it is interesting that this is one of the first situations where a 5-point scale has been used in a situation akin to benchmarking.

Readers who do not have access to the book should note that key parts have been summarised in another report, entitled “SECEE Working Groups and Change – MIT’s 90 project”. This was found lurking on a web site at Plymouth University.⁵ The document has an internal date (of creation) of 11 November 1998 but a date in the footer of 13 April 1998, suggesting a period of authoring over the intervening months. It is not now clear what SECEE was – there is no entry for it when searching the Plymouth University web site, but the URL suggests that it is a research group associated with DCEE, the Department of Communications and Electrical Engineering, which appears now not to exist (presumably being part of the School of Computing, Communications and Electronics) – it also suggests that the author was Paul Filmore, who is still at the University.⁶ The document describes the work that was carried out at NCET (the predecessor of Becta) to map the MIT90s business transformation levels into language more appropriate for the educational sector and then suggests how his department (or group) might use this mapped approach to plan their use of IT – in other words, a kind of benchmarking.

³ The Google search [MIT90s site:mitsloan.mit.edu] yields no hits, the search [MIT90s site:mit.edu] yields just two.

⁴ See <http://lef.csc.com/about/teamdetail.asp?ID=70>.

⁵ See <http://www.tech.plym.ac.uk/dcee/staff/PaulFilmore/Manage/MITs90project.PDF>.

⁶ See <http://www.tech.plym.ac.uk/dcee/staff/PaulFilmore/>. Interestingly he cites the file as “MIT’s 90/ NCET Projects & Ford et al (HE learning Environments)”.

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The document is useful as one of the few documents on the web to contain any quotations from the MIT90s ur-report. It gives the following explanations of the business transformation levels:

<i>level</i>	<i>name</i>	<i>description</i>	<i>page in report</i>
1	Localised exploitation	characterised by localised exploitation. In this stage IT is exploited within existing, isolated business activities, normally within one function	108
2	Internal integration	...can be thought of as building the internal electronic infrastructure that permits the integration of tasks, processes and functions. Stage 2 is a necessary condition if the investments in stage 1 are ever to be exploited.	111
3	Business process redesign	...results from a fundamental rethinking of the most effective way to conduct business.	115
4	Business network redesign	...the use of IT by the organisation to include suppliers, customers or any other trading partner to contribute to the organisation's effectiveness. In a sense one is moving from the traditional, formal organisation, to a "virtual" or "networked" organisation that works together to accomplish a particular purpose.	119
5	Business scope redefinition	...where an organisation decides to break out and exploit the new technology in the marketplace. The aim is to explain the logic underlying the composition of the organisation's portfolio of businesses, identify differential strategic thrusts and develop criteria for allocation of scarce resources among the businesses. Considerations of business scope dictate major strategic activities such as diversification, divestment, consolidation and mergers and acquisitions.	123

So much for the past. What can one say about the *current* relevance to business of the MIT90s work on business transformation?

The first key point is that the number of uses of the phrase "business transformation levels" is extremely low, only 13 essentially distinct hits out of 20 overall⁷ – and only a further 7 distinct hits out of 11 overall for the singular version of the phrase. Out of the 13 hits for the plural phrase, there are only four distinct non-trivial (i.e. other than passing) appropriate references in the non-educational literature, together with one reference to work in education (the report, already discussed, from a member of staff of Plymouth University about the NCET work)⁸ and two (only two) references to it in teaching material (in presentations on two weeks of a module CM5111 on "Structured Systems Analysis Techniques" at Staffordshire University).⁹ The usages of the phrase in the singular are fewer and even less to the point.

As an example, readers should contrast this paucity with the over 300 hits on "CNL" (the acronym of an important but not majorly important JISC project) even when further qualified by the phrase "costs" and by restriction to the domain "ac.uk". Thus it seems that the "business transformation

⁷ Search undertaken via Google on 22 May 2006.

⁸ See <http://www.tech.plym.ac.uk/dcee/staff/PaulFilmore/Manage/CHAP3.pdf>.

⁹ See <http://gawain.soc.staffs.ac.uk/modules/level3/CE53503-3/Week%205/Week5-OrgTransHOs.ppt> and <http://gawain.soc.staffs.ac.uk/modules/level2/CE52801-2/Week-6-OrgTrans.ppt>.

levels” approach has not been influential in recent years in business school thinking – unless under some other name that I am not aware of. In contrast, it is worth noting that ideas from the slightly later career of Venkatraman – in particular that of “strategic alignment”, first published (joint with T Henderson) in the IBM Systems Journal in 1993¹⁰ – are and have remained influential, and that Venkatraman is a “highly cited researcher” in ISI jargon,¹¹ with a list there of 98 publications.¹²

The original ideas of “business transformation levels” were adapted to a UK schools context by NCET and moved into DfES thinking and that of LSC, but since the focus of this report is on ideas used in higher education, I do not discuss them further. It is possible that a subsequent piece of work may address this issue. It is not unrelated to the early history of the ELTI methodology.¹³

1.2 The strategic framework for managing information technology

In terms of Higher Education, a more relevant set of ideas from the MIT90s era are those to do with a strategic framework for change management. As described in the MIT90s book,¹⁴ the framework posits that success in managing the deployment of IT in organisations is down to managing the balance between six inter-related factors.¹⁵

1. The external environment
2. The organisational strategy
3. Individuals and their roles
4. The organisational structures
5. The technology being used
6. The management processes.

This is often represented diagrammatically. The diagram on the next page is taken from the JISC INLEI report.¹⁶

In UK e-learning terms, probably the most successful use of this framework is in the RAIIE study led by David Nicol of the University of Strathclyde, funded by JISC during the period April 2003 to May 2004,¹⁷ which produced a final report *A Framework for Managing the Risks of e-Learning Investment*.¹⁸ Other work has gone on in Australia, described later. (The so-called “related work” by NCET that Nicol refers to in fact uses the other MIT90s methodology, the Venkatraman “business transformation levels” model.)

¹⁰ For the official abstract see

<http://domino.watson.ibm.com/tchjr/journalindex.nsf/600cc5649e2871db852568150060213c/b0d32b9975af5a2e85256bfa00685ca0?OpenDocument> and for a summary of the theory see http://www.tongatapu.net.to/compstud/mmedia/local_issues/ITAlignment.pdf.

¹¹ See <http://hcr3.isiknowledge.com/author.cgi?&link1=Browse&link2=Results&id=1667>.

¹² See

<http://hcr3.isiknowledge.com/formViewCharacteristic.cgi?table=Publication&link1=Browse&link2=Results&link3=Biography&id=1667>.

¹³ See http://www.jisc.ac.uk/index.cfm?name=project_elti and <http://www.le.ac.uk/talent/>.

¹⁴ From now on the phrase “MIT90s book” means *The Corporation of the 1990s: Information Technology and Organizational Transformation* (edited by M S Scott Morton).

¹⁵ Sometimes also called elements, categories or nodes.

¹⁶ See http://www.sfeuprojects.org.uk/inlei/Final_Report.pdf.

¹⁷ See http://www.jisc.ac.uk/index.cfm?name=project_raiie.

¹⁸ See <http://www.insight.strath.ac.uk/projects/risk/documents/framework.pdf>.

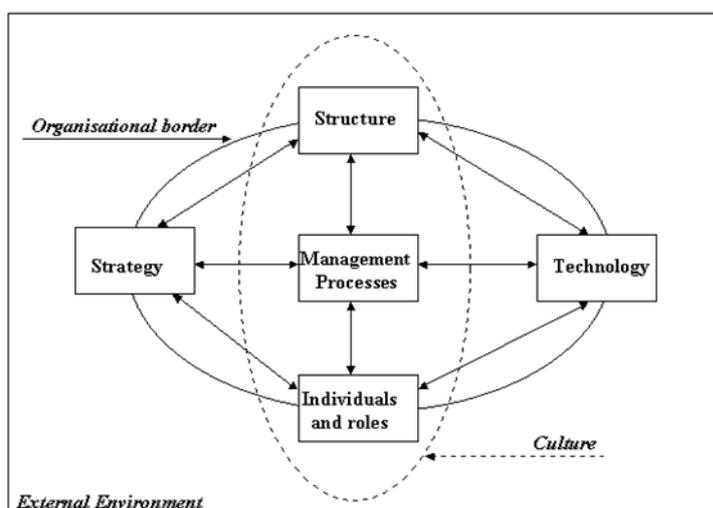


Figure 1: Scott-Morton's MIT90s Framework

2. Where has the MIT90s strategic framework been used before in e-learning?

This section contains an analysis of the main reports and presentations citing one of the above methodologies, concentrating on the MIT90s strategic framework.

A Google search on “MIT90s e-learning” yields 20 essentially distinct hits out of an overall 39. The companion search on “MIT90s elearning” yields 15 essentially distinct hits out of 33.¹⁹

This paper analyses the majority of the reports and related material arising from these searches. While it is likely that this slightly underestimates the amount of work on e-learning that references the MIT90s work, it is assumed that nowadays most research work on e-learning ends up with some trace on the web. (Even if not always an accurate trace.)

2.1 References to do with benchmarking

To begin with, three of the references are to do with the current benchmarking pilot, two being from Strathclyde²⁰ and one from myself.²¹ (This seems an under-estimate, but it is likely that several references to this work are still “in transit” to the Google databases.)

2.2 References to do with Australian work

Segrave et al

Two references are to Australian work by Stephen Segrave, Dale Holt and James Farmer, entitled “The power of the 6th model for enhancing academic teachers’ capacities for effective online teaching and learning: Benefits, initiatives and future directions”. This ended up as a paper in *AJET*,

¹⁹ Searches undertaken on 23 May 2006 using Google. Searches have been done since then and also using other search engines without materially affecting the conclusions. The number of hits is more affected by material being recently put on the web as a result of the work which led to this paper.

²⁰ See <http://www.heacademy.ac.uk/weblogs/pilot2/?p=7> and <http://www.heacademy.ac.uk/weblogs/pilot2/>.

²¹ See “Benchmarking e-learning: the role of WebCT usage reports” at http://gromit.webct.com/webct_europe_2006/Tu/Bacsich.ppt.

the *Australasian Journal of Educational Technology*²² – the precursor of this work was presented at the ASCILITE conference in December 2004.²³ For speed I review only the AJET paper.

The paper reflects on the need for a new paradigm of development for academic staff under the impact of a drive towards substantial use of ICT in an organisation, specifically Deakin University (which has a long tradition of distance learning and is now moving into e-learning). Reflecting on their earlier work with various collaborators on the MIT90s framework for strategic management of IT as applied to Australian universities, and on the local situation at Deakin University, in the context of work by Senge and others, the authors posit a 6 x 6 x 6 model for academic development. It is not clear that the model is a logical consequence of the earlier narrative (nor should it be) – rather, it comes from an intuitive leap generating by reflecting on earlier work by themselves and others, aided by a number of scaffolds, of which the MIT90s strategic framework is one – and only one, indeed one which does not make any appearance in the 6 x 6 x 6 model. (It is outside the scope of this paper but it is likely that Venkatraman’s later work on strategic alignment was of much more direct influence – see in particular figure 2 and the narrative preceding it.)

Thus in conclusion the MIT90s strategic framework was of use in the analysis but does not seem to have been a dominant influence or been a framework from which logical consequences were derived.

Note also that the paper refers to earlier work by Holt and Thompson which clearly draws on the same MIT90s tradition. This will be analysed next.

Holt and Thompson

Segrave et al, in the paper discussed above, reported that “Holt and Thompson (1998), drawing on the MIT90s strategic framework for managing IT (as used by DEETYA 1997), critically examined the five components of managing information and communications technologies (ICT) in relation to open and distance education”. This is confirmed by a report from Gooley and Towers, two of the Australian “Flexible learning leaders”, entitled “The journey towards a learning organisation”, where they state that:

Using the Massachusetts Institute of Technology (MIT) Management in the 1990s framework, Holt and Thompson (1998) suggest that there are five key factors in the strategic framework – strategy, technology, structure, management process, and staff skills and roles. They argue that strategy is the pivotal factor and is central to all the other factors, as over time it shapes each of these factors.

I think that the word “using” and “suggest” are rather strong, since the framework describes these as the key factors, so it is not clear what the added value of this sentence is. (And it is interesting that they left out the external environment.) Having said that, the next sentence is interesting and though challenged several times during the e-benchmarking pilot, is often at the heart of funding agency wishes.

Unfortunately there is no further public information on the web on this paper – in particular the Google search [Holt Thompson MIT “managing information technology in open”] yields no further data.

Work for DEETYA

A much more fruitful source of information comes from a report commissioned by DEETYA (a kind of analogue of DFES and HEFCE) in Australia. This is entitled *Managing the Introduction of Technology in the Delivery and Administration of Higher Education*. The study was led by Philip

²² *AJET* 2005, 21(1), pp. 118-135 – <http://www.ascilite.org.au/ajet/ajet21/segrave.html>.

²³ See “The 6 by the power of 3 model for enhancing academic teachers’ capacities for effective online teaching and learning: Benefits, initiatives and future directions”, <http://www.ascilite.org.au/conferences/perth04/procs/pdf/segrave.pdf>.

Yetton of the University of South Australia and is available on the web.²⁴ In the Executive Summary Yetton notes:

We studied twelve universities' management of IT in some detail with follow up investigations at another eight universities. We selected the MIT90s schema both to frame our field research and to structure our analysis. This assumes that an organisation's performance is a function of the level of fit²⁵ among five factors: strategy, roles and skills, management processes, structure and technology.

(Again they missed out the external environment.)

They go on (pages 12-13) to give a clear definition of "fit", which is well worth quoting in full.

To understand an organisation's strategic fit, we need to examine the relationships among all the five factors. Simply knowing an organisation's strategy will tell us very little about its performance, or about its likelihood of success. Similarly, knowing just its structure, technology or human resources, or its environment, each considered in isolation, provides a very limited basis on which to assess or forecast performance. We need to consider the gestalt or configuration of relationships across all of these organisational elements in order to predict and explain its performance. The congruence or pattern of relationships among these factors constitutes the particular form of strategic fit (Doty, Glick & Huber 1993). Organisations may have forms of fit that are distinctly different from each other, but that are highly effective for the set of contingencies they are facing. These organisations may be considered to be in a state of tight fit. Similarly, some patterns will be ineffective or inappropriate, and constitute a state of weak or fragile fit either among the factors within the organisation or between the organisational configuration and its environment (Miles & Snow 1994). The survival of such organisations is under threat.

Organisations in strategic fit have four characteristics.

- First, the effective integration of strategy, structure, management processes, technology and roles/skills creates a very focused organisational gestalt which simplifies formerly complex organisational and management demands.
- Second, this simplicity fosters a clarity of understanding within the organisation which reinforces and sustains fit. This means that the organisation structures, management processes (such as reward and control systems), and key technologies combine to support the strategic intent, as well as shaping the required task focus and behaviour of managers and employees.
- Third, simplicity reduces the need for elaborate and complex coordinating mechanisms, thereby freeing up resources which can be focused on value-generating activities.
- Fourth, the high levels of performance created by this strategic fit serve to reinforce the process by which it is attained, and thus further simplify the fit among the elements of the organisational gestalt.

Such a *tight fit*, both internally among the elements of the organisation and externally with its environment, is associated with high performance. As the environment changes, organisations which discover, articulate and evolve new and effective patterns of strategy,

²⁴ See <http://www.dest.gov.au/archive/highered/eippubs/eip9703/front.htm>.

²⁵ This is their name for the concept of strategic alignment first introduced by Venkatraman.

structure, management processes, technology and roles and skills create an early fit, which frequently results in high performance (Miles & Snow 1994).

Then they go on to perhaps the most interesting aspect:

A key question is how does an organisation, in this case a university, achieve this strategic fit? What paths of strategic change will lead it into fit? In the 1980s it was generally accepted that strategic change was a three-step process, driven by a top down strategic positioning perspective. First, a new strategy was identified and adopted. Second, the organisation was restructured to support that strategy. Finally, the IT strategy and the management processes were redefined and aligned to the organisational strategy and human resources trained in these new skills as required (see Figure 3). This conventional, rational model of strategic change assumes that successful change is the result of a formal process of strategic planning, in which IT is aligned to the dominant strategic design. In line with business organisations in other industries, many universities have explicitly adopted this top down positioning model of IT-based strategic change.

But the Australian authors' view (presumably sanctioned by DEETYA) is that this is not the whole story, or the only story.

More recently, other paths of IT-based strategic change have been identified (Yetton, Johnston & Craig 1994). Two of these paths to fit, or models of strategic change, were observed in this study. One begins with the building of core competencies based on gradually developing new roles and skills in combination with new management processes and technologies. This is better known as bottom-up management, in which strategies gradually emerge from the developing capabilities, and then are formally recognised or adopted by the organisation. In this model, successful strategic change builds on and leverages an organisation's core capabilities within the domain of an evolving strategic intent (Hamel and Prahalad 1989; Barney 1996). We observe a number of universities which are implicitly building innovation through IT strategic change in this way.

The other path begins with structure. A university restructures to create a 'subsidiary' to deliver education in a different way, often to new 'customers'. A typical example is the creation of distance education and open learning centres leveraged by developments in information and communications technologies. Once success has been achieved on a limited basis, the intention is either to grow the 'subsidiary' as fast as possible, so it becomes a major operation in its own right, or to use it as a role model from which other parts of the organisation can learn and thereby integrate the new mode of operation into the university. The choice depends on whether the students or customers served by the subsidiary are typical of the whole customer segment served by the organisation, or whether they constitute a different market segment.²⁶

The study gets even more trenchant in Chapter 6, written by Philip Yetton, Kim Johnston and Anne Forster (the last a global expert on e-learning now based at the University of Sydney), which is entitled "Managing IT-based Strategic Change: Integration and Conclusions". They say:

Chapters 2, 3, 4, and 5 in this report examined the management of technology issues facing universities with regard to strategy, roles and skills, management processes and structure. Each chapter took one of the pairings of technology with another element of the MIT90s framework, and described and analysed the management issues associated with each. They are briefly reviewed above. It would normally be assumed that proceeding to undertake a

²⁶ We do not seem to see so much of this model in the UK, although in their own separate ways the Robert Gordon Virtual Campus, the Interactive University (spun out of Heriot-Watt), the Middlesex University Global Campus and the University of Ulster Campus One, all have aspects of this.

combined analysis of all five elements together would increase the complexity in a more than additive fashion, in which case their management would be intractable.

Certainly, treating the issues as if they were independent, so that managerial action on each could be decoupled from the others, leaves the universities managing a very complex strategic change program. And this implicitly assumes that they can solve, for example, the conflict between the professional and machine bureaucracy within a university, which is currently an unresolved theoretical problem. Furthermore, there is no methodology for prioritising and ordering the multiple components of the resultant change program.

But what if the expected increase in complexity when we examine all five elements together does not occur? What if the reverse is true? Here we utilise the concept of fit introduced in Chapter 1 to show that when these five elements form congruent and reinforcing patterns of relationships, they represent organisational gestalts which have the capacity to simplify management problems and provide a tight focus for action. The counter-intuitive insight is that when the issue is analysed at a sufficiently high level of complexity, and the interdependencies among elements are considered, then under certain circumstances, the problem becomes tractable.

I hope I have quoted enough to show that the authors are convinced that the use of the MIT90s strategic framework was a useful analytic standpoint, considerably simplifying the work. The rest of the chapter and indeed the full report is well worth reading also.

There is also some flow-back into the MIT90s framework. The Conclusions chapter (chapter 6) recommends an alternative way of viewing the MIT90s framework which places Technology in the middle with Strategy and Structure above, and Skills and Management Processes below. The authors claim that among the advantages of this reconceptualisation it that it symbolises a better balance between top-down and bottom-up change approaches. Subsequent Australian work has further developed this viewpoint, as demonstrated next.

Sandra Wills

Professor Sandra Wills, one of the authors of the DEETYA study (Chapter 2 in particular) has continued her earlier work on the MIT90s framework. In a joint paper of 2006 with Russ Pennell,²⁷ she describes how the Yetton view of the framework developed in the 1997 DEETYA report has been used to inform strategic planning and implementation of the new MLE at the University of Wollongong. In particular the paper classifies the 22 “actions” of the Wollongong implementation plan into the five (internal) categories of the Yetton/MIT90s framework. This is highly relevant to the issue of “tagging” criterion-based benchmarking schemes such as Pick&Mix²⁸ with the MIT90s framework.

Even more specific to MIT90s and to UK benchmarking is her paper “Strategic Planning for Blended eLearning” presented to the IEE conference *ITHET06*, Sydney, July 2006.²⁹ In this she takes the issue of categorising the 22 actions of the University of Wollongong *eTeaching Business Plan* into the five categories (factors) of the Yetton/MIT90s framework. What is particularly useful to those engaged in similar tasks are the comments she makes on the process. For example:

²⁷ Pennell, Russ and Wills, Sandra, “Changing horses in mid-stream: a new LMS plus improved teaching”, *Ausweb06*, <http://ausweb.scu.edu.au/aw06/papers/refereed/pennell/paper.html>.

²⁸ See “Pick & Mix 2.0 beta 1 release notes”, 15 August 2006, <http://elearning.heacademy.ac.uk/weblogs/benchmarking/?p=139>.

²⁹ There is no URL yet for this paper. However the conference programme is at <http://ithet06.eng.uts.edu.au/>.

It is not always clear-cut which action belongs to which category as some actions cross boundaries. However they have been placed in the category which best represents their main thrust.

Of course this categorization does not reflect the amount of activity against any one action: for example, “Increase staff development opportunities” is a very large area compared with “Revise intellectual property statute”.

It reinforces that technology itself is a small part of the implementation process because the majority of actions are in the categories of Management Processes and Roles and Skills rather than the Technology category. In addition, a number of the Technology actions, such as “Underpin with Content Management System” (see last section of this paper), include sub-projects which are about roles and skills and culture change, further demonstrating that technology is not the whole story.

The author also reflects on the point that only some of the actions of the *Plan* are generalisable to the rest of the sector. In the remainder of the paper she analyses seven generalisable actions:

- Establish eTeaching committees
- Strengthen focus on Learning Designs
- Design new spaces for eTeaching and eLearning
- Increase Staff Development opportunities
- Increase and vary student support options
- Integrate emerging technologies
- Underpin with a Content Management System.

All of these could again be turned into benchmarking criteria.

2.3 *Work in New Zealand*

Those who study benchmarking e-learning are now well aware of the work from New Zealand on the e-Learning Maturity Model.³⁰ However, it is not as yet widely known that there is an interesting strand of work on MIT90s by Philip Uys, now at Charles Sturt University in Australia.³¹ In his 2000 PhD dissertation *Towards the Virtual Class: key management issues in tertiary education*,³² he describes the value of the MIT90s framework in structuring and analysing a large implementation action research programme. Reflecting on this programme he describes a number of good practice “heuristics” for each node of the MIT90s strategic framework, many of which can be transformed into benchmarking criteria. Thus the thesis is one of the few examples of flow-back into the MIT90s framework (chapters 2, 8 and 10 are particularly relevant).

For example, his first seven good practice heuristics for the factor “Individuals and their roles” state the need to:

1. Provide computer literacy training for students

³⁰ See <http://www.utdc.vuw.ac.nz/research/emml/>.

³¹ In part this is because at the time of writing, there were no Google hits at all on [Uys “MIT90s”]. Even more intriguingly, Philip Uys was in the UK in summer 2006 unbeknownst to the HE Academy benchmarking team. Thanks are due to Professor Sandra Wills of Australia for alerting me to his work.

³² PhD dissertation, Victoria University of Wellington, 2000, available at <http://www.globe-online.com/philip.uys/phdthesis>. (This was put online in September 2006.) Note that the dissertation mentions “MIT90s” only once in the whole document, yet the framework infuses his approach.

2. Address the concerns, perceptions and changing role of academic staff
3. Provide training and support for academic staff
4. Ensure that the scholarship of teaching is recognised and appreciated
5. Design an appropriate workload formula for teachers in networked education
6. Address authenticity in assessment and on-line communications
7. Address the social needs in learning of both students and teachers.

All seven can be turned into benchmarking criteria. All seven are refreshingly modern and practical in their applicability.

The Uys strand of MIT90s work also led on to a suggested variant of the MIT90s framework for applicability to “networked education management” in the pedagogic sense. This is conceptualised by first shrinking the MIT90s framework in a “fractal” way down from the institution level through the faculty/school/department to the workgroup level and indeed to the individual teacher moving to teach online. This aspect has been picked up by a number of commentators³³ and looks worthy of further attention (but the topic outside the scope of a benchmarking paper).

Finally, there is another strand of his work which led to a “LASO” (Leadership, Academic & Student Ownership and Readiness) Model for technological transformation in tertiary education, which has been used in the southern African situation – see his publications list for more details.³⁴

2.4 JISC and related work

Nicol’s MIT90s-related work on “risk” was briefly described in subsection 1.2. But there is more JISC work on MIT90s than this.

TALENT

TALENT was actually a TLTP project, not a JISC project although it later influenced the JISC ELTI project. The documentation produced by TALENT, the so-called *Book of TALENT*, is now on a web site at the University of Leicester.³⁵

The TALENT project was one of the first (in higher education circles) to make use of MIT90s methodologies. As described in an INLEI project report,³⁶ the MIT90s transformation model as re-interpreted by NCET was used in 1999 to derive an early e-learning benchmarking scheme with 14 criteria and a 1-5 scale:

The TALENT matrix describes five states of institutional readiness, from ‘localised’ to ‘innovative’, with brief descriptions of each state with respect to fourteen key factors. Institutions can be rated from one to five on each factor by choosing the description which matches most.

CDSS

However, an interesting comment comes from the CDSS project (Career Development of Learning Technology Staff: Scoping Study).³⁷ There it states (our italics):

³³ See for example Bridgeman, N. and Chamberlain, B. “Teaching and Learning: Educators experience collaborative learning”, paper for the conference Educators and Planners: Symphony or Discord, AAIR 1999, <http://www.aair.org.au/jir/1999Papers/bridgeman1.pdf#search=%22Uys%20%22MIT90%22%22>

³⁴ His publications list is online at <http://www.globe-online.com/philip.uys/>.

³⁵ See <http://www.le.ac.uk/talent/book/index.html>.

³⁶ See the “Context” report at <http://www.sfeuprojects.org.uk/inlei/context/context.html>.

³⁷ See http://www.jisc.ac.uk/uploaded_documents/cdss_final_report_v8.doc.

The final part of the audit tool was designed to collect data about a range of factors relating to current use of learning technologies at each institution. This section was based on an existing matrix developed by the TLTP3 TALENT project (TALENT 1999) and already used at a number of UK HEIs to audit institutional readiness for learning technologies. The TALENT matrix describes five states of institutional readiness, from 'localised' to 'innovative', with brief descriptions of each state with respect to fourteen key factors. Institutions can be rated from one to five on each factor by choosing the description which matches most.³⁸

The working group identified a number of problems with this matrix. First, it was based on a model that had been developed in by the MIT90 [sic] group in the US and defined readiness in terms of progress towards a highly centralised, managerial approach to the use of learning technologies, driven by top-down decision making. It was felt that this entailed a particular value judgement which did not sit comfortably with the hybrid culture of UK higher education. Second, the matrix descriptions often referred to a number of distinct issues within a single institutional description, and this proved confusing. Third, the aim was to capture the actual experience of learning and teaching staff at the institution in question rather than institutional mission statements, and it was felt that measures could be developed which gave more prominence to this viewpoint.

This first point in that last paragraph appears not entirely consistent with the views of the authors of the DEETYA report, who (as noted earlier) observed several distinct trajectories within the MIT90s framework and indeed produced a reinterpreted model which balanced top-down and bottom-up forces. The other two points are of more substance and indeed point two has affected some benchmarking approaches to this day.

INLEI

The INLEI project (Impact of Networked Learning)³⁹ carried out various literature searches and case study work relevant to this area. It started in December 2002 and ran until April 2004 – it is listed on JISC as “completed”. The JISC INLEI site does not list any deliverables. The project web site at UHI (the one listed by JISC) has an out of date feel and no documentary outcomes are listed. The JCALT meeting minutes of 28 May 2004 give an indication of some issues with the Final Report.⁴⁰ Yet there is a Final Report⁴¹ on an “official” site (SFEU), so that I feel comfortable in quoting from it. INLEI notes that:

Other projects have adopted and adapted the MIT90 [sic] model (Scott Morton, 1991) shown in Figure 2-1 [diagram omitted – see earlier] to provide a range of frameworks that can be used to analyse and investigate the processes of institutional change resulting from networked learning activity.

However, it then goes on rather confusingly to talk about the *other* MIT90s model:

³⁸ This is based on the transformation model component of MIT90s (on which there are some reservations), not on the strategic framework component.

³⁹ See http://www.jisc.ac.uk/index.cfm?name=project_inlei and <http://www.learn.uhi.ac.uk/jisc/index.htm>.

⁴⁰ In <http://www.jisc.ac.uk/jcalt20.html> it is noted that: “Members DISCUSSED the final report from the INLEI project team. It was recognised that some good outputs could be extracted from this study and that some rich data had been gathered. Members were concerned that this data should be used effectively and felt that this work could be built upon or joined up with other work. The committee AGREED that the name of the project should be changed to have clearer meaning, and the value of the report teased out. In particular it was AGREED that the case studies should be reviewed to identify key messages.” There is also a rather cryptic but possibly supportive reference in the JOS minutes of 23 September 2004 (<http://www.jisc.ac.uk/jos21.html>).

⁴¹ See <http://www.sfeuprojects.org.uk/inlei/> for the Final Report in HTML format (separate chapters) and in PDF format (consolidated version).

For example two UK projects, Citscapes (2002) and TALENT (1999), adapted one of the MIT90s models (Venkatraman's model) to create a **transformation model**,... which describes the stages an institution may go through in the process of transforming from a traditional institution to an ICT led educational institution...

2.5 *Becta work*

Becta (and their predecessor NCET) have made use of the MIT90s ideas at various times. The transformation model was used as the basis for the Becta and LSDA benchmarking scheme oriented to further education – but this is out of scope for this report which focusses purely on HE.

Becta staff have made a number of presentations on these topics. For example, Dave Hassell made a presentation, “Personalised Learning – Vision into Reality”, to the South West Grid for Learning in November 2004.⁴² This mentions only the transformation model.

2.6 *References in presentations from Chris Yapp*

A web search establishes that there are a number of relevant presentations associated with the name of Chris Yapp (Head of Public Sector Innovation, Microsoft). Since he is such an influential thinker on e-learning, I feel that several need careful analysis. They include:

1. Chris Yapp, “Personalisation for all: organising for personalisation at scale”, presentation delivered at the Post-16 e-Learning Practitioners’ Conference, November 2004.⁴³ In this he covers the need for business process re-engineering, change of teachers’ roles, etc – but with slides on both the MIT90s transformation levels and the strategic framework.
2. Chris Yapp, “Personalisation for all: organising for personalisation at scale”, presentation delivered at *ASEM* 2005 (4th Conference on e-Commerce), London, February 2005.⁴⁴ In this he delivers the same sort of presentation as number 1. Since this was a recent DTi-sponsored event and Chris is regarded in most circles as “on message” (sometimes the message comes from him), it tends to confirm that the MIT90s work is still well-regarded by DTi and DfES.
3. Chris Yapp, “Personalisation for all?”⁴⁵ This appears to be a presentation base from the Microsoft library which Chris would then customise (personalise) for the particular audience.
4. Chris Yapp, “What about the teachers? Education reform for the Knowledge Society – the dynamics of change”.⁴⁶ The URL indicates that this was given at a conference or meeting of the e-Learning Foundation, with which Chris was associated.⁴⁷

⁴² See <http://www.swgfl.org.uk/admin/eventsimages/PersonalisedLearningDavidHassell.ppt> and https://portal.swgfl.org.uk/ContentStore/_Public/Documents/0006200/6281/SWGfL%20DH%20presentation%2028-04-05.ppt (note the apparent weird date).

⁴³ See http://ferl.becta.org.uk/content_files/ferl/pages/news_events/events/2004/november/keynote_presentations/chris_yapp.ppt. This sort of presentation was current among a number of presenters from the late 1990s but adds a dash of the “mass customisation” rhetoric popular among strategic thinkers in the early UKeU era.

⁴⁴ See http://www.asemec-london.org/presentations/elearning_d1_2.pdf. (There is also a collection of Chris’s slides among all the first day’s slides at http://www.asemec-london.org/presentations/elearning_d1_all.pdf.)

⁴⁵ See http://download.microsoft.com/documents/uk/education/promo-events/Personalisation_for_all-Chris_Yapp.ppt. There is no valid internal date in the document so that I cannot tell when it was created (the internal date of 1 January 1901 is regarded as implausible).

⁴⁶ See <http://www.e-learningfoundation.com/uploads/Chris%20Yapp%20presentation.pdf>.

⁴⁷ The date (of 30 September 2003), the graphic style (more workaday than the Microsoft presentations) and the affiliation (HP not Microsoft) all confirm that this is from an earlier era than the ones above. (It would be a fascinating “history of ideas” analysis to work out how Chris’s presentations have evolved – something for any keen MSc students around.)

5. Chris Yapp, “The Renaissance of Learning: Education reform for the Knowledge Society”, presentation to Leeds Metropolitan University.⁴⁸ It is wide-ranging.

2.7 Related searches

MIT90

A related search on [MIT90 “e-learning”] yields 6 essentially distinct results. However, only two of these are new and interesting.

The first is a useful set of “Notes from *Supporting Sustainable eLearning Forum* workshop: Supporting institutional change: the changing role of students and staff” held in London on 7 August 2004.⁴⁹ This has a survey of various projects but for me the most useful information is a quote from Phil Poole (now at Canterbury Christ Church University):

“The Transformation model was based on models developed by the MIT90s project at the Massachusetts Institute for Technology (Scott Morton, 1991). One of these models, Venkatraman’s model, was later adapted to explore the development of Communications and Information Technology (C&IT) skills at educational institutions in two UK projects: Citscapes and TALENT (Derbyshire, 1999, and Martin, 2002). Venkatraman’s model, whilst occasionally referred to as the MIT90 model, became more widely known as the ‘Transformation Model’, as it described the transformation from traditional to ICT (Information and Communication Technology) led institutions.”⁵⁰
http://www.shef.ac.uk/nlc2004/Proceedings/Symposia/Symposium8/Weedon_et_al.htm.⁵¹

I have used the phrase “transformation model” in this report in deference to this quote.

The second is the presentation made by Helen Beetham to the Higher Education Academy Town Meeting on benchmarking.⁵² In a comment perhaps rather overlooked in the “drang nach benchmarking” she noted:

Tools for auditing institutional ‘readiness for’ LTs have been developed for use in the UK (e.g. BeCTA, 1998; TALENT, 1999) based on the work of the MIT90 [sic] group in the US, which defines readiness in terms of progress towards centralised budgets and administrative structures, top-down strategic decisions, clear divisions of labour and a focus on competitive advantage...

Although business process models account well for the rational, centralising force of information technologies, they account poorly for the impact of those technologies on the life of academic institutions, and the attempts on the part of human players to reassert their identities.

However, she then went on to pose an alternative “developmental” viewpoint and provide information on the ELTI project. However, this may be a false dichotomy – there are many other

⁴⁸ See http://www.leedsmet.ac.uk/teaching/Ita/downloads/yapp_presentation.ppt. The date (original of 15 December 2003 but edited 20 November 2004), the graphic style (transitional from HP to Microsoft) and the affiliation (Microsoft, but clearly early on) make it clear that this was a “bridge” sort of presentation.

⁴⁹ See http://www.heacademy.ac.uk/learningandteaching/EL007D_SSeLFWorkshopNotes.rtf.

⁵⁰ This is very similar to the quote from INLEI given above.

⁵¹ This takes a cautious evidence-informed view of transformation levels and their inexorability. See http://web.archive.org/web/20040616191501/http://www.shef.ac.uk/nlc2004/Proceedings/Symposia/Symposium8/Weedon_et_al.htm.

⁵² See <http://www.heacademy.ac.uk/learningandteaching/ELO54PresentationHB.ppt>.

analytic standpoints including more modern MIT-related developments of the old MIT90s work (some even by the same authors), as noted above and in the work of the NESIS group at Bath.

A search on [MIT90 elearning] yields nothing new.

MITs 90

A search on [“MITs 90” e-learning] yields three results. One is from Strathclyde themselves.⁵³ Confusingly, the phrase “MITs 90” is used in their presentation on benchmarking.⁵⁴

2.8 *The work with ICL on “Managing Change in Higher Education”*

A possibly salutary lesson on the limitations of web searching, or at least the need to keep one’s network of human contacts,⁵⁵ is the relevance of the ICL OPENframework to MIT90s. (The Google search [“OPENframework” “MIT90s”] generates no hits.)

The OPENframework was first publicly applied to higher education with the release of the book *Managing Change in Higher Education* in 1996.⁵⁶ This book was written by a large team led by Peter Ford and including Peter Goodyear (now at the University of Sydney), Jonathan Darby and others, including two from ICL. (ICL were one of the main corporate sponsors of the MIT90s programme and a senior ICL person was one of the authors of the MIT90s book. It is on record⁵⁷ that Chris Yapp was involved both in the MIT90s project at MIT and in OPENframework.)

Peter Ford was a keynote speaker at the JISC Annual Conference in 2005 and the biography for him described the book as “the stimulus to some key work undertaken by JISC concerning its Information Strategy in the late 1990s”.⁵⁸

The book makes explicit reference to the MIT90s work, in particular the MIT90s business transformation levels (Figure 3.5 on page 31 of the paperback), but intriguingly neither “MIT” nor “MIT90s” (nor any of the usual variants) appear in the index. However, it seems clear that the OPENframework is an elaboration of the MIT90s strategic framework (with around 18 elements, depending on how one defines an element) – apart from any narrative and conceptual similarities, one can compare Figure 1.1 on the “Learning Environment Architecture” (page 5 in the paperback) with Figure 1-2 on “The MIT90s framework” on page 20 of the MIT90s book, noting the similar terminology and even the positioning of the “socioeconomic” and “technological” externalities.

The book is widely cited, and not only by its authors, but there is only a little evidence (e.g. at the University of Hull)⁵⁹ that any institution has applied the methodology. It attracted a number of not entirely sympathetic reviews. Some were from the “usual suspects” of traditional academics who tend to regard anything to do with BPR or even change management with suspicion but others were from

⁵³ See <http://www.heacademy.ac.uk/learningandteaching/eLBPilotUniversityofStrathclyde.ppt>.

⁵⁴ It is even more confusing that its title on Google search comes up with “Why choose WebCT?”

⁵⁵ I am indebted to Jonathan Darby for alerting me to this book, when discussing the MIT90s approach with him.

⁵⁶ Its full title is *Managing Change in Higher Education: A Learning Environment Architecture*, Society for Research into Higher Education and Open University Press, Buckingham, 1996, ISBN 0 335 19791 4 (paperback).

⁵⁷ See his CV at <http://www.cs.ncl.ac.uk/research/events/intseminars/1999/speakers.html>.

⁵⁸ See the conference report at <http://www.ariadne.ac.uk/issue44/jisc-conf-rpt/>. This also mentions that Peter Ford is working on a new book due in 2005 but Amazon does not record this as yet published.

⁵⁹ The University of Hull records using OPENframework – see the JISC Case Study report at http://www.jisc.ac.uk/uploaded_documents/hullbklt.pdf#search=%22%22OPENframework%22%20university%22. However, this is the only Google hit in the world for [“information strategy” “OPENframework” university].

more neutral commentators. In particular a relatively recent review from Michael Kerres in 2004⁶⁰ observed that: “One of the seminal publications presenting an approach that has reached much attention is from a group of authors from the UK that – although published in 1996 – still is interesting to read.” However, he goes on to note that in it is a “rather complex analytical framework” and that the book “does not present any evidence about the feasibility or applicability of the approach”. More telling are the comments from the relatively recent (September 2004) *JISC Review of Managed Learning Environment (MLE) Activity* by Glenaffric.⁶¹ While in paragraph 5.1.8 Glenaffric noted that: “Another key influence on the development of an MLE concept was the 1996 book by Peter Ford and colleagues entitled *Managing Change in Higher Education: a Learning Environment Architecture* (Ford et al, 1996), which had the status of a mandatory reference manual for all members of the MLESG”,⁶² there was a footnote to that paragraph which observed that: “It is not clear why the text failed to find favour beyond the MLESG but it may have been that the approach was too revolutionary or because its origins lay with International Computers Limited (ICL) who developed OPENframework”.

It is beyond the scope of this short paper to speculate what were the issues that prevented the wider use of OPENframework in higher education or what could have been done or might even be done now to put right the situation. As a general observation, it is true (even if a sad fact) that in education, as in much of business, simpler models tend to find more favour. There are some small variants of the MIT90s model as in the work of Uys that might usefully be thought about more. As an interesting continental European contrast, the work by Schönwald at the Swiss Centre for Innovations in Learning (who are closely associated with the Swiss Virtual Campus) might repay further attention.⁶³

The Glenaffric report also has many useful historical observations which make it clear that in detailed ways the climate for MLEs and how they might be deployed was very different in the mid to late 1990s from what it is now as we enter a post-MLE world. For a wider overview of the history of virtual learning environments see the relevant Wikipedia article.⁶⁴

3. What is the evidence that the methodology is still valid outside higher education?

To some not much older than the “net generation” it may be surprising that insights gained from US corporates prior to the rise of the Internet and web can still be valid. Yet there seems to be a constant flow of citations of the MIT90s work, implying that it is seminal, including outside education. This broader aspect is the core topic of this section.

⁶⁰ See <http://www.elearning-reviews.org/topics/culture/change-management/1996-ford-et-al-managing-change-higher-education>. Michael Kerres is Professor of Education and director of the Duisburg Learning Lab, University of Duisburg-Essen (Germany). In 2004 he was Fellow at the Swiss Center for Innovations of Learning, University of St. Gallen (CH), which is heavily involved in the Swiss Virtual Campus.

⁶¹ Glenaffric Ltd eLearning Consultants have carried out several delicate reviews of e-learning activities for JISC and similar bodies in the last few years – see their portfolio at <http://www.glenaffric.com/portfolio.html>.

⁶² The members of MLESG, the MLE Steering Group are listed in section 8 of the *MLE Interoperability Pilots: main report* (of the MLE Steering Group), March 2002 – see http://www.jisc.ac.uk/uploaded_documents/interop_final_main.doc. Since there had been no criticism of the book in the JISC report commissioned from Jos Boys in March 2002 (http://www.jisc.ac.uk/index.cfm?name=mle_related_joined) it seems that the MLESG were happy with the OPENframework approach but could not communicate their enthusiasm beyond their own circles to a wider circle of higher education theorists and managers perhaps less technically aware than the members of MLESG.

⁶³ See “Sustainable implementation of E-Learning as a change process at universities”, paper for Online Educa 2003, <http://www.scil.ch/publications/docs/2003-12-online-educa-schoenwald.pdf#search=%22sustainable%20implementation%20swiss%20centre%22>.

⁶⁴ See http://en.wikipedia.org/wiki/History_of_virtual_learning_environments.

3.1 *The situation in MIT*

Within MIT itself, the game has moved on. A more recent programme, perhaps the successor to the MIT90s programme, is the initiative “Inventing the Organizations of the 21st Century” launched by MIT in 1994. This initiative, which has also now ended (just before 2000 started) was co-directed by Professor Thomas Malone and Professor Michael S Scott Morton.⁶⁵ A quick survey of the work undertaken reveals nothing directly impacting on e-learning, although there are several that mention learning (sometimes as organisational learning), collaboration, and post-modern organisational constructs such as guild structures. While it is a truism that universities are still rather conservative places, it is also a truism that in some of their operations and decision-making they are very unlike traditional business organisations. It would be a much larger study (and of dubious value to the current debate) to do a detailed study of what material from this initiative was relevant. As a depressing indicator, note that there are only two hits for “e-learning” on the Sloan web site.⁶⁶ But one can imagine that a distinguished professor at MIT might be flattered that his ancient work was still being cited but also be mystified that readers were not using his more up to date theories.

It is not clear what in turn has replaced the “Inventing the Organizations of the 21st Century” initiative, which after all ended over six years ago. It seems from the list of Research Centres⁶⁷ at Sloan that there is no direct follow-on. However, a note on the initiative’s web site states that “The research begun in this initiative is now continuing in a variety of other places at MIT, including the Center for eBusiness and the Center for Coordination Science”.

Finally note that there are only 10 hits for a Google search on [benchmarking e-learning “Inventing the Organizations of the 21st Century”] and none of them are relevant. Thus either the site has not been mined, or no relevant ore has been extracted.

3.1 *The work at Bath (NESIS project)*

MIT90s work is referenced in a report from a team at the University of Bath working on the EU NESIS project (New Economy Statistical Information System). Their “Final Report on Conceptualisation and Analysis of the New Information Economy” (Deliverable D 5.3⁶⁸ of the project) is replete with information particularly relevant to those interested in benchmarking e-learning, especially at a national level. In particular the material on Pillar 3 “Human Investment and the New Economy” contains many references to e-learning and relevant indicators thereof – and I recommend that this material is analysed at some future stage. But this is not my focus in the current report – the focus here is on MIT90s aspects in higher education institutions not at the national level.

In that more narrow context, Section 2.2 on “Pillar 2: Productivity and Competitiveness”, especially the narrative on pages 56-81, is particularly recommended. The MIT90s model (or framework) is introduced by the standard diagram at the bottom of page 58 and then two key paragraphs follow (our italics).

The model provides the basis for considering the issues that a firm needs to address, when planning its ICT investments. The business strategy sets the overall direction for the firm. Information systems can play two roles here. First, information systems can provide the information so that the business knows whether it is successful. Second, information systems may provide an alternative route for the delivery of the product or service. Different organisational structures may require different information systems set-ups. A new strategy

⁶⁵ See <http://ccs.mit.edu/21c/>.

⁶⁶ Google search on “e-learning site:mitsloan.mit.edu”. (There are no hits for “elearning site:mitsloan.mit.edu”).

⁶⁷ See <http://mitsloan.mit.edu/faculty/c-main.php>.

⁶⁸ See http://www.bath.ac.uk/soc-pol/research/nesis/D5.3%2027th%20August%20submitted1.doc?cPath=10135&products_id=1080.

many require different access to information for managers. The management processes need to be considered in deciding on appropriate ICT. For example, in a production environment there is likely to be an emphasis on control to monitor inventory and work in progress to ensure best use of resources. Technology and systems change rapidly. The firm needs to review the existing technologies to ensure that they are able to achieve the new targets set by the business strategy. Finally, there is a need to ensure that all staff have the skills to succeed in the new strategic environment.

The wider issues raised by the MIT90s framework have been explored by the OECD in a range of initiatives to develop statistical indicators to measure the information economy, such as OECD (2002d), and in particular the Electronic Commerce Business Impacts Project (EBIP). The EBIP project looks beyond easy to measure indicators and considers innovation within firms in the areas of products, processes, and relationships through multiple in-depth case studies. In addition, the assumptions in the EU documentation that effort needs to be concentrated on the advanced areas of computing research is questioned by discussion within the OECD of whether a strong local ICT-producing industry is necessary for competitiveness benefits to arise in the rest of the economy (OECD, 2001b).

From this material it is clear that the MIT90s model is regarded as relevant to the current analytic needs of major organisations (EU, OECD, etc) and the impression is confirmed in the rest of the section, which expertly summarises a vast amount of *recent* information systems and business research relevant to the issue. Many other issues come out – too many to go into here – which also could have impact on benchmarking e-learning – including the beginnings of a *business* (not rhetorical) justification for why institutions need to network (in human terms) with each other in order to innovate.

On the other hand, there is no evidence that the MIT90s levels of business transformation are now seen as relevant. In fact, a rather different (essentially three-stage; the fourth stage is an output) classification of innovation processes is given. Again, a rather long quote (our italics):

The conceptual framework developed for [this] Deliverable D 5.1 employed a model of innovation with four stages. The choice and definition of these four stages was informed by a variety of literatures, including sociological models of learning and innovation, neo-Schumpeterian accounts of economic growth and neo-classical approaches to the production, embodiment and diffusion of innovation. Our approach was eclectic and pragmatic. In the preparation of the present report, we have deepened and widened our stocktaking on these literatures, and the results are embodied in the conceptual working papers which accompany this report, as a series of Annexes. These provide the conceptual underpinning to the analysis in the main report.

The four stages of innovation and transformation identified for Deliverable D 5.1 remain at the centre of our model.

Stage 1: Preparation and Invention

In face of the risks and opportunities presented by technological advance, enterprises, public services and many other organisations are obliged to take note of the new situation they create. The same, indeed, is true of households. These actors scan and plan. They take stock of their own capacities and resources, but also those that are available to them in the wider society through the national, European and international innovation system. They proceed to devise inventive responses in the light of available leading edge practice, whose identification may be helped by benchmarking market leaders.

Stage 2: Application

Enterprises, public service organisations and many other organisations undertake innovations, embodying these in their practices through a process of learning by doing. Households also seek to cope with the new risks and opportunities which these technologies create, investing in their human capital and using the new technologies to implement their life projects. Each of these actors is riding successive waves of ICT advance: trying to avoid falling victim to its creative destruction, aiming instead to exploit its potentialities by a process of continuous innovation and transformation. *The result can be trajectories of cumulative strengthening and weakening of actors' positions. At the same time, however, new technologies may also offer opportunities for actors to escape, leapfrogging the trajectories in which they might seem to be locked.*

Stage 3: Diffusion

Processes of innovation at the micro-level are having pervasive effects at the macro-level, transforming the whole socio-economic system. Successive waves of technological change will provide the impulse to successive waves of innovatory activity, rippling through the socio-economic system. This will reshape the national innovation system and the terms on which actors cope with each subsequent impulse. *Diffusion also involves domination, with those who drive the innovation process setting the terms on which others can participate in the new economy.*

Stage 4: Outcomes

The *outcomes* of these processes of innovation and transformation can be conceptualised and measured in a variety of ways: we choose those that are of particular relevance to the four Pillars, in terms of which the NESIS work is organised. Some of these outcomes pose particular conceptual and methodological difficulties and were therefore the subject of working papers prepared in anticipation of this Deliverable...

The last sentence is a cautionary message to those who regard creation of benchmarking systems as a quick exercise.

3.3 *Some more recent papers on MIT90s from business schools*

Out of a mass of papers, two caught my eye.

New paths to alignment

The first is "IS Alignment in Small Firms: New Paths through the Maze" by Levy, Powell and Yetton – the last name is the Yetton of the DEETYA report discussed earlier – found on a site at LSE.⁶⁹ The paper is from around 2003 – it has no publication date but it has an internal date of June 2003 and the latest reference cited is from 2002. The "maze" referred to is the network of five factors surrounded by the "external environment" in the MIT90s strategic framework. At the beginning of section 2 "Opportunities for Strategic Alignment" the authors state (our italics):

The MIT90s model argues that a successful organization has a high fit among its strategy, structure, roles and skills, management processes and technology, and between that configuration and its business environment (Scott Morton 1991). *The 'classical' or conventional alignment model (Figure 1)⁷⁰ starts with a change in strategy.* This changes structure, which in turn leads to change in processes, technology and individuals and roles. While Scott Morton suggests that there is one path for strategic alignment, *Yetton et al (1994)*

⁶⁹ See <http://is2.lse.ac.uk/asp/aspecis/20030124.pdf>.

⁷⁰ All Figures are omitted.

demonstrate that it is possible for technology to be the driver of change. For example, a firm of architects, Flower and Samios, transformed their business by adopting computer-aided design tools. Their path was to develop individuals, then change the management structure. The strategic vision evolved dynamically and grew out of the changes made. Yetton (1997) argues that the adoption of technology led Flower and Samios to identify other uses, in particular as a means of cost reduction and improving efficiency. Competitiveness may depend on organizations' abilities to derive new competencies as much as the determination of strategic direction enabled by IT (Craig and Yetton 1997).

Yetton et al (1994) demonstrate three paths through the alignment elements. The first, *technological determinism, commences with a change in technology that forces change in the other four elements* (Figure 2). The lead-lag model (Figure 3) involves change in strategy, technology and structure but leaves processes and individuals and roles untouched. Finally, there is the path found at the architectural practice model (Figure 4)

However, in one of the other major studies of alignment paths Hsiao and Ormerod (1998) find four different paths. *Two planned paths emphasize the centrality of strategy – structural reconfiguration (Figure 5) and process engineering (Figure 6)- while the other two emergent paths – human renewal (Figure 7) and IT transformation (Figure 8) – lead with individuals and technology respectively.*

The paper is well worth reading in its entirety (it is quite short) but clearly makes the point that *there are various routes to strategic alignment*, all potentially valid, and that non top-down routes are of interest, not just to “whingeing academics”. There are also some interesting methodological issues for someone else to explore as to whether experiences of SMEs are more relevant to universities than at first sight might be evident.

Readers will note that Yetton's work was mentioned a lot in the above quotes. To complete the background on him, mention should be made of his book with Christopher Sauer, *Steps to the Future: Fresh Thinking on the Management of IT-Based Organizational Transformation*, Jossey-Bass Business & Management Series, 1997.

Compound business models

The second paper, by Hedman and Kalling, is harder going. It is entitled “The Business Model: A means to comprehend the management and business context of information and communications technology” and was presented at the European Conference on Information Systems 2002 conference in Poland.⁷¹ Its basic point is that viable predictions will come only from a computational “business model” that integrates several methodologies. I precis the introduction only.

In order to understand how Information and Communication Technologies (ICT) create or erode economic value of business and strategy, we argue that it is important to understand the logic and structure of the *business context* of ICT. Within information systems research, there is a range of different approaches and frameworks to explain ICT and business strategy, we assume, because, 1) the field of business strategy as a theoretic field is relatively fragmented and has not been particularly interested in ICT, 2) there is a lack of knowledge about strategy theories (Sambamurthy, 2000), and 3) because of lacking abilities to integrate disparate strategy models and theories within information systems research (cf. Flatten et al., 1992; Applegate et al., 1999). Existing information systems research tends not to be able to measure the bottom-line contribution of ICT investments – the so-called IT Productivity Paradox (e.g. Strassman, 1985; Brynjolfsson, 1993; Barua & Mukhopadhyay, 2000; Sambamurthy, 2000).

⁷¹ See <http://is2.lse.ac.uk/asp/aspecis/20020064.pdf>.

We believe this may be due to a shortage of models that explain the impact of ICT on other resources (e.g. knowledge, people, and structure), on different activities and functions, and subsequently on product offerings, and the longitudinal management process. *Within the field of strategy there are few holistic models* which incorporate the finer aspects of strategy, e.g. resource-bases, competences, activities, organisational structure, culture and politics, products, markets, competitors, environmental factors etc. In fact, strategists still tend to argue about what it is that make companies successful, e.g. whether it is firm-internal resources (Barney, 1991), whether it is successful reconfiguration of the value chain (Porter, 1985) or generic strategy (Porter, 1980). This problem is extended into ICT research.

For the purpose of understanding better the economic context of ICT, it would be valuable to integrate the different theories and frameworks into one model, i.e. a *business model*. It would probably be good for other types of resources as well, e.g. knowledge, brand names, machinery etc, *but we believe it is particularly important for ICT resources*. They are complex in nature, they are supposedly creating value on the product market, they impose their own logic of the world on activities, structure, and strategy, and they are financially and technically demanding (cf. Davenport, 2000). *We also believe that one integrative model should incorporate the management process dimension of ICT*. Although there is always a rationalistic idea about how to analyse, decide and implement ICT, many political and cultural obstacles lie in the way between the investment and economic success. Hence this paper describes how such a *business model* could be outlined and which theories it could draw upon.

... It could be that business managers in general regard strategy changes as difficult. They can only manage smaller modifications, such as entering a new geographical or demographical market, innovating new products or processes, or extend their knowledge – they are becoming path dependent. Radical strategy changes, such as ‘strategic leaps’, seem to appear more seldom – and in those cases changes are so radical that the entire business model is changed anyway (Upton & McAffe, 2000). In addition, it is always difficult to discuss strategic management if one excludes such things as competence management, knowledge management, organisation, politics, and culture etc, because these are the elements that business managers (have to) work with. The concept of business models is frequently used in conjunction with e-business research (e.g. Timmers, 1998; Rappa, 2000; Afuah & Tucci, 2001; Applegate, 2000; Weill & Vitale, 2001). However, few of these discuss the theoretical sub-constructs of their models, but from solely in ‘specific’ empirically identified business models. Theoretical literature on the business model is relatively scarce, even though the concept is becoming increasingly popular, albeit criticised (cf. Porter, 2001)

3.4 *More recent and variant frameworks*

Life moves on outside MIT also, and there are a number of newer approaches, plus a number of variants of MIT90s – some even come from earlier eras. As a starter, I analysed the syllabus of a typical modern “IT Systems and Strategy” course, in this case the course CS852 from the School of Computer Science at the University of Manchester.⁷² In the section on “Strategy Frameworks”, it remarks (our italics and bold italics):

The central problem in information systems strategy is how to relate IT investments and strategies to business strategy. *Several different approaches to this problem will be discussed including the McKinsey 7S model, MIT 90s framework, the socio-technical approach through to more recent developments such as Keen’s Reach/Range/Responsiveness model and the business operating system. All of these approaches have a common theme of alignment.* As the costs of IT investment have risen, a related problem of how to align the IT strategy with

⁷² See http://www.cs.manchester.ac.uk/Study_subweb/Postgrad/ACS-CS/webpages/syllabus/acs/CS852.php.

the business strategy is that of return on investment and how to measure the benefits of IT systems. There have been several approaches to the alignment problem ranging from the application of pure strategy models to develop IT strategies through to technology specific models such as ERP implementation models. An overview of the different approaches will be given and applied to companies in different sectors to illustrate the concepts. The tutorial reading by Markus (2000) gives an authoritative overview of how business and technology innovations are closely related to each other, and also proposes why problems still persist in IT deployment.

Due to space and time limitations, I expand on only two of these, hopefully the most relevant.

McKinsey 7S model

This is described succinctly in several places – I liked the reasonably recent description for NHS managers in Scotland done in 2001.⁷³ The comments in [] position 7S in terms of MIT90s.

Developed by Waterman, Peters and Phillips (1980),⁷⁴ the 7S model can be used as a framework for thinking constructively about the complexity, interdependence and fragmentation of a change programme.

It is based on the concept that there are seven areas of an organisation that need to work in harmony with one another. These areas comprise both hard and soft components:

Hard Ss

- **Strategy:** a plan to reach identified goals [also in MIT90s]
- **Structure:** the main features of the organisational structure and the interconnections between them which are influenced by strategy and organisational size and diversity [also in MIT90s]
- **Systems:** procedures and processes that support the strategy and structure. [“Management Processes” in MIT90s]

Soft Ss

- **Style/culture:** organisational culture and management style (values, beliefs, norms and behaviours) [this is a “container” not a node in MIT90s, and so susceptible to being ignored]
- **Staff:** the people within the organisation [“Individuals and their roles” in MIT90s]
- **Skills:** the capabilities of the organisation and people within the organisation [included with Staff in MIT90s?]
- **Shared values:** guiding concepts and fundamental ideas imbedded within the organisation. [taken along with “Culture” in MIT90s?]

These elements all interlink and are therefore affected by one another. When a change is made to one or more of these areas, there will be an impact on all of the other areas.

⁷³ See

http://www.workinginhealth.com/workforce/wih_dt_disp_temp.jsp;jsessionid=D84189D7BFDF3BF8BC5E2A684581FDAA?pContentID=1221&p_applic=CCC&p_service=Content.show&.

⁷⁴ See Waterman, R. H., Peters, T. J. & Phillips, J. R. (1980) “Structure is not organization”, *Business Horizons* 23(3) pp. 14-26.

Therefore, a change in one will necessitate complementary changes in the others.

A common mistake in change programmes is that attention is on the Hard Ss, with little done to align the Soft Ss with the change.

However, the Soft Ss can make or break a change programme. Imagine, for example, a change initiative to empower teams within an organisation, creating a flatter organisational structure.

The strategy, structure and systems can be established, but if managers and individuals are not trained in the appropriate skills, it cannot be successful.

One of the attractions of this, despite its age, is that it “reifies” style/culture and shared values, which are of particular resonance in a university – and leave a slot into which one can insert pedagogy, which has no place as such in MIT90s. On the other hand, one of its weaknesses is that, due to its age, it leaves out IT.

Keen’s Reach/Range/Responsiveness model

This is one of the more exotic and more IT-specific models. Peter Keen⁷⁵ is a globetrotting management guru, known both to corporates and to universities.⁷⁶ In a series of books and articles⁷⁷ dating from the early 1990s, he has argued that reach, range and responsiveness are what will typify successful global organisations.

3.5 Conclusions

There is much more that could be said but I hope that these snippets demonstrate that the MIT90s strategic framework is one but only one of the methodologies under active consideration in the business world. However, it does seem the one that has by far generated most interest from IT and e-learning analysts in universities.⁷⁸

4. Where are the gurus of this methodology?

Clearly the founding guru of this methodology is Michael S Scott Morton. He is still at MIT but now Professor Emeritus, and still jointly publishing articles as late as 2003.⁷⁹

⁷⁵ See <http://www.peterkeen.com/>.

⁷⁶ He is Visiting Professor at the Technical University of Delft and was Visiting School at the University of Sydney, 2004-05.

⁷⁷ See <http://www.peterkeen.com/recent/books/index.htm> and <http://www.peterkeen.com/recent/articles/index.htm>.

⁷⁸ By comparison, at least. There are no non-trivial hits for [“McKinsey 7S” model] e-learning on Google. However, among the near-misses is a mysterious and to some eyes scary document *USACE 2012 Future Corporate and Headquarters Design Study: Aligning the U.S. Army Corps of Engineers for Success in the 21st Century* (April 2003) in which they discuss using a modified 7S model to ensure that the Corps becomes a “learning organisation”. Another is a PhD dissertation (March 2005) on “Nexus between organisational culture and IT implementation in Vietnamese organisations”, which, inter alia, establishes that 7S is still a viable research approach for IT strategy issues worldwide.

There are also no non-trivial hits for [“Peter Keen” reach range responsiveness e-learning] on Google. Interestingly while doing that search, I came across an interesting book chapter “Competing with Information Technology”, dating from early 2003, at <http://highered.mcgraw-hill.com/sites/dl/free/0072823119/74356/obr6ch02.pdf>.

⁷⁹ See Robert Laubacher, Thomas W. Malone and Michael S. Scott Morton, “Introduction”, *Inventing the Organizations of the 21st Century*, MIT Press, 2003.

The other guru is of course Professor N Venkat Venkatraman, now Professor of Management at Boston University School of Management.

It is not clear whether there are any other gurus. In terms of successor work at MIT Sloan, it should be noted that Thomas Malone was co-director. Moreover, at the closing conference of the successor programme,⁸⁰ one of the keynote speakers was Erik Brynjolfsson, co-director of Sloan's new Center for eBusiness@MIT – one of whose research areas is on a “matrix of change” approach to enabling companies to move faster to new Internet-based strategies. (Intriguingly, Peter Senge also spoke at the closing conference.)

5. Can MIT90s still be used to inform benchmarking, and if so, how?

Here I focus on the MIT90s strategic framework, as the business transformation levels approach has not been adopted in higher education.

The general idea of the strategic framework seems still to “have legs”, and is still running. Admittedly there are precursors of that, such as the “diamond” organisational model proposed by Leavitt⁸¹ as far back as 1965 – with technology, structure, tasks and people – and the 7S model, but both are more or less precursors of the MIT90s work. Even the later work on strategic alignment (associated with Venkatraman) is a close relative, and indeed a key analytic tool within it.

The value of the framework in education has been shown by a succession of papers over the years including the “Australian school” (DEETYA report, Yetton, Wills etc) and the work of Nicol et al on risks of e-learning.

However, one should not over-egg this. As clearly demonstrated at length in the DEETYA report – and more crisply in the work by Nicol and by the Australian school – the value of the strategic framework is as a *framework*, for analysis, reflection, etc – not as a theory from which detailed deductions can be made. Within the framework, much hard work and creative work has to be done – it is not at all a question of turning the handle.

A separate paper from me demonstrates how a criterion-based benchmarking system such as Pick&Mix can be mapped into the strategic framework – and it is likely that by a human being reflecting on the framework (and by related issues such as alignment) any such criterion-based system can be improved. But the framework cannot automatically *create* the system.

On this point, it is perhaps best to leave the last paragraph to Professor Chris Holland of Manchester Business School.⁸² But it is our italics on his very last words.

On the use of the framework the original text by Scott-Morton gives the best description and explanation of the concepts which are part of a broader literature on strategy alignment (e.g. McKinsey 7S). In terms of their application, the alignment frameworks are very broad concepts and can be applied in a wide variety of contexts. *My personal viewpoint is that their utility is as much to do with the individual using them as the framework itself.*

6. Further reading

This is not a complete list of references – see the footnotes for these. Instead it is a list of papers with direct relevance for higher education that readers interested in deploying MIT90s in benchmarking are likely to find useful.

⁸⁰ See <http://ccs.mit.edu/21c/21conference.htm>.

⁸¹ For a relatively recent use of Leavitt's approach see S. Lähteenmäki, “Managing the learning organisation”, September 2001, at http://www.ergonomiayhdistys.fi/nes2001/nes2001_p6.pdf.

⁸² Email to Paul Bacsich of 7 June 2006.

The relevance of the MIT90s framework to benchmarking e-learning

Ford, Peter, et al., *Managing Change in Higher Education: A Learning Environment Architecture*, Society for Research into Higher Education and Open University Press, Buckingham, 1996, ISBN 0 335 19792 2 (hardback). (This describes the OPENframework, developed by ICL in part based on MIT90s thinking, and its application to IT-driven change management.)

Pennell, Russ, and Wills, Sandra, “Changing horses in mid-stream: a new LMS plus improved teaching”, *Ausweb06*, <http://ausweb.scu.edu.au/aw06/papers/refereed/pennell/paper.html>.

Scott Morton, Michael S. (ed), *The Corporation of the 1990s: Information Technology and Organizational Transformation*, Oxford University Press, 1991, ISBN: 0195063589. (Still an excellent and quite fast read.)

Segrave, Stephen, Holt, Dale and Farmer, James, “The power of the 6th model for enhancing academic teachers’ capacities for effective online teaching and learning: Benefits, initiatives and future directions”, *Australasian Journal of Educational Technology (AJET)* 21(1), 2005, available at <http://www.ascilite.org.au/ajet/ajet21/segrave.html>. (A good read useful as a modern confirmation of the relevance of the MIT90s framework.)

Uys, Philip, *Towards the Virtual Class: key management issues in tertiary education*, PhD dissertation, Victoria University of Wellington, 2000, available at <http://www.globe-online.com/philip.uys/phdthesis>. (This describes the value of the MIT90s framework in structuring and analysing a large implementation action research programme – and the heuristics derived. It is, perhaps along with the work of Wills, one of the few examples of serious flow-back into the MIT90s framework. See in particular chapters 2 and 10.)

Venkatraman, N. and Henderson, J. C. Strategic alignment: Leveraging information technology for transforming organizations, *IBM Systems Journal* Vol. 32, No. 1, 1993. Available at <http://domino.watson.ibm.com/tchjr/journalindex.nsf/600cc5649e2871db852568150060213c/b0d32b9975af5a2e85256bfa00685ca0?OpenDocument>.

Wills, Sandra, “Strategic Planning for Blended eLearning”, paper presented to the IEE conference *ITHET06*, Sydney, July 2006. (The programme, but not the paper, is online at <http://ithet06.eng.uts.edu.au/frames/program.html>. For those who do not have access to the complete paper, the Pennell and Wills paper provides a partial substitute.)

Yetton, Philip et al., *Managing the Introduction of Technology in the Delivery and Administration of Higher Education*, DEETYA, available at <http://www.dest.gov.au/archive/highered/eippubs/eip9703/front.htm>. (If you have time just to read one report, read this one.)