E-LEARNING STRATEGIES OF HIGHER EDUCATION INSTITUTIONS

AN EXPLORATY STUDY INTO THE INFLUENCE OF ENVIRONMENTAL CONTINGENCIES ON STRATEGIC CHOICES OF HIGHER EDUCATION INSTITUTIONS WITH RESPECT TO INTEGRATING E-LEARNING IN THEIR EDUCATION DELIVERY AND SUPPORT PROCESSES

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prof.dr.W.H.M. Zijm

volgens besluit van het College voor Promoties

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geboren op 30 september 1971

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Preface

An emergent or planned strategy? That is a good starting point for explaining the result that lies in front of you: my PhD about e-Learning strategies of higher education institutions. Writing my PhD was a combination of having the emergence of ideas, theories and results and a planned, practical and structured process. It is about ideas that were not present at all when I started as a researcher at CHEPS in 1996. But, over the years, fostered by discussions about science, the profession of a researcher and/or practitioner and project results that seemed to be ideal for further and deeper exploration, the idea of writing a PhD slowly emerged. Discussions at the EAIR 2002 conference in Prague were in the end the starting point of my career as a promovenda. The first period can be characterised by a mostly emergent strategy of collecting ideas and theories. It was after that, that the characteristics of a more planned strategy turned out to be of importance; at least in my experiences, writing a PhD meant: planning, structure, setting directions and delivering deadlines. Both processes could not have been achieved without the support of my family, friends and colleagues.

This preface provides me with the opportunity to thank all those who supported me. First of all, I would like to thank Leo Goedegebuure (former director of CHEPS) for giving me the opportunity to combine my CHEPS work with writing my PhD. But most of all I would like to thank Leo for his belief that I could really succeed in doing this job (and of course for accompanying me so many times at late ours via de Bosweg to the Hasseler Es!). Second, I would like to thank Marijk van der Wende and Jeroen Huisman; Marijk thank you for the interesting discussions, pointing me the main lines of reasoning and most of all for encouraging me to carry on, even in my most dark days. Jeroen, thank you for all those times that your door was open; varying from a quick and simple question about finding a proper article to helping me with statistics. Furthermore I would like to thank Betty Collis for all those creative and inspiring meetings, of which I sometimes wondered whether the results of those meetings added something to the content or just added more to the possible ideas.

A special thank you for Marlies, Gillian, Monique, Anneke and Karin; I already miss our 8.30-9.00 o' clock do-not-come-at-the-secretariat coffee drinking moments. Jurgen and Jon, thank you for giving me the opportunity to finalise my thesis and Anneke, besides coffee drinking, thank you for the "women-only" special lunches at the Broeierd.

Also a special word to two of my former roommates; Frans, thank you for all those hours we (dis)agreed about projects, approach, outcomes, organizational structures and above all your time when chatting about the personal things in life. Ben, also a special thanks for you, as it must have been hard for you to share your once so quiet office with me. After hundreds of walks to the coffee machine and even so many (at least for you) disturbing telephone conversations, I think we both managed to work in a very pleasant environment in which times of hard working were alternated with chatting and laughter.

Furthermore, for helping me with finalizing my PhD I would like to thank Carlo, Gillian and Marwine. Carlo thanks for your help with the difficulties in statistics and above all for editing the final texts. Marwine, thank you for helping me find both data and literature and last but not least: Gillian, thank you for all those hours you helped me with the lay-out and supporting me with arranging my defence. Where would I have been without you!

And not to forget: a thank you for all those CHEP-pers who I did not personally address. Thank you for a very pleasant and inspiring time. From my personal point of view a time marked by: cricket and tennis games, barbeques, darting competitions, three CHEPS-anniversaries with trips to London, Ameland and Enschede, the academic project "South African wines" and other parties and celebrations either in national or international context. However, despite all mentioned above, finalising my PhD also means saying goodbye to those at CHEPS. The projects and international trips that emerged during the years provided me with so many opportunities to meet people from other organisations. It was one of those opportunities that brought me in contact with the SURF Foundation; a study trip in 2000 was the beginning of my still ongoing SURF journey. I would especially like to thank Bas Cordewener and Tom Dousma for all those hours of creative brainstorming and steering me into the direction, at least for the coming years, towards combining strategy and practice. I am looking forward to working with you for the coming years!

Finally, I would like to thank my mother and two of my best friends: Monique and Renate. They all supported me by offering either face-to-face or long-distance telephone assistance and helped me to keep track and supported me in reaching my goals. Thanks!

Petra Boezerooy
Enschede,-Utrecht-Veenendaal, May 2006

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1 Introduction

1.1 e-Learning

e-Learning has become increasingly important in higher education institutions. The development and introduction of a variety of e-Learning tools (from using e-mail to a digital portfolio and a virtual learning environment) has been causing numerous changes in higher education institutions, especially with respect to their educational delivery and support processes. But what exactly is e-Learning? It is difficult to find a commonly accepted definition. According to Dublin (2003) and Oblinger and Hawkins (2005) there is even no common definition. Dublin states that one of the myths about e-Learning is that "everybody knows what you mean when you talk about e-Learning: however, the term e-Learning means different things to different people" (p.2). Is it on-line coursework for students at a distance? Is it the use of a virtual learning environment to support the delivery of campus-based education? Is it an on-line tool to enrich, enhance and extend collaboration? Is it totally on-line learning or part of blended learning? Below a short overview of different e-Learning definitions is presented.

According to Oblinger and Hawkins (2005) many educators assume e-learning means that "an entire course and all the interactions between faculty and students are online" (p.14). This focus on full on-line course delivery is also part of the following definitions: e-Learning is "computer-based training delivered over Intranets and the Internet (Dublin, 2003: 2), e-Learning is "the delivery of a learning, training or education program by electronic means, e-learning involves the use of a computer or electronic device (e.g. a mobile phone) to provide training, educational or learning material" (Stockley, 2005), e-Learning is "a term covering a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio- and videotape, satellite broadcast, interactive TV, CD-ROM, and more" (Singh, *et al.*, 2003: 1), or e-Learning is "distance education or education delivered on the Web" (Zemsky and Massy, 2004: 5).

In other definitions e-Learning involves more than just offering fully on-line courses. For example Oblinger and Hawkins (2005) suggest that e-Learning "has morphed from a fully-online course to the use of technology to deliver some or all of a course independent of fixed time and place. Students can be residential, commuting or at a distance" (p.14). Or as the European Commission (2001) describes, e-Learning is "using new multimedia technologies and the Internet to improve the quality of learning by facilitating access to facilities and services as well as remote exchanges and collaboration".

This is also the focus of Galagher's (2003) definition who describes e-Learning as "the use of digital technologies to support and deliver some or all of the teaching and learning for a particular unit of study" (p.11). According to HEFCE (2005) e-Learning is "any learning that uses ICT" (p.4). HEFCE further emphasizes that "with this definition one has to ensure that there is confident use of the full range of pedagogic opportunities provided by ICT. For higher education this will encompass flexible learning as well as distance learning, and the use of ICT as a communication and delivery tool between individuals and groups, to support and improve the management of learning" (p. 4). The OECD (2005) claims that "e-Learning refers to the use of information and communications technology (ICT) to enhance and/or support learning in tertiary education. While keeping a presiding interest in more advanced applications, e-learning refers to both wholly online provision and campus-based or other distance-education provision supplemented with ICT in some way" (p.11). Or as Oblinger and Hawkins (2005) state, "e-Learning may mean a fully online course. For others, it may mean the use of a course management system". The latter definitions include the focus on both educational delivery and support processes of higher education. The online presence in these processes can be categorised as follows (OECD, 2005: 36):

- None of trivial online presence
- Web supplemented: participation online is optional for the student. Enrolled students can access information on course outlines, assessment overviews, readings lists and other online learning resources.
- Web dependent: students are required to use the Web for key "active" elements of their study programme – online discussions, communication with students or staff, assessments, online project/collaborative work – but without significant reduction in classroom time.
- Mixed mode: students are required to participate in online activities such as online discussions, communication with students or staff, assessments, online project/collaborative work, which *replace* part of face-to-face teaching and learning activities. Significant campus attendance remains.
- Fully online: there is no direct contact with a campus. All interactions with staff and students, education content, learning activities, assessment and support services are integrated and delivered online

From the above one can conclude that a common e-Learning definition is difficult to identify. Some authors describe e-Learning as offering only complete on-line courses whereas include web-supplemented and web-dependent services for the delivery of educational and support processes. In this study the focus is on strategic approaches of higher education institutions with respect to integrating e-Learning in their educational delivery and support processes.

For this it is important not only to focus on the "narrow" definition of e-Learning of only offering complete on-line course, but on the "broader" definition that also incorporates the use of digital technologies and the Internet to support and deliver education for both on-campus as well as remote exchanges and collaboration. Therefore, in this thesis, the definition of e-Learning as described by the OECD is used, in which e-Learning refers to "the use of information and communications technology (ICT) to enhance and/or support learning in tertiary education. While keeping a presiding interest in more advanced applications, e-learning refers to both wholly online provision and campus-based or other distance-education provision supplemented with ICT in some way".

The next question is how higher education institutions deal with integrating e-Learning in their educational delivery and support processes. This is explored in the next section.

1.2 Higher education institutions and e-Learning

Over the last two decades, many higher education institutions have adopted a wide range of e-Learning tools into their educational delivery and support processes. Lessons so far demonstrate that a wide range of e-Learning projects have stimulated an agenda of bottom-up innovation rather than one of institutionally-led changes in educational delivery processes. Furthermore the implementation of e-Learning has primarily been evolutionary and not revolutionary. It has mainly been a process of bottom-up, incremental change from within through which the use of e-Learning is integrated in old and existing practices (Collis & Van der Wende, 2002). Douglas (2005) further notes that most of the time blended models of teaching and learning occur that has not (yet) replaced the ubiquitous mode of delivery (the classroom) by other forms (online). This view is confirmed by Smith (2005) who states that "the only widespread adoption of a dominant application directly related to the student's learning experiences (focus on educational delivery and support processes) is that of the institutional virtual learning environment"(p.100).

The above described processes relate to the general process of change in education as described by Fullan (1991) and applied to the introduction of new technologies in higher education by Collis & Moonen (2001). The following steps can be distinguished:

- Pre-initiation and initiation, in which activities are mainly bottom-up experiences.
- Implementation, in which a more strategic approach is developed.
- Institutionalization, in which the change becomes institutionalized and becomes an integral part of the core processes in higher education institutions.

Although many e-Learning projects can still be characterized as being part of either the initiation or the implementation step, one can see that higher education institutions now are making steps forward from the initiation to the implementation phase and even some higher education institutions are in the beginning of the institutionalization process. This is confirmed by for example Smith (2005) who states that "a fundamental shift away from individual innovation to a systematic and politically –driven model of online education is highlighted, reflecting wider developments in UK higher education. There is also evidence for an increasing systematization" (p.104). The OECD (2005) also states that "it appears to be increasingly common for universities to employ an institution-wide strategy for on-line or e-Learning" (p.77). According to Collis & Van der Wende (2002) for ICT to be completely institutionalized it is necessary to: establish an institution-wide technological infrastructure, make rich pedagogical use of this infrastructure and develop strategic plans to use ICT with a view to different target groups. They further suggest that "in many higher education institutions an institution-wide technological infrastructure is in place, however, rich pedagogical use of this infrastructure is in many cases still in development and strategic use of ICT with a view to different target groups, has in most cases not been considered explicitly yet" (p.8).

1.3 The need for Strategy

This focus on a more strategic use of e-Learning has become important as the environment in which higher education institutions operate changes. Over the last decades higher education institutions have experienced profound changes in their external environment affecting both their primary and secondary processes of education, research and organisation. It is generally acknowledged that technology, demography, governmental policy and economic factors are the main external drivers for change (e.g. Bates, 1997, Wills & Yetton, 1997, Sporn, 1999, Fisser, 2001, Middlehurst, 2003 and Van der Wende & van der Ven, 2003).

One result of the changes that these factors have brought about is that higher education institutions must operate in a far more competitive world than before. Higher education institutions must deal with greater market forces, because of the decline in public funding, together with other challenges such as rising expenses, increasingly diverse student bodies and their changing needs and expectations and heightened demand for new and different programs and services (Eckel *et al*., 2005: 4 and Douglas, 2005: 6). This means that entrepreneurialism and commercialization have become increasingly central to institutions that were historically (only) concerned with teaching, research and service. In this quest most higher education institutions are seeking to apply new technologies in the delivery of education to reach new student markets and by doing so expand enrolment (Douglas, 2005: 2).

In order to respond to new student markets and changing needs and expectations, higher education institutions have to define clear and comprehensive strategies for the integration of e-Learning in their educational delivery processes. The Coimbra group (2002) argues that:

> *"the extent and range of new expectations on universities will create important challenges for the institutions themselves in implementing ICT. Among the most important factors is the issue of effective leadership within institutions, not only to stimulate, enable and reward the uptake of e-Learning but also to create a level of strategic thinking and planning for the university as it adapts to both external pressures and internal opportunities".*

Bates (1997) and Van der Wende and van der Ven (2003) also argue that higher education institutions have to develop strategies for integrating e-Learning in their educational delivery and support processes. One of the main reasons for this is to effectively educate students for the new social context that will arise the coming years (Van der Wende and van der Ven).

For responding to new student markets and changing needs and expectations, according to Bates (2000: 44-45), it is necessary for higher education institutions to:

- Define a vision for teaching and learning, and define where technology fits within that vision
- Identify new target groups that could be reached through the use of technology
- Define priority target groups and appropriate programs for the use of technology-based delivery
- Identify areas of already-existing technology support and encourage people in those areas to provide support for "novice" technology users
- Identify areas of support outside the department, faculty or institution, and determine the organisational support staffing for technology-based teaching that still needs to be provided in-house
- Ensure that innovation and the skilled use of technology for teaching is properly recognised and rewarded
- Identify the role of and priorities for face-to-face teaching in an increasingly sophisticated technology-based learning environment
- Decide on key areas of investment and resource allocation for technology-based teaching

1.4 Previous research

The need for and importance of a strategic approach to the use of e-Learning in higher education has been of interest to various researchers (see for example Wilks & Yetton, 1997, Bates, 2000, Fisser 2001 and Middlehurst, 2003). It was also one of the main rationales for the Center for Higher Education and Policy Studies (CHEPS) and the Faculty of Educational Science and Technology of the University of Twente to carry out a major international comparative study on Models of Technology and Change in Higher Education during the period January 2001 to December 2002. This study was focused on emerging scenarios with respect to the use of ICT in higher education, how future developments could be predicted and how strategic choices could be based on these scenarios. The author of this thesis participated in the study on Models of Technology and Change in Higher Education as a member of the research team.

The study on Models of Technology and Change in Higher Education showed that higher education institutions generally do not expect revolutionary change as a result of or related to ICT use. Rather, a "business as usual" approach is taken without anticipating any real dramatic changes in mission, profile or market position. Second, ICT in teaching and learning is becoming part of a blend of on-campus and on-line delivery and third, the instructor is and expected to remain the "core medium", but gradually doing more with ICT. This all led to a 2002 situation in which most higher education institutions could be characterised by a "Back to the Basics" scenario[1], in which higher education institutions focus on the traditional, campus-based students. In this scenario learning takes place through face-to-face contacts and through direct interaction with instructors. Technology does not replace the traditional on-campus settings but rather complements them.

Although in 2002 most institutions could be characterised by the "Back to the Basics" scenario, the study results also showed that institutions were gradually moving towards a "Stretching-the-mould" scenario. This scenario can be characterised by offering more flexible educational delivery and support processes for students who still are mainly campus-based. Within this scenario technology becomes more prominent: especially for offering time and place independent education, though without changing the underlying pedagogical model within the institution. Besides these two scenarios, two other scenarios, "Global Campus" and "New Economy" were part of the 2002 study. The "Global Campus" scenario focused on flexible ways of offering traditional higher education in which technology is very important for facilitating on-campus access to facilities and services as well as remote exchanges and collaboration.

[1] A detailed description of the scenarios is shown in section 3.4.

The "New Economy" scenario can be characterised by offering "anytime, anywhere" education. This scenario focused on offering (mainly) lifelong learning, in which students can stay at home or at the workplace. It goes without saying that technology is very prominent within this scenario. The results of the 2002 study showed that very few higher education institutions could be characterised as being either a "Global Campus" or a "New Economy" institution.

These general conclusions were mainly based on average scores on a large range of variables related to the strategic orientations (scenarios) of higher education institutions in the area of e-Learning. The study applied an international comparative methodology, including respondents from the Netherlands, Germany, the United Kingdom, Australia, Finland, Norway and the United States. Looking more closely at the study's outcomes it appeared that statistically significant differences on variables such as expectations about changing student demands, internationalisation and the offering of flexibility of time and place, could not be explained by country differences. This means that for explaining the sometimes rather high standard deviations, other factors should be taken into consideration.

The present study aims to unravel these other factors that influence the strategic choices of higher education institutions with respect to e-Learning.

An interesting finding from the previous study was that although the use of e-Learning for different target groups has in most cases not been explicitly considered, in those cases that do demonstrate a strong strategic orientation on "new" student markets, such as lifelong learners and international students, a strong correlation seemed to exist between this and an extensive use of ICT in teaching and learning. This underscores the motivation to further explore how the differences in strategic choices of institutions for e-Learning can be explained. How can it, for instance, be explained that some institutions focus on integrating e-Learning in their educational delivery processes in order to respond to a diversified student market while others do not. Is this because these institutions respond to external elements or is this because of the history and type of management of the institution?

1.5 Rationale and research questions

From the above it is clear that a strategic approach to e-Learning is important for two reasons. One, in order to integrate e-Learning more systematically into the primary process of teaching and learning (institutionalization of change). And two, because e-Learning plays an increasingly important role in the positioning of higher education institutions in their increasingly competitive environment.

Furthermore, it was demonstrated that although higher education institutions do differ with respect to their strategic choices in this area, it is not clear how they differ or why. The aim of this study is to further explore how these differences can be described and explained.

Consequently, the main research question and sub-questions for this study are as follows:

How do higher education institutions differ in their strategic choices with respect to integrating e-Learning into their educational delivery processes and how can these differences be explained?

Sub-questions are:

1. What strategies are emerging?
2. What are the differences between higher education institutions with respect to their strategic choices?
3. Which (internal and external) factors help explain these differences?

As the author was involved in the research team that undertook the major international comparative study on Models for Technology and Change in Higher Education, the data was readily available. The data set has been expanded, re-organised and further explored in order to answer the above presented questions. This process is described in the following sections.

1.6 Structure of the book

This book is divided into two parts: the first part (Chapters two, three and four) focuses on the theoretical concepts used as well as on the methodology and operationalisation. The second part of the book (Chapters five, six and seven) focuses on the empirical results.

In Chapter two of this thesis, the theoretical framework (contingency theory) explaining the relationship between higher education institutions and their environment, is explored as well as the concept of strategy. Based on these perspectives a theoretical framework was developed. In Chapter three this theoretical framework (based on internal and external contingencies) is applied to the context of higher education, especially e-Learning (ICT) in higher education. Furthermore this chapter focuses on the description of the independent variables (the internal and external contingencies) and on the dependent variable (strategic choices of higher education institutions). Chapter four focuses on the operationalisation and methodology of this thesis.

The second part of the book contains the empirical results of this thesis. In Chapter five, first, the answer to sub-question one "What strategies emerge" is answered. Then, based on one-way ANOVA and chi-square tests, an overview is given of the statistically significant variables. This provides a first indication of the answer to sub-question two: "How do higher education institutions differ in their strategic choices with respect to integrating e-Learning in their educational delivery and support processes and how can these differences be explained?" In Chapter six, the significant variables found are used as input in a regression analysis of which the results are used to answer sub-question three "Which (external and internal) factors help explain the differences between higher education institutions". In the last chapter a short summary, the conclusions and a reflection is described.

2 Theoretical framework

2.1 Introduction

From the preceding chapter it has become clear that the environment in which higher education institutions have to operate has changed significantly the last decade. An environment that has become more turbulent, more uncertain and more competitive. To be more competitive, and for coping with new student markets, higher education institutions must respond to or even anticipate these changes in their environment. One way to cope with environmental change is strategy formulation. Many authors (e.g. Asplund, 1982; Mintzberg, 1983, 1998; Stoner and Freeman, 1989; Prahalad and Hamel, 1994; Peterson, 1997; Watson, 2000; Taylor and Miroiu, 2002) suggest that the link between the organisation and the environment is strategy. For example, Asplund (1982) states that "theories of strategy formulation and strategic management have been developed to cope with environmental change, an environment which for most organisations is becoming more complex and less predictable" (p.9). Furthermore, strategy also helps in defining the vision and mission of organisations and helps to give direction and focus to organisations' activities. In addition strategic planning helps to develop a concept for the organisation, which enables it to formulate plans and activities that will bring an organisation closer to its goals. Or as described by Mintzberg *et al.* (1998), strategy is needed to set the direction, to focus efforts, to define the organisation and to provide consistency.

To cope with a changing environment, in which it is expected that higher education institutions have to compete in new student markets in order to "survive", the use of e-Learning within higher education institutions can be seen as one response institutions can employ. The question then is what types of strategies with respect to integrating e-Learning in their educational delivery and support processes higher education institutions employ and by which environmental influences these choices are affected. This chapter starts with an exploration of the relationship between the environment and strategies of organisations in general. An exploratory conceptual framework was developed by drawing on both the contingency theory and the environmental school of strategy.

2.2 Relationship between environment and organisations; contingency theory

One of the theories dealing with the explanation of the relationships between organisations and their environments is contingency theory. Contingency theorists argue that organisational choice and actions are limited by various external pressures and demands, and that organisations must be responsive in order to survive.

According to contingency theory there is no single best way to cope with environmental pressures. For example Morgan (1986) states that "the appropriate form depends on the kind of task or environment with which one is dealing" and "management must be concerned, above all, with achieving good fits" (p.49). Or according to Scott (in Hall, 1991) contingency theory can be summarized in the following manner: "the best way to organize depends on the nature of the environment to which the organisation must relate. It is all about adopting the appropriate level of the variable (e.g. structure, strategy or policy) that fits the contingency it faces" (p.314). According to Donaldson (2001) this fit is necessary to achieve organisational effectiveness. Furthermore Donaldson argues that organisations are motivated to avoid a misfit that results after contingencies change. By adopting new organisational characteristics that fit these contingencies, the organisation becomes shaped by the contingencies.

External contingencies

The main basic assumption behind contingency theory is that an organisation's contexts, its environments, are important for understanding actions and structures of organisations. Therefore to understand the behaviour of an organisation (i.e. actions taken by organisations) one must understand the context (environment) of that organisation. This implies that an organisation's response to external demands can, to some extent, be predicted from the situation of environmental contingencies confronting it. The key in this is the organisation's ability to respond to environmental contingencies in order to survive.

This dependency on the environment is in itself not problematic; if stable supplies or effects were assured from the sources needed, there would be no problem. As Pfeffer and Salancik (1978) suggest "problems arise not merely because organisations are dependent from their environment, but because this environment is not dependable" (p.3). Environments change over time and one has to deal with both uncertainty as well as turbulence in terms of complexity and stability. Environments tend to become more turbulent and uncertain over time, although turbulence and uncertainty grow more quickly in some industries than in others.

Environments can and actually do change so organisations have to face the prospect of either not surviving or changing their activities in response to these (changing) environmental factors. For example, Ansoff (1965) has described the organisational predicament as turbulence increases: events are less predictable, change more frequent and past experience is less relevant to current decision making, more competition. To understand organisational behaviour then, it is necessary to understand the external constraints they face. These constraints influence organisational actions, such as decision-making processes, and create a need to manage the environment.

Internal contingencies

The main focus of contingency theory is the influence environmental or external contingencies have on organisational choice and actions. This implies that organisations are tightly linked to their environment, but Pfeffer and Salancik (1978) amongst others argue that organisations are instead loosely coupled to their environment. Some research (Child, in: Pfeffer and Salancik, 1978) has pointed out that:

> *"the correlations observed in studies of organisation-environment relationships are far from perfect. Either the studies have been poorly done with much measurement error, or else the link between organisations and their environments is much less tight than has been implied. Furthermore they state that when the environment changes rapidly, in a situation of tightly linking, this means that organisations will change rapidly in response, and that is not happening" (p.226).*

Pfeffer and Salancik (1978) conclude that assumptions about the tight linkage between organisations and their environment are incorrect. They argue that the relationship between organisations and their environments is important, but, at the same time indefinite. In other words, organisations are loosely coupled with their environment (p.227).

If one agrees that organisations are loosely or partially coupled to their environment, this implies that besides environmental influences, organisational actions are affected by other internal factors. For example Pfeffer and Salancik (1978) describe that what happens in an organisation is not only a consequence of the environment and the particular contingencies deriving from that environment. What happens is also a function of the organisation, its strategy, its structure, its actions, its leadership and its procedures. This is confirmed by Maassen and Gornitzka (1999) who suggest that in addition to the focus on external contingencies it is also necessary to examine "the role of organisational leadership and the way internal power distributions affect and are affected by external dependencies" (p.298).

Or as Mintzberg *et al*. (1998) explain "it all depends", on for example the size of the organisation, its technology, the stability of its context, external hostility and so on" (p.288). This stresses both the importance of *internal* and *external contingencies* in understanding organisational behaviour.

Both the emphasis on internal (institutional) contingencies as well as on external environmental contingencies for understanding how organisations react with and to their environment, are closely related to the enactment of those factors by organisational members.

Pfeffer and Salancik (1978) state that:

> *"organisational environments are not objective realities. Environments become known through a process of enactment in which perceptions, attention and interpretation come to define the context for the organisation. Enactments of dependencies, contingencies and external demands are in part determined by organisational structures, information systems and the distribution of power and control within organisations. Since coping with critical contingencies is an important determinant of influence, subunits will seek to enact environments to favour their position. Organisations will enquire some discretion to adjust to contingencies as they develop" (p.260).*

Furthermore Hall (1991) describes that "the perceptions of the organisational decision makers are a critical mediating variable between the organisation and the environment; it is them who make the strategic choices about the environment and how to respond to it" (p.120). Consequently different organisations can act differently towards environmental conditions if their perceptions of that environment are different.

Short summary
Organisations must interact with their internal and external environment in order to survive. One can conclude that the survival of the organisation is partially explained by the ability to cope with external environmental contingencies and partially explained by the organisation (internal contingencies) itself. Furthermore, organisational environments are not given realities; they are created through a process of attention and interpretation. In this respect it is important to know how organisational members perceive their environment.

Types of contingency theory
The focus on achieving a fit between contingencies reflecting the environment of the organisation and organisational choices and actions has been the subject of many authors. Although they share the same common focus (relationship between environment and organisation), their focus differs in terms of the environmental contingencies as well as on organisational choices.

A short overview is given below. Contingency theory can be traced back to Burns and Stalker (1961) who focused on the environment's influence on organisational structures. They found that the more stable the environment of an organisation was, the more mechanistic structure was needed and that in contrast to an organic approach, fit with a more unstable environment. This focus on the influence of technology was also subject of a research by Woodward (1965, in: Morgan, 1986: 51) who found that different technologies imposed different demands on individuals and organisations that had to be met with appropriate structures.

These insights were further developed by Lawrence and Lorsch (1967; in e.g. Morgan, 1986: 54-55 and Hall, 1991: 314) who found that the most successful firms were those that were differentiated enough to deal with an uncertain and changing environment. Their study also provided information about the modes of internal actions necessary to achieve the best fit between an organisation and its environment: in relatively stable environments, hierarchy seems to be the best way to coordinate actions, while in more turbulent and uncertain environments more "decentralised" ways of managing an organisation are favourable. Another contingency influencing structure is the size of an organisation (i.e. number of employees). Child (1975, in: Donaldson, 2001: 3) researched the influence of the number of employees on the degree to which an organisation's structure was bureaucratic or decentralized. Child found that a large organisation fits with a bureaucratic structure and in contrast the simple, decentralized structure fits with the small firm. The use of organisational strategy as a contingency influencing structure has been described by amongst others Chandler (1962), who found that a functional structure fits with an undiversified strategy and in contrast a divisional structure fits with a diversified strategy.

Over time, other authors have used the main premises of contingency theory to study the influence of environmental contingencies on other organisational characteristics than just the structure of the organisation. For example there is the contingency approach on management, whose view is that the management technique that best contributes to the attainment of organisational goals might vary in different types of situations or circumstances. In this approach the manager's task is to identify which technique will, in a particular situation, under particular circumstances, and at a particular time, best contribute to the attainment of management goals (Stoner and Freeman, 1989). Fiedler (1967) has focused on the fit between environment and leadership styles. He suggests that a manager must fit to the situation and that this depends on the specific skills needed for this situation. He also argues that it is inefficient to change a manager's skills to match the situation and that it is more useful to select a specific manager instead (Stoner and Freeman, 1989).

Others focused on the influence of the environment on the organisation's resources (Pfeffer and Salancik, 1978). This perspective of the contingency theory has formed the basis of empirical research by Oliver (1991), Maassen and Gornitzka (1999) and Fisser (2001).

The focus on the match between environmental contingencies and strategy has been described by Hofer (1975), Miller and Friesen (1978 and 1983), Mintzberg (1983, 1998), Miller (1988, 1992), Boisot (1995) and Peterson (1997). Hofer's main goal was to develop a contingency theory of business strategy. He identified environmental variables and organisational characteristics and resources that seem to be of the greatest importance to the formulation of viable business strategies. Miller and Friesen found that a dynamic environment requires a more analyzed and innovative strategy.

Furthermore growing environmental hostility seems to require additional analysis and organisations facing more heterogeneity apparently benefit from innovation. In later work Miller (1988, 1992) showed that strategy has a relationship with environment, especially in cases in which the environment is sub-divided into specific target niches. Those organisations that applied a more innovative and differentiated marketing strategy performed best in unpredictable and dynamic environments. Miller also states that "organisations that achieve the best fit with environmental uncertainty have the weakest linkages among (internal) structural and process variables" (p.159).

Boisot focused on the link between strategy and the environment, specifically with respect to the strategic responses of organisations to turbulence in their environment. He found that "an organisation enhances its survival prospects not by seeking out the unique strategy that fits its circumstances but by expanding its strategic repertoire to cope with a broader variety of environmental contingencies" (p. 45). This focus on a turbulent environment is also part of Petersons' (1997) description of the link between strategy and environment. He refers to the term contextual planning in which the focus is on understanding the changing nature of the organisational environment. By taking into account a growing complexity and turbulence of an organisation's contexts strategies can be better planned, adjusted and perhaps redirected.

As described in Chapter One this thesis focuses on the relationship between the changing higher education environment (environmental contingencies) and strategic choices of higher education institutions for e-Learning. A relationship, as defined above, that can be looked at by the premises of the contingency theory: environmental variables and organisational characteristics and resources seem to be of importance to the strategic actions of an organisation. To further explore these strategic actions, in the next section the concept of strategy and strategy formation is described.

2.3 Strategy

As described in Section 2.1, strategy is one of the responses organisations can employ to respond to a changing environment. But what is strategy? Various definitions of the concept of strategy exist. An old definition is that "strategy is the determination of the long-term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" (Chandler, 1962).

Quinn *et al*. (1988) defines the concept of strategy as:

> "*the pattern or plan that integrates an organisation's major goals, policies and action sequences into a cohesive whole. A well-formulated strategy helps to marshal and allocate an organisation's resources into a unique and viable posture based on its relative internal competencies and shortcomings, anticipated changes in the environment and contingent moves by intelligent opponents" (p.3).*

A more detailed description is provided by Stoner and Freeman (1989) who state that:

> *"strategy can be defined from at least two perspectives; from the perspective of what an organisation intends to do, and also from the perspective of what an organisation eventually does, whether or not its actions were originally intended. From the first perspective, strategy is the broad program for defining and achieving an organisations objectives and implementing its missions. The word program implies an active, conscious and rational role played by mangers in formulating the organisations strategy. From the second perspective, strategy is the pattern of the organisations responses to its environment over time. In this definition, every organisation has a strategy, even if that strategy has never been explicitly formulated. This view of strategy includes organisations whose manager's behaviour is reactive – managers who respond and adjust to the environment as the need arises*" (p.193).

Building on these strategy concepts, Mintzberg *et al*. (1998) argue that "strategy requires not one but five particular definitions related to strategy: strategy as a plan, pattern, position, perspective and ploy" (p.9).

1. Strategy is a plan, a direction, a guide or course of action into the future, a path to get from here to there (looking ahead, intend what you want to do).
2. Strategy is a pattern; specifically a pattern in a stream of actions, strategy is consistency in behaviour, whether or not intended (looking at past behaviour, looking at what you already realized).
3. Strategy is as position, a means of identifying where an organisation locates itself in the environment (the location of particular products in particular markets). Strategy becomes the mediating force or "match" between the organisation and the environment.

4. Strategy is a perspective; namely an organisation's fundamental way of doing things.
5. Strategy is a ploy, just a specific manoeuvre intended to outwit an opponent or competitor.

Different approaches of strategy formation

Over the past three decades, thousands of books and even more articles have been written about different strategy formation approaches. For an extensive overview of the history, development and use of these approaches one can read for example Boisot (1995), Mintzberg *et al.* (1998) or Mahoney and McCue (1999). These authors describe many of the (both "old" and "new") well-known perspectives about strategy itself and the strategy formation processes. In the book "Strategy Safari, A Guided Tour Through The Wilds Of Strategic Management" Mintzberg *et al.* (1998) describe the following 10 "schools of thought" about strategy formation:

The Design school:	strategy formation as a process of conception
The Planning school:	strategy formation as a formal process
The Positioning school:	strategy formation as an analytical process
The Entrepreneurial school:	strategy formation as a visionary process
The Cognitive school:	strategy formation as a mental process
The Learning school:	strategy formation as an emergent process
The Power school:	strategy formation as a process of negotiation
The Cultural school:	strategy formation as a collective process
The Environmental school:	strategy formation as a reactive process
The Configuration school:	strategy formation as a process of transformation

These "schools" are classified according to their appearance at different stages in the development of strategic management literature: not so much based on their date of origin, but more focused from the time when the "school" received attention (both from writers and practitioners) within strategic management.

The overview starts with a short description of the main assumptions of the design school, which in the 1960's presented the basic framework for many of the other schools. Based on this framework the other "schools" are described, including the most prominent author(s) of each specific "school" [2].

The first, the design school, focuses on strategy formation as a process of conception, a deliberate process in which the formation of strategy and the implementation of this strategy has to be separated. Furthermore, this school focuses on simple and informal strategy formation; a process in which strategies appear fully formulated as a perspective. There is no room for incremental or emergent strategies. Once a strategy is formulated it is ready for implementation. Influential authors in this area are for example Selznick (1957) and Andrews (1965).

The second, the planning school, focuses on strategy formation as a formal process in which the emphasis is on formal procedures, formal training and formal analysis. Although this school builds on the premises of the design school there is one fundamental difference: instead of focusing on simple and informal strategies within the planning school, strategy formation becomes a complex, formal and detailed process. For this type of strategy formation the use of scenario planning is an important tool for predicting future conditions in the environment. An important author in this area of strategy formation is Ansoff (1965).

The third, the positioning school, focuses on the content of strategies themselves to the premises of both the design and planning school. According to this school, there are not unlimited strategic options; instead this school focuses on only a few key strategies which arise in the course of data analyses. Furthermore the positioning school is characterized by the existence of a "wave of systematic empirical research for relationships between external conditions and internal strategies" (Mintzberg *et al.,* 1998: 99). An important author in this area of strategy formation is Porter (1980 and 1985).

The fourth is the entrepreneurial school, where the focus is on strategy formation as a visionary process. A process in which the single leader within an organisation is believed to play an important role: it is this leader to which the power is centralised and who actively searches for new opportunities. The process of strategy formation is particularly based on the leader's vision. Like the positioning school, this school grew out of economics; the leader of the organisation focuses on the competitive environment. Important authors in this area are Schumpeter (1950) and Cole (1959).

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[2] The description of the schools, as well as the reference to the most prominent author(s) is derived from Mintzberg *et al.* (1998).

The focus of the fifth school of strategy formation, the cognitive school, is on strategy formation as a mental process. Strategy can be seen as a person's interpretation of the world based on the "existence of a mental structure to organize knowledge". Individuals are believed to make decisions from a frame or causal map. In this school strategy is formulated based on the enactment of the environment. Compared to those already mentioned, the cognitive school is the first that "recognises that there is an interesting environment out there; that strategists don't pluck strategies from some tree of environmental opportunity" (Mintzberg *et al*., 1998: 173). Important authors in this area are Simon (1947, 1957) and March and Simon (1958).

The learning school focuses on strategy formation as an emergent process; it is all about how strategies are actually formed in organisations. Advocates of the learning school emphasis the role of incremental learning, learning by which strategies emerge over time instead of being planned or designed. Learning is necessary because of the "complex and unpredictable nature of the organisation's environment" (Mintzberg *et al*., 1998: 208). Furthermore, and contrary to the design, planning and positioning school, the learning school sees the relationship between strategy formation and strategy implementation not as separated activities but as interrelated with each other. Important authors in this area are Lindblom (1959, 1968), Weick (1969), Quinn (1980) and Prahalad and Hamel (1990s).

In the power school the focus is on strategy formation as a process of negotiation, whether as a "process inside the organisation or as the behaviour of the organisation itself in its external environment" (Mintzberg *et al.,* 1998: 260). Unlike the previously described schools, the power school focuses not only on shareholders, but also on stakeholders. This means that strategy formation becomes a political process in which bargaining and compromise are important aspects. Important authors in this area are Pfeffer and Salancik (1978).

Opposite to the power school, the cultural school sees strategy formation as a collective process in which strategy is formed by "beliefs and understandings shared by the members of an organisation" (Mintzberg *et al.,* 1998: 267). The result of such a process is that organisations with different cultures operating in the same environment will interpret that environment in quite different ways (Mintzberg *et al.,* 1998: 269). Important authors in this area are Rhenman and Normann's late work during the late 1960s in Sweden.

The focus of the ninth, the environmental school, is on strategy formation as a reactive process. Contrary to the former school, the environmental school focuses on "a set of forces outside the organisation: the environment" (Mintzberg *et al.,* 1998: 286). Organisations have to respond to these forces to survive. In this school, the environment is seen as an actor and strategy making as a mirroring process of this environment. Important authors in this area are Hannan and Freeman (1977) and contingency theorists.

The last school, the configuration school, focuses on strategy formation as a process of transformation. Advocates of this school state that an organisation can be described in terms of "stable configuration of its characteristics, which are interrupted occasionally by some process of transformation – a quantum leap to another configuration" (Mintzberg *et al.,* 1998: 305). Strategy formation focuses on continuity instead of change. Accordingly, the process of strategy making can be directed to any one of the schools described above, but each "must be found at its own time and its own context". Or at Mintzberg *et al*. (1998) state "in other words, the schools of thought on strategy formation themselves represent particular configurations" (p.306). Important authors in this area are Chandler (1962) and Mintzberg, Miller, late 1970s).

Mintzberg *et al.* (1998) claim that these 10 schools of thought fall into three groupings: the first three (design, planning and positioning) are prescriptive in nature. In other words: they are concerned with "how" strategies should be formulated. These types of schools focus on the development of a set of analytical techniques to develop strategies. The second group of schools (entrepreneurial, cognitive, learning, power, cultural and environmental) focuses on describing how strategies actually are made. These schools describe strategy making as looking at both the process of strategy formation as well as the content of strategies themselves. The third group only contains one school (configuration) in which actually all the other nine schools are combined. The focus here is to seek integration and clustering various organisational aspects such as the strategy-making process, strategy content, organisational structures and contexts.

Mintzberg *et al*. (1998) state that one school cannot be seen in complete isolation from the others. For example the planning school is built upon some of the design school's premises, and is an elaboration of the positioning school. The positioning, cognitive, learning, power, environmental and configuration schools all incorporate the role of the environment in the process of strategy formation. Mintzberg *et al.* (1998) also argue that "looking at the ten schools of strategy formation every strategy process has to combine various aspects of the different schools" (p.367).

So, first of all, the process of strategy formation has to include future-oriented and historically understood perspectives, or as Garratt (1995) states: "strategic thinkers must have the skills of looking both forwards and backwards while knowing their organisation now, so that wise risks can be taken by the direction-givers to achieve their organisation's purpose, or political will, while avoiding having to repeat the mistakes of the past" (p.2). In addition, "strategic thinkers must have both the "outside-in" approach, based on the ideas of Porter (1980), as well as an "inside-out" approach, based on the ideas of Prahalad and Hamel (1990s)" (Taylor and Minoiu, 2002: 34). The "outside-in" approach of strategy formation is based on a detailed assessment of context, environment and response to competitive forces. The "inside-out" approach builds on and exploits the organisation's core competencies, building on strengths and growing from within".

This focus on including past, present and future oriented perspectives, as well as inward and outward looking perspectives can all be found in the definition of strategy that is described in Section 2.3: strategy as a plan, a pattern, a position, a perspective and a ploy. Mintzberg *et al.* (1998) explain that organisations develop plans for the future and they also evolve from past patterns. The first can be called "intended" strategy and the second "realized" strategy. In this respect an important question is whether a realized strategy always has been intended? Overall one can conclude that most strategies are partially intended but also developed during the process. Intended strategies that are fully realized are called "deliberate" strategies. Those that are not realized at all can be called "unrealized" strategies. There is also a fifth case, which is been called "emergent" strategy, where an emerging pattern was not expressly intended (see Figure 2-1).

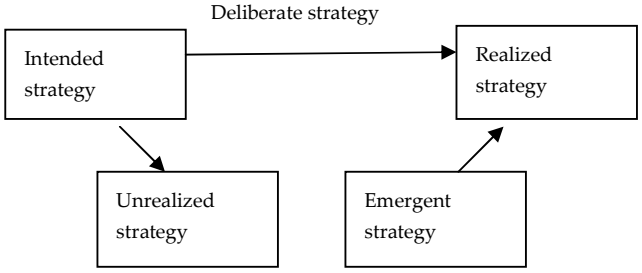

Figure 2-1: five different strategies

Mintzberg *et al*. (1998, based on Mintzberg, 1987) also suggest that there are few, if any, strategies that are purely deliberate, just as few are purely emergent. One means no learning, the other means no control. All real-world strategies (like the ten schools described earlier) need to mix these in some way; strategies have to form as well as be formulated. Thus, emergent strategies are not necessarily bad nor are deliberate strategies necessarily good. Effective strategists mix these in ways that reflect the conditions at hand, notably the ability to predict as well as the need to react to unexpected events.

Alongside plan and pattern, Mintzberg (1987) adds two more "p" words. Strategy as a position, namely the locating of particular products in particular markets, and strategy as a perspective, namely the organisation's way of doing things. Strategy as a position is downward looking to where the "x" marks the spot or where the product meets the customer, but is also looks to the external marketplace. In contrast, a strategy as a perspective, looks inside the organisation, inside the strategist's head, but it also looks up to the grand vision of the enterprise. A fifth dimension is strategy as a ploy that is a specific manoeuvre intended to outwit an opponent or competitor. The real strategy can be seen as a threat to others in the same business.

Mintzberg's description of the five Ps (1997) indicates that organisations have different ways of responding to turbulence and uncertainty in their environment. They can vary by adapting an intended strategy to applying an emergent strategy in cases where there is hardly any change and uncertainty in the environment. But how about strategy formation in higher education institutions?

2.4 From organisation science to higher education management

As stated before, given the changes affecting the higher education institutions' environment, higher education institutions must increasingly focus on strategy formation. Although this can be seen as a prerequisite for higher education institutions to survive (Bayent, *et al*., 2000), how they are to go about it, has still largely to be determined. The main question is whether classical or general strategic models, as described in the preceding sections, are applicable to higher education institutions. For answering this question it is important to know more about the special characteristics of higher education institutions as organisations. For example higher education institutions are not seen as organisations in the way that enterprises and public administrations are. It is as if they are "homogeneous entities" boasting their own specificity, yet with no attention being paid to how they function, to the dynamic of their structures or to the decision-making processes that take place within them (Thys-Clement and Wilkin (1998). The next section gives an overview of the nature of these "homogenous entities".

2.4.1 The nature of higher education institutions

Higher education institutions are traditionally seen as "professional bureaucracies" (Mintzberg, 1983). The "professionals", consist of highly trained academic staff who strongly identify with the discipline they practice in rather than the institution to which they are attached. Alongside them is he "bureaucracy", consisting of administrative staff members who perform at least routine housekeeping tasks on a day-to-day basis (De Boer and Huisman, 1999). According to Mintzberg (1983), there are two parallel administrative hierarchies, one democratic and bottom-up for the professionals and a second machine bureaucracy that is top down for the support staff. The professional bureaucracy is democratic, disseminating its power directly to its workers (at least those who are professional) and it provides them with extensive autonomy (De Boer and Huisman, 1999). The specific characteristics of higher education institutions as "professional bureaucracies" is described below.

In both the continental higher education systems as well as the Anglo-Saxon models, for centuries higher education institutions have been seen as centers of knowledge. According to Clark (1983) knowledge is the prime material around which all activities of higher education institutions are organised: the knowledge areas form the basic foci of attention. The knowledge areas are the "building blocks of a higher education institution and without some institutionalisation of these knowledge areas, higher education institutions cannot exist" (Van Vught, 1989: 52).

This principle leads to the typical decentralised organisational structure of higher education institutions. Throughout the organisation specialised cells (either being faculties, programmes, etc.) exist that are only loosely coupled (Weick, 1976). The crucial knowledge-oriented activities take place within the autonomous cells, in which specialists in specific knowledge fields group together to teach and undertake research. Another important characteristic of higher education institutions is the extreme diffusion of the decision-making power. In an organisation where production is knowledge-intensive, there is a need to decentralise. Such an organisation is also heavily fragmented. Decision-making power is spread over a large number of units and actors. A higher education institution therefore becomes like a federal system: "semi-autonomous departments and schools, chairs and faculties act like small sovereign states as they pursue distinctive self-interests and stand over against the authority of the whole" (Clark, 1983: 266-267). Below this decision-making process, as being important for the strategy formation within higher education institutions is described in more detail.

2.4.2 Decision-making processes within higher education institutions[3]

Traditionally, within higher education institutions, the "professionals" have had a great deal of autonomy over both teaching and research. Hardy *et al.* (1984) describe this as decisions made by professional judgment, which can be seen as a form of decentralisation to the level of the individual academic. To understand this, two essential concepts about higher education institutions must be understood: pigeonholing and standardisation of skills of knowledge. Pigeonholing divides the institution's activities into a series of standard components or programs that are applied to predetermined situations or contingencies that are also standardized. For example, students entering the institution are directed towards a specific program (e.g. history) of which a professor is in control. This means that each program or even course is a "standardized" part of the institution. By standardizing the specific tasks through the process of pigeonholing, each academic has its own task for which he carries the responsibility. In Weick's (1976) terms, this is the idea of loosely coupled systems.

The control the professional has over his own "pigeonhole" is evident in the teaching method used, the materials, course content, books, grades employed, as well as the research to be conducted or topics and methodology covered. This control by professionals over their own "pigeonhole" is based on the ideas that, due to long years of training, it is expected that their skills and knowledge have been standardized and generally accepted in their study fields and by their peers. It is this standardization of skills and knowledge that enables the organisation to achieve much of the coordination that remains to be effected across pigeonholes (Hardy *et al*., 1984). Clark (1983) describes this as a situation in which the floor in higher education institutions is cluttered with bundles of knowledge that are attended by professionals. The professionals push and pull on their respective bundles. If they are doing research, they are trying to increase the size of the bundle and even to reconstitute it. If engaged in scholarship other than research, they are conserving, criticising and reworking it.

The second type of decision-making, described by Hardy *et al*. (1984) is decision-making by administrative fiat. These are decisions which are made by the senior administration, under which Hardy *et al*. (1984) include the board of regents (or equivalent), the president or principal and the senior echelon of administrators who surround that individual. Decisions made by administrative fiat are concerned with finances (e.g. buy and sell property, embark on fund raising campaigns, budget reallocations or student scholarship). Furthermore, many of the support services, which are very often organized in a top-down hierarchy, fall under the control of the central administration.

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[3] The description of the types of decision-making is based on Hardy *et al* (1984)

The third type of decision-making is that made by collective choice. Because of the processes described above (pigeonholing and standardization) in many higher education institutions it is the academic staff that control much of the administration. Many academics take part in committees and task forces that oftentimes make key decisions. In the collective decision making processes the administrators join the academics in these committees and task forces. According to Hardy *et al*. (1984) among the most important decisions made via the collective decision making process are the ones related to the definition, creation, design and discontinuation of pigeonholes or programs, research centres, departments and, at a lower level, individual courses. Other important decisions include promotion, tenure and hiring and in some cases administrative decision about support services that are more critical to academic matters like libraries or computers.

The traditional model of institutional decision-making described above is characterised by values such as academic autonomy and freedom, control over "pigeonholes", decentralised decision-making by administrative fiat and by collective choice.

However, due to the shifting relationship between the state and higher education institutions towards deregulation and decentralisation of autonomy (described into more detail in Section 3.2.3) and the introduction of New Public Management and other more corporate management approaches, the decision-making structures within many higher education institutions have been changing the last two decades. The latter movement is described in the next section.

2.5 Changing decision-making structures of higher education institutions

To evaluate whether decision-making structures of higher education institutions are moving from a traditional model to a more corporate management style (the "managed university") the influence of more business-like approaches is described. Business-like management originated in part from the broader New Public management (NPM) phenomenon (see for more information Pollitt and Bouckaert (2000) or Pollitt (2003)). One of the main principles behind NPM is that while public actors such as government should maintain core public service values, they should place greater emphasis on achieving the desired results or outcomes of services rather than on the processes and rules of service delivery. NPM assumes that efficiency and effectiveness of service delivery will be achieved through the use of private sector management techniques (Meek, 2003).

Although many authors state that much of NPM is more a set of ideological assumptions about how public institutions should be run than a well-thought strategy for improving the efficiency and effectiveness of how they are actually managed, it has become clear that a number of aspects derived from the NPM movement have been incorporated into the management of higher education institutions (De Boer and Huisman, 1999, Pollitt and Bouckaert, 2000, Marginson and Considine, 2000).

Reforms inspired by NPM have, for example, introduced corporate enterprise principles (Larsen, 2003: 76). Reforms and measures in higher education institutions have involved both centralisation and decentralisation. NPM places decision-making authority at the local level (decentralisation) according to goals set by the central authorities (centralisation). A management oriented governance system highlights the need for strong local leadership, as well as incentives and control of results to assure quality and efficiency. In general these changes have been based on the assumption that decision making authority within universities should be less decentralised and should be in the hands of those who are "qualified to rule". Institutional governance has become more centralized, implying that in a number of respects the democratic nature of the internal university governance structures has decreased (Maassen, 2002: 30-40).

Henkel (2000) and Clark (1998) call this development "centralised decentralisation". The latter argues that this centralised decentralisation has consequences for the "academic heartland" of the higher education institutions. By introducing more business like management approaches, the traditionally autonomous role of academics in institutional decision-making processes has been changing. Academics are no longer the only "professionals" involved in decision-making processes. According to Fulton (2003) there is now "a set of complementary (or competing) service providers each of whom can claim their own area of educational expertise with its own professional competence" (p.203). The role of these service providers changed from mainly supporting academic staff towards relieving academics of their traditional authority and autonomy in their specific pigeonholes. More and more decision-making at the pigeonhole level will be the domain of both academics and the so-called service providers, or as Fulton (2003) describes "most of the urgent issues for debate by governance bodies require the contributions of these new "para-academics" just as much as they need academic input" (p.205).

Building on these new developments towards centralised decentralisation, Musselin and Mignot-Gérard (2002) observe "the emergence of a more collective conception of the universities" (p.72). As in other countries, academics have dual loyalties to their discipline and to their institution. The former has almost always existed. The second form of loyalty has been strengthened under the new arrangements for decision-making. Furthermore, centralisation and concentration of power reduces the opportunity of staff and students to participate in (strategic) decision-making which may have negative implications for the university viability (De Boer, 2003: 44).

The trend towards the managed university stresses the vertical relationships among a minimum of powerful persons or bodies and is in some ways comparable to a hierarchy (De Boer, 2003). The movement towards more centralised decision-making structures, in which the authority of senior managers is increasing, can have influence on the decision-making and motivation of the individual academics. No longer are the academics the only authority to decide how to teach, which books to buy or what type of education is offered. Decisions about many subjects are no longer under the complete control of the individual academic, a movement from professional judgement towards more collective choice and even administrative fiat is evident.

Alongside the new academic experts and changing patterns of decision-making, Fulton (2003) states that new managers are to be found in higher education institutions. No longer it is just the administrators-bureaucrats (e.g. Vice-Chancellors and Pro-Vice-Chancellors), but quality managers, finance directors and fund-raisers. Like the new academic experts, they all have plausible claims to play a role in institutional governance. What is more, for some the traditional academic activities of undergraduate and postgraduate teaching and basic research are visibly of less interest and importance then the new near-market activities like full-cost training, commercial research, intellectual property development and technology transfer. One can no longer assume that senior managers see themselves and act as academics, even if they are powerful leaders (Fulton, 2003: 205).

2.5.1 From the traditional model toward the managed university?

As described above, much of the writing in higher education over the last decade(s) assumes a movement away from traditional governance models to the "managed" university, but one can argue about the direction of this movement.

Reed *et al*. (2002:) claim that:

> *"many agree that this movement is far from clear and varies considerably in both content and intensity from country to country and over time. And while change in governance appears ubiquitous, expectations that higher education will retain traditional functions, particularly with respect to knowledge generation and training the next generation of knowledge workers, remain" (p. xxvii).*

Besides this focus on knowledge generation, there are other characteristics of higher education which point to the introduction of more corporate management styles taking some time before take root. For many authors (e.g. Maassen, 2003, Larssen, 2003, Musselin, 2002) the nature of the decision-making processes makes it difficult to talk about a complete "managed university". For example Maassen (2003) states that:

> *"complicating in higher education is that management is as such a relatively new function that is internally embedded in a traditional democratic governance structure for decision-making and a traditional administrative structure. Despite recent adaptations of these governance structures and a professionalisation of the university administration, institutional managers at various levels are still caught between the horizontal decision-making practices (including individual academic freedom) and the hierarchical administrative traditions" (p.48).*

Furthermore, academics still remain under the influence of the disciplines: the role of the academic expert is still important and the balance between the discipline-based decisions and the university-based decisions is always shifting and has not yet stabilized (Musselin and Mignot-Gérard, 2002). Another point is the concept of leadership. Larsen (2003) shows that "most department heads do not consider themselves as research leaders at the departmental level in the sense that they neither instruct academic personnel in research matters, nor desire any role in quality assurance of research" (p.85-86).

2.6 Relevance for this study: linking theoretical concepts to the research question

The aim of this chapter was to link the premises of the contingency theory and the environmental school of strategy formation to each other in a conceptual framework. A framework that is used to explore the main question of this study: "how do higher education institutions differ in their strategic choices with respect to integrating e-Learning in their educational delivery and support processes and how can these differences be explained?"

The main assumption of the contingency theory, being that an organisations' contexts, its environments, are important for understanding the actions and structures of organisations, is used to explore this question. This implies that organisation's responses, such as strategic choices with respect to integrating e-Learning in educational delivery and support processes, can to some extent be predicted from the external and internal environmental contingencies confronting it. This is also the focus of the environmental school of strategy formation.

Furthermore both the contingency theory as well as the environmental school of strategy formation focus on the reactive processes of organisations to the environment: a process in which the environmental contingencies "tend to be more or less isolated variables of which the relationship with the strategic choices of organisations are studied" (Mintzberg *et al.,* 1998: 303).

These "isolated" variables can be seen from two different perspectives: 1) the influence of external environmental variables on strategic choices of higher education institutions and 2) the influence of internal (organisational) variables on strategic choices of higher education institutions. This is visualised in Figure 2-2.

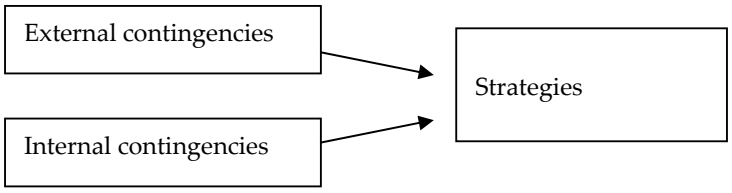

Figure 2-2: conceptual framework

Off course there are dynamics, such as feedback mechanisms from the strategic choices on the external and internal contingencies as well as possible interactions between external and internal contingencies. However, this thesis confines only the rather explorative analysis of the straightforward relationships between the external and internal contingencies and the strategic choices of higher education institutions.

In the following chapters the independent variables: the external and internal contingencies as well as the dependent variable: strategic choices of higher education institutions are further conceptualised.

3 The contingencies

3.1 Introduction

As described in the preceding chapter, the choice for a specific strategy is in part function of how higher education institutions make different judgments about both the internal and the external environment. How to manage this strategic choice is challenging because in "discovering, adopting and implementing its strategy a higher education institution can be confronted by the problems of uncertainty. Furthermore, the strategy game is a turbulent one in which everything keeps changing, including customer's needs, government policies, technology and competitor's strategies" (Wills and Yetton, 1997: 1).

In the conceptual framework, that was described in the preceding chapter, one can see that both sets of independent variables, external and internal contingencies, are expected to influence the strategic choices of higher education institutions. However, the conceptual framework does not provide specific insights in which specific external and internal contingencies influence which specific strategic choices. In this chapter, first of all, based on a literature study, an overview is given of the different external and internal contingencies. Furthermore the dependent variable, strategic choices of higher education institutions for e-Learning, is conceptualised. At the end of this chapter a further elaborated contingency model is presented that shows the possible relationship between external and internal contingencies and strategic choices of higher education institutions in the area of e-Learning.

3.2 The first group of independent variables: the external contingencies

Chapter one described how the external environment of most higher education institutions has been changing over the last decades. But what is actually the "external" environment of higher education institutions? According to Stoner and Freeman (1989) "this environment consists of elements outside an organisation that are relevant to its operations" (p.70). Not all possible external environmental influences are relevant and important to organisations and the organisation cannot respond to all environmental influences. Therefore one can think of the environment in two ways:

- The societal, or general environment (that affects all organisations in a given society)
- The task or specific environment, which directly affects the formulation and attainment or organisational objects and differs for each organisation

The changes in the societal or general environment are often described in terms of a set of abstract dimensions such as dynamic, complex, stable, turbulent, etc. Based on the contingency theory, Mintzberg *et al*. (1998) identified four dimensions of the external environment responsible for differences in organisations (p.289). These are the following:

1. Stability
An organisation's environment can range from stable to dynamic. A variety of factors can make an environment dynamic, such as unstable governments, unexpected changes in customer demand and a rapidly changing technology. The real problems are caused by changes that occur unexpectedly and for which no patterns could have been discerned in advance.

2. Complexity
An organisation's environment can range from simple to complex. An environment is complex to the extent that it requires the organisation to have a great deal of sophisticated knowledge about its products, customers, or other concerns. It becomes simple, however, when that knowledge can be rationalised or broken down into comprehendible components.

3. Market diversity
The markets of an organisation can range from integrated to diversified

4. Hostility
An organisation's environment can range from munificent to hostile. Hostility is influenced by competition

These dimensions can be very abstract. Or as Mintzberg *et al.* (1998) explain, "in reality, no organisation faces an "environment" that is complex, or hostile, or dynamic. There may be periodic pockets of such things, but it seems foolhardy to manage strategy at such aggregated levels" (p.297). So, these dimensions can be used as a heuristic device to describe the more general changes in the external environment of higher education institutions, but they do not explain what components of this environment can directly influence the strategic choices of higher education institutions.

These components can be categorised on the basis of different perspectives in looking at higher education. Different authors have contributed to the debate on external contingencies affecting higher education. For example Peterson and Dill (1997) focus on higher education as an industry that can be (re) shaped by the following forces: threat of new entrants, bargaining power of suppliers, threat of substitute services, bargaining power of customers and innovation in the core technology (p.8).

Peterson and Dill also identify the following societal conditions or challenges: patterns of diversity, telematics revolution, quality reform, economic productivity, postsecondary relearning and globalization of scholarship. Other authors use different indexes, like Sporn (1999) who discerns five major trends influencing higher education institutions: restructuring the economy, changing role of the state, shifting demographics, new technologies and increasing globalization. Hammond (2003) indicates other factors that can influence higher education institutions: political, cultural and social context, national policy drivers, developing technologies, beliefs & expectations of society about educational goals & methods and funding and support agencies. And Fisser (2001) focuses on the influence of environmental factors on the use of new forms of ICT in education. She categorises these changes into environmental pressures (such as new market, part-time students, funding, demographics, competition, etc.), technology developments, institutional conditions, educational developments, cost-reduction/cost-effectiveness and support facilities.

Although these categorisations are based on different view points, researchers in general agree that technology (and innovation therein), demography (leading to more diversity in the student population), governmental policy and economic factors (including globalisation and increasing competition) are the main external drivers for change that higher education institutions must take into account. These external environmental contingencies, influencing both the primary and secondary processes of higher education institutions (education, research and organisation) are described in more detail below.

3.2.1 Technological factors

Information technology plays an important role in today's society as well as in higher education institutions. For example Singh *et al*. (2005) argue that the technological developments over the last two decades not only have the potential to change the way society accesses and maintains knowledge, but also to restructure the traditional models of delivery of education. Today's Western youth are growing up with technology and the Internet (e.g. mobile phones, chat rooms, games and simulations). They have almost all day access to Internet (either at home or at school) and are used to integrating these technologies into their daily lives. This "Net generation" uses technology already at primary and secondary school and expect to use it in higher education as well (Oblinger and Hawkins, 2005). Peterson and Dill (1997) describe this as follows: "probably the most pervasive challenge to higher education institutions is the rapid expansion and influx of interactive telecommunications networks, which link students and faculty to extensive data resources via workstations and computers capable of integrating information, sound and video images" (p.13).

These (rapidly changing) technologies influence the options for opening access to knowledge, both within higher education institutions as well as for society in general. For example Fisser (2001: 48) and Bates (2000: 1) describe how the development of the Internet and access to the World Wide Web (WWW) have contributed and have the potential to further widen access, not only to information sources but also to new learners. Knowledge is analysed and new knowledge is created and all this is available both to higher education institutions and to the broader society.

Furthermore technology firms are now entering the higher education market and are forcing universities to reconsider how they define and deliver education (Sporn, 1999). A number of institutions offering post-secondary education via interactive telecommunications have emerged and large companies are adopting these technologies for their own internal postsecondary training programs. According to Peterson and Dill (1997) "one of the things that make this technological revolution so critical is the extent to which it interacts with all the other societal (external) challenges" (p.14). For example, because of technology, higher education institutions can reach new target groups, offer programs at a distance, foster competition and cooperation between higher education institutions and between higher education institutions and industry. Additionally technology has the potential to increase flexibility for the traditional students and improve the teaching quality by achieving higher levels of learning (Bates, 2000). Technology can also be used to focus on "how, when and why people learn" (Zemsky and Massy, 2004: 1).

3.2.2 Demographic changes

For the last two decades, expanding higher education enrolments have been the norm. Newman and Couturier (2002) as well as Middlehurst (2003) describe the expansion of enrolments as a global phenomenon, although numbers vary across countries and regions. In the last twenty years the number of tertiary students worldwide has doubled in size, growing from 40.3 million students in 1975 to 80.5 million students by 1995 (Worldbank, 2000). Other researchers (Blight, 1995, Bohm and King, 1999 and Olsen, 2002) have tried to extrapolate from current figures to predict future global demand. They forecast that global demand would grow from 48 million enrolments in 1990 to 159 million in 2025.

According to Van der Wende (2001, 2003) this growing demand for higher education can be distinguished into two main trends: on the one hand the rapidly growing need for widening initial access to higher education and on the other hand the increasing need for more diversified and flexible types of higher education, including life-long learning and corporate training. Collis (1999) points out that although an increase of 20% in the number of 18 year-old students entering higher education by 2010 can be predicted, higher education institutions also must look at the "broader market".

In the United States 43% of students are over 25 years old. By 2010, these mature students are expected to be in the majority due to ever increasing requirements of the economy. Mature students require a very different approach than the traditional 18-years old. Generally, they look for part-time degree programs that are easily accessible from their homes, affordable and offered at convenient times and dates (Collis, 1999).

These two trends are leading to an increasingly mixed student profile. In the context of initial higher education, usually regarded as being for students aged 18-24, not only can continuing demand growth be observed (increase of the educational attainment), but also an alteration of the character of this student population can be expected. These include more and varied ethnic backgrounds and minorities being represented, or of 18-24 year old students studying full-time in combination with a (part-time) job; the so-called learner-earners. On the other hand, there is the focus on offering more flexible and diversified types of higher education, that aim to fulfil the demands of the broader market, including the adult, relearning, continuing education or life-long learning market (Van der Wende, 2001).

These markets are characterised by students who combine often a full-time employment with part-time study; the so-called earner-learner students. Bates (2001) argues that, especially in knowledge-based economies, life-long learning has become critical for economic development. He estimates that the life-long learning market for formal university and college courses in knowledge-based economies is at least as great as the market for students leaving high school for university or college. Furthermore, companies need to update the skills of their workforce. Consequently universities are using re-education programs to exploit this lucrative market. Especially in the US the vast market for relearning had led to a shift in emphasis from undergraduate to professional education (Sporn, 1999: 10).

In addition to the two trends mentioned above, a third trend can be seen: internationalisation. There is the growing global market of international students, as supply and demand is increasingly matched across national borders (Van Vught *et al*., 2002). More and more higher education institutions try to attract students from other countries (especially Asia), mainly to "seek new financial resources, face new competition and seek greater prestige domestically and internationally" (Douglas, 2005: 2). This can be both students travelling from their home country to the country of the higher education offering institution as well as higher education provision from one country to another. According to Garrett and Verbik (2004) the latter is called transnational education.

One can also see an increase in the need for international experience for higher education graduates and academics. According to Sporn (1999), many employers require a good understanding of different cultural settings, economic and social conditions and mobility across borders. The international student and faculty exchange programs underscore the importance of global experience, foreign languages and cultural versatility for different higher education actors.

3.2.3 Governmental factors

The relationship between the government and higher education institutions is of importance as "the character of these relationships defines the scope and room to manoeuvre, not only for policy-makers to choose objectives and means of policy, but also for the possible repertoire of higher education responses and government/higher education interactions that can be played out in specific policy areas" (De Boer and Huisman, 1999: 3). A well-know classification of instruments (means of policy) that governments can apply when performing such interactions, is defined by Hood (1983). Hood distinguishes four types of governmental instruments: 1) information provision, 2) treasure; the power of the cheque book by offering contracts and incentives, 3) authority, to command, restrict or control and to comment and permit, and 4) actions; all activities that directly influence the citizens, their property or their environment (see Maassen, 1996 and Van Vught, 1989 for applications in the context of higher education). Looking at the choice for objectives and means of policy of governments, Maassen and Stensaker (2003: 56) make a distinction between 1) symbolic policy (aimed at establishing principles ant attempting to unify different interest groups), 2) comprehensive policy (an approach aimed at impacting a whole sector or system in a unified and homogenous way) and 3) differentiated policy (which involves making trade-offs between competing interests, on the basis of indicators or specific criteria, with the intention of addressing targeted problems or sub-sectors.

The above mentioned relationship between the government and higher education institutions, characterised by both different types of policy itself and different categories of instruments that can be applied to reach these policy objectives, is often referred to as the governance structure. Acknowledging that governance structure can be looked at from different levels: national, local, institutional, sub-unit or discipline level (Clark 1983), governance structure in this study relates to what Clark terms the "superstructure": the vast array of government and other system regulatory mechanisms that relate organisations to one another).

Governance at the superstructure level includes a complex web of interactions, structures and regulatory mechanisms above the level of the individual institution (Clark, 1983).

Actors involved are for example the European Union, national Ministries of Education and advisory bodies and intermediary organisations. Within this superstructure the system- level relationship between the state and the higher education institutions is a central issue.

These system-level governance structures can broadly be categorised into three different models: the bureaucratic model (continental Europe), the collegial model (United Kingdom) and the market model (United States) (Clark, 1983). In the bureaucratic model governance authority is shared by faculty guilds and state bureaucracy; while in the collegial model authority is shared between faculty guilds and institutional trustees and administrators. The market model, while similar to the collegial model, is characterised by weaker faculty governance and stronger trustees and administrators rule (see e.g. Reed, *et al*., 2002). Many Western national higher education systems can be characterised according to these models; most Western European countries like the Netherlands, Finland, Norway belong to the continental model, as Australia and the United Kingdom can be characterised by the collegial model. The various models and conceptualisations of higher education governance are ideal types, which have been existing for a long time. However, since the 1980s/1990s many higher education systems, both in continental Europe as well as in the United Kingdom, Australia and the United States have experienced a shift in the relationship between the state and the higher education institutions which has led to important, and sometimes revolutionary, changes in system-level governance.

While there are significant differences by countries, there is clear evidence that all of the systems are subject to external pressure to adopt management approaches that favour responsiveness to the economic needs of the nation and the incorporation of the ideas and values of business (Amaral *et al*., 2002). The common observation is that in many continental European countries government steps back from detailed, centralised regulation in favour of steering institutions at a distance. This decentralisation and deregulation provides the higher education institutions with greater levels of increased institutional autonomy. In contrast the United Kingdom and Australia (as well as the United States and Canada) have all experienced increased government intervention and regulation: the (federal) state claims more power to control higher education institutions, either directly through regulation or through the market (see e.g. Maassen, 2002, Theisens, 2003).

Furthermore Maassen (2002) argues that, while in the USA, Canada, Australia and the UK the relationship between society and higher education is driven more and more by a form of academic capitalism relying on market-type mechanisms, in continental Europe the emerging new relationship between society and higher education can be characterised as network-types of relationships with the state continuing to be an important actor. Market elements have also been introduced in the steering of higher education in continental Europe, but they are not as radical and far-reaching as in the Anglo-Saxon countries.

The above described models all include one important dimension: the relationship between the government and higher education institutions can be framed by the concept of government regulation (or state steering, coordination or governance). Government regulation can be described as the efforts of the government to steer the decisions and actions of specific societal actors according to the objectives government has set and by using instruments government has at its disposal (Van Vught, 1989: 21). This steering of the government can take place in different models/classifications (e.g. Olsen, 1988, Van Vught, 1989 and Goedegebuure, *et al*., 1994). In general one can say that steering models indicate different approaches that governments apply in influencing higher education institutions. Huisman et al. (1999) describe that most classifications offer idealtypes of steering, often ranging from centralised, direct state steering and control to a decentralised system with indirect control based on market (like) mechanisms and self-regulation.

Gornitzka and Maassen (2000) explore the steering models of Olsen (1988) who differentiates between a sovereign state, an institutional state, a corporate-pluralist state and a classical liberal state (referred to as state supermarket model). Olsen's steering models are particularly relevant, for they surpass the – in the context of this study – simplified dichotomy of state control versus self-regulation and forestall the unnecessary coupling between models and countries (as Clark's seems to suggest). In their description, Gornitzka and Maassen show that in the sovereign state, higher education is seen as a governmental instrument for reaching political, economic or social goals. That role of higher education is best upheld by tight control over universities and colleges, with a strong emphasis on them being accountable to political authorities. In the institutional steering model higher education institutions have the responsibility to protect academic values and traditions against political pressures. The role of higher education institutions is to uphold its traditions and its socio-economic and cultural role, to protect academic freedom and to store and transmit knowledge. Decision-making within higher education institutions is not directly influenced by government. In the corporate-pluralist steering model the government is seen as one of many actors that have control and authority with respect to higher education.

The role of higher education reflects the constellations of other (external) actors. Decision-making is segmented and dominated by clusters of interest groups. The dominant mode of decision-making is one of negotiation and consultation. In the last model, the supermarket model, the role of the national government (state) is minimal. The role of higher education institutions is to deliver services such as teaching and research. There is no dominant arena of decision-making, as a result of extreme decentralisation

3.2.4 Economic factors

To meet the demands of the new world, a paradigm shift from a system of postsecondary institutions to one of a postsecondary knowledge system or industry can be seen (e.g. Peterson *et al.,* 1997 and Rowley *et al*., 1998). For centuries the role of markets and their (possible) influence on higher education institutions was hardly discussed, mainly because national government fully funded and owned higher education institutions (Newman, 2000). However the movement towards a more postsecondary knowledge system creates a need for workers with specialised (knowledge) skills. This leads to a far more competitive environment in which higher education institutions have to both compete and collaborate to attract students: with each other as well as with new providers such as for-profit (higher education) degree granting institutions. Furthermore, in many (Western) countries public funding is decreasing and higher education institutions have to find other ways to fund their primary and secondary processes. Some of these trends, patterns of public spending and global competition and cooperation are described below.

Public spending

As was described in Chapter One, over the last few decades the relationship between higher education institutions and the state has been changing; a shift towards more deregulation and decentralisation and a greater reliance on management approaches was already discussed. There is another factor which characterises the relationship between higher education institutions and the state: public funding. Higher education institutions, like other organisations depend on resources. This dependence means that changes to resource allocation arrangements will have an impact on the institutions (e.g. less governmental funding means that the institution has to find other ways of funding). In this respect it is about the way resources are obtained and from whom (Chevaillier, 2002: 87).

One can observe a changing pattern in the allocation of state funding for higher education institutions. Until the 1990s European higher education systems experienced continued incremental growth in public financial support. In the 1990s reductions in public expenditure for higher education occurred in most European countries. At the same time the share of funds by non-public sources has increased. Chevaillier (2002) also states that:

> *"the main trends in higher education finance over the last decades are, for most countries, a diversification of funding and a change in the financial relations between the universities and the State. These changes are partly a result of the increasing costs of higher education associated with the democratization of access and the related growth in enrolment. They are also, in many countries, a product of new approaches to public policy that attempt to introduce public sector management techniques, derived from private sector practices, partly through decentralization, incentives and increased accountability of public services" (p.87).*

This shift towards the market is underpinned by an ideological shift towards the perception of higher education as a private rather then a public good (Meek, 2000: 24).

According to Chevaillier (2002) at the system level (superstructure level) resource allocation models range from central to marketdriven. Markets are basically a mode of co-ordination of autonomous entities through which goods and services are sold and bought. Central control means that every action is subordinated to centralized decisions over the allocation of resources in kind to various economic entities. It is important to recognise that money plays a very different role in each of the models. In a centralised system, it is used as an accounting device. Institutions receive resources that are measured and expressed in monetary terms, but these resources are specified in terms of their nature and amount (the money is "allocated"). In a market context, money is purchasing power. Money can be used to obtain anything that its owner decides to buy. The way in which money is used becomes an expression of the autonomy of the individual who is free to choose whatever physical resources are sought.

Chevaillier (2002) describes that in the higher education world, a centralised system is one in which universities are a component of the state administration and they are allocated the resources deemed necessary to produce the education service specified by political authorities. A market system in higher education is one in which independent institutions sell their services to students or any other body willing to buy them. They freely decide on the amount and the type of resources they need to produce such services. Institutions are financed by tuition fees paid by the individual students and by a lump sum received from the government.

Competition

The economic environment in which higher education institutions operate is changing. One of the main economic changes can be summarised as globalisation. According to Douglas (2005) globalisation focuses on "changing markets and providers linked to new methods of delivering higher education products" (p.3). In recent years, the introduction of marketisation policies and market-type mechanisms in many countries' sectors previously characterised by a high degree of government steering can be seen.

Governments have turned to deregulatory policies and privatisation schemes (Jongbloed, 2003). These types of marketisation policies mainly consist of deregulation efforts and policies to increase competition between higher education providers. These changes have had a profound impact in higher education institutions. Education is no longer seen as a social right, but as a service. Institutions are increasingly seen as service providers and students as clients (Amaral, 2002: 8). Together with the growing increase in demand for higher education and the consequent creation of a larger market, many new (for-profit) providers are emerging. This large and diverse market is expected to produce a more heterogenous range of higher education institutions as universities seek to identify strategically specific niches in which they hope they can maximise their chance of being successful (Floor, in Van der Wende & Van de Ven, 2003: 37). Or as Fisser (2001) concludes: "these trends imply that there are more and more stakeholders that are trying to influence universities and that universities sense a from of competition for a diversity of resources such as budgets, students and research". Also, the new economy's demand for workers with speciliazed skills has led to new competitors in education and new forms of competition among traditional players. In some countries a new and growing group of for-profit, degree granting institutions is emerging (Newman & Couturier, 2001).

Collaboration

How might higher education institutions respond to the threat of private sector intervention? According to Collis (1999) the most important strategy imperative is to quickly form alliances with credible new entrants. But of course also alliances can be formed with trustworthy existing higher education institutions. Higher education institutions should attach great urgency to debates about their future. Rather than sitting back and observing how markets develop, they should proactively determine their future. The biggest mistake established institutions can make today is one of omission, not commission.

Also Van der Wende and van der Ven (2003) argue that:

> *"collaboration is greatly encouraged as a mechanism that could ensure the clustering of investment and expertise, sufficient economy of scale and effective dissemination of results. Collaboration within the sector, but also with corporate partners has let to a multitude of bottom-up networks and consortia, supplemented in several countries by more centralised initiatives leading to e.g. the establishment of virtual universities" (p.14).*

3.3 The second group of independent variables: the internal contingencies

3.3.1 Institutional governance

The shift in the relationship between the state and higher education institutions has influenced the institutions' internal management in many Western countries. As described in Section 3.2.3, in many continental European countries, government stepped back from detailed, centralized regulation in favour of steering at a distance, which provides higher education institutions with more institutional autonomy. Although in both the Anglo-Saxon countries as well in the United States state control has increased, in these countries higher education institutions still have a lot of autonomy. In general one can state that the trend towards governmental decentralisation and deregulation in the 1990s, both in continental Europe as well as in the Anglo-Saxon countries, in line with the introduction of more management approaches, attempted to redistribute authority between the various levels in the higher education systems .

Amongst others, De Boer (2003; 91) gives a good summary of the results of the search for this new redistribution. National governments have encouraged a strengthening of institutional management by changing the composition of governing bodies, streamlined decision making within universities, provided greater power and authority to institutional executives, and altered the role of democratically elected senates and councils. Collegial decision-making bodies are now largely advisory rather than vested with specific decision-making powers. Compared to the past, universities have been reshaped around a command structure with increased powers of executives and clear line management.

Generally, there has been a tendency to centralise decision making with respect to teaching and to a lesser extent research. Furthermore, many university functions of scholarship, administration and leadership were interwoven. Traditionally leaders and managers in higher education were academics, who controlled the main decision areas, at least to a large extent. In the new structures of university governance and management, leaders are no longer expected to combine academic and administrative work. They are first and foremost full-time managers, no longer involved in the implementation of teaching and research programmes. It appears that they are given the right "to manage".

The picture sketched above can be described in more detail by looking at the internal governance of higher education institutions. Internal governance does need to be distinguished from related terms, such as management, administration and leadership.

Following the definitions of Gallagher (2001), governance can be seen as a relational concept incorporating leadership, management and administration. In this description the following elements are defined: Governance refers to the structure and processes of decision-making that brings about organisational coherence, authorised policies, plans and decisions, and accounts for their responsiveness and cost-effectiveness.

- Leadership is seeing opportunities and setting strategic directions
- Management is achieving intended outcomes through the allocation of responsibilities and resources, and monitoring their efficiency and effectiveness.
- Administration is the implementation of authorized procedures and the application of systems to achieve agreed results.

3.3.2 Institutional profile

Above the institutional governance characteristics of higher education institutions were described. Besides these characteristics, according to Peterson *et al.* (1997), strategy and planning in colleges and universities can also be seen as a function of the type of institution. External contingencies differ so much by institution type that planning and strategy must be designed for the particular conditions of a specific type of institution. As a rule, different institutions with different histories will respond to changes in the external environment in different ways. Even when they share a common management culture, higher education institutions are likely to react differently to new external constraints, according to each university's unique combination of activities, access to various resources and local environment. They all have their own unique "institutional pathway to transformation" (Chevaillier, 2002: 95). Meek (2002) also indicates that "each university's development is itself a complex institutional story, one best told when embedded in contextual peculiarities and unique features of organisational character. When thus portrayed, the universities offer different histories, traditions, settings and profiles" (p.250).

This unique institutional pathway consists of different elements that can be summarised under the heading of diversity. According to Huisman (2000), diversity is "the variety of types of entities and the dispersion of entities across these types". Central to the conceptualisation of diversity is the distinction between entities (higher education institutions) and determining why the type that the entity belongs to. This takes place on the basis of selected characteristics: higher education institutions differ from each other in certain respects. Differentiating characteristics are for example size, degree programs or mission.
Other characteristics can include the history of the institutions, teaching-related characteristics and characteristics related to organisational effectiveness. There is much discussion on which variables to include and exclude. For this study, the classification of characteristics of Birnbaum (1983) was used, with some additions from other authors, like Dill (1997), Ratcliff (1996), Meek (2002), Fairweather (2000).

Diversity characteristics
Birnbaum's classification (1983) is based on the difference between external and internal diversity. External diversity (also named institutional or organisational diversity) relates to differences between higher education institutions. Internal diversity relates to the differences within higher education organisations, in terms of mission, program, clienteles and instructional methodology, within a single institution. Birnbaum (1983) identifies seven forms of diversity.

Systemic diversity
The concept of systemic diversity refers to differences in institutional type, size, and control found within a higher education system. According to Birnbaum (1983) and many other authors (e.g. Ratcliff, 1996, Dill, 1997, Meek, 2002 and Fairweather, 2000) these are the variables most often considered when dealing with the concept of diversity and they are closely related to the other forms of diversity as well. For example Dill (1997) argues that "differences between colleges and universities have led to the prevailing view that different type of institutions required different forms of governance, management and planning" (p.89). The second component of systemic diversity is size, and the third major characteristic is control, referring to the institutions source of legal authority. One can think of the traditional dichotomy between public and private control.

Structural diversity
The two major characteristics related to structural diversity are the degree to which they are subject to legal authority beyond their own board of control and whether they exist as a single unit or as an integrated part of a multicampus system. Structural diversity refers to institutional differences resulting from historical and legal foundations, or differences in the division of authority within institutions. For example De Boer (2003) states that "history matters, in particular when it comes to governance and management.

Under the assumption that institutional designs are path dependent, the same phenomenon may turn out differently from one place to another. Not all higher education institutions, given their past, have the same options and choices" (p.92).

Programmatic diversity

According to Birnbaum, institutions can be distinguished on at least five programmatic bases: degree level, degree area, comprehensiveness, mission and emphasis of programmes and services provided. Defining institutions based upon the highest degree offered – associate, bachelor, master, doctor, is one way of representing institutional diversity. A separate related area is defined by which degrees are offered. Third, the aggregation of programs within an institution permits classification on a third variable: comprehensiveness. The simplest distinction is between those institutions with a single curriculum orientation and those with more than one. Institutional mission constitutes the fourth programmatic element of diversity. According to Dill (1997) the mission of a higher education institution has to be understood as "identifying the appropriate scale and scope of an institution, as well as articulating the community values by which an institution determines programs that are academically and economically viable" (p.171). Closely related to the issue of mission in a macro sense is the fifth programmatic dimension of external diversity, emphasis, which is mission in a micro sense. Its major characteristic is that it distinguishes an institution not from those different from itself but from those that in most other respects are similar to it. One can think of institutions with an ecological orientation, a local orientation, or even an urban mission.

Procedural diversity

Programmatic diversity refers to "what" is offered, whereas procedural diversity is related to "how" it is offered. At least three types of procedural diversity can be identified: educational delivery systems, student policies and administrative processes. Today, as in the past, the dominant mode of delivering educational services in higher education is based on student-faculty interaction in the form of lectures, recitations and laboratories. At the same time there are only a few campuses that have not experimented to some degree with new forms of delivering educational services. Birnbaum states that these a-typical forms of delivery of education can have an impact on the mission of an institution (p.43). Also Jongbloed (2003) describes that higher education institutions try to distinguish themselves from others in offering a range of additional services to their (prospective) students. Diversity is seen in methods of instruction and delivery, ranging form intensive courses requiring face-to-face discussions to distance education and self study programs supported by information technology.

The second type of procedural diversity concerns student policies, particularly those aimed at aspects of academic life. Birnbaum states that student and academic policies reflect general trends and for the most part impart no particular distinctiveness on those institutions that have adopted some of them. The policies include reforms to student-designed majors, interdisciplinary programs or new grading systems that, have increased student options and institutional flexibility.

The third component of procedural diversity described by Birnbaum is the institution's policy. Higher education institutions' policies are intended to contribute to reaching the objectives the institutions has set for itself and to realizing the conditions that the institution judges to be important. Policy analysis intends to support the institutions activities regarding strategic decision making (Van Vught, 1997).

Reputational diversity
This type of diversity communicates the perceived differences in institutions based on status and prestige. Regional or local reputation may be based upon history, notoriety, an outspoken president, or an extensive outreach programme.

Constitutional diversity
Constitutional diversity relates mainly to differences in students' family backgrounds, abilities, values and educational goals. Most attention is given to students' characteristics, although they are not the only constituent within institutions (think for example of administrators and academic staff). Birnbaum identifies at least seven sources of constitutional diversity: sex, ethnic background religion, socio-economic status, academic ability, values and institutional climate and geography. Other factors that also distinguish between institutions include the proportion of students residing on campus, the mix between graduate and undergraduate students, full- versus part-time students and gender.

Values and climate diversity
Climate diversity is associated with differences in social (campus) environment and culture. Although the differences appear quite real and have been found repeatedly in many research programs, it is not clear how large a difference must be before it can be said to represent a significant contribution to institutional diversity (Birnbaum, 1983: 53).

3.3.3 Institutional technology

A third internal contingency relates to the use of technology within the higher education institutions. As stated in Section 3.2.1, technology is expanding very rapidly, both in society and within higher education institutions. However, the main question is whether the use of these technologies will lead to "a sweeping reinvention of how students and faculty teach, learn and conduct scholarship, or whether it is merely a technical substitute" (Peterson and Dill, 1997: 13). Bates (2000: 2001) describes that appropriate technology infrastructure is an essential requirement for technology-based teaching. The impact of technology on how students learn, professors teach and how administrators manage the institution is complex.

Technology can be employed in many different ways to expand or improve the educational experience. Today's four-year colleges and universities may well protest that distance learning and the Internet are no substitute for what they offer on campus. But for the potential students who cannot afford the time, expense, or relocation such an approach may well embrace the new technology and exploiting its inherent scale economies (Collis, 1999). For example Hammond (2003) describes that "in terms of emerging technology one might hazard the following as particularly relevant to higher education over the next five years:

- the web as a major source of delivering information throughout the community
- increased bandwith and the convergence of phone and computing technologies enabling more flexible and more effective home and distance working
- ubiquitous computer ownership and wireless technology (p.121).

3.4 The dependent variable: the strategic choices of higher education institutions

3.4.1 Strategy formation: the use of scenarios

As argued in Chapter One, for coping with changing demand, new student markets and competition, higher education institutions have to formulate strategies for integrating e-Learning in their educational delivery and support processes. One of the tools for strategy formulation is scenario planning. The purpose of using scenario techniques is twofold: 1) scenarios can be used for long-term survival and 2) scenario planning can be used to open up an organisational mind for exploration, or to achieve closure on specific decisions and actions (Bradfield *et al*., 2005). In this study scenarios are used for exploring purposes: the goal of this study is to explore strategic choices of higher education institutions with respect to integrating e-Learning in their educational delivery and support processes. The different strategic choices of higher education institutions were based on a scenario study conducted by Collis & Gommer (2001).

3.4.2 Scenarios for e-Learning

In many scenario techniques the starting point depends on the purpose of the scenario undertaking, but in general is related to a particular management issue or area of general concern, which in turn determines the focus in terms of the driving forces to be examined (Bradfield *et al.*, 2005). Furthermore, Bradfield *et al*. state that "although the processes and tools used by scenario practitioners to achieve this vary, they are basically generic and include desk research, individual and group brainstorming, and clustering techniques, contextual environment analysis using the Societal, Technology, Economic, Environment, Technology (STEEP) framework or its derivatives, matrices, systems dynamics, stakeholder analysis and discussions with remarkable people".

Collis & Gommer (2001) developed four main scenarios for educational delivery. These were based on extensive trend analyses of news items, reports, and articles relating to current developments in the broader context of learning environment as well as on interviews conducted with experts on technology and higher education (including members of the Advice Group Innovation and the Steering Group Learning Environments of the University of Twente, the Netherlands). The two main dimensions used to distinguish the four scenarios were location and (quality) control[4].

The first dimension relates to the local versus global issue. Should the university move toward strengthening itself as a home base for its learners, or move toward a future in which its students rarely or never come to the home campus (e.g. using multinational partnerships, satellite campuses or distance education instead). What if the individual university decides to go alone? Can it compete? Will big partnerships dominate client attention? Or will a swing *back to the basics* occur, as a backlash against failed attempts at globalisation?

The second dimension relates to the quality of the program and the content offered. How should this be obtained, and offered to clients? As total programs? As individual courses? As portions of courses (modules, or learning events of different types) which can be combined in different ways? What if the *choose-your-own-combination* idea takes root, stimulated by competition for fee-paying professional clients? Can the local institution handle this sort of individualisation itself?

Many different ways could be found to zoom in on key aspects of these developments and emerging contexts. Figure 3-1 gives one analysis (Collis & Gommer, 2001; Collis & Moonen, 2001).

[4] This section is derived from Collis and Gommer (2001).

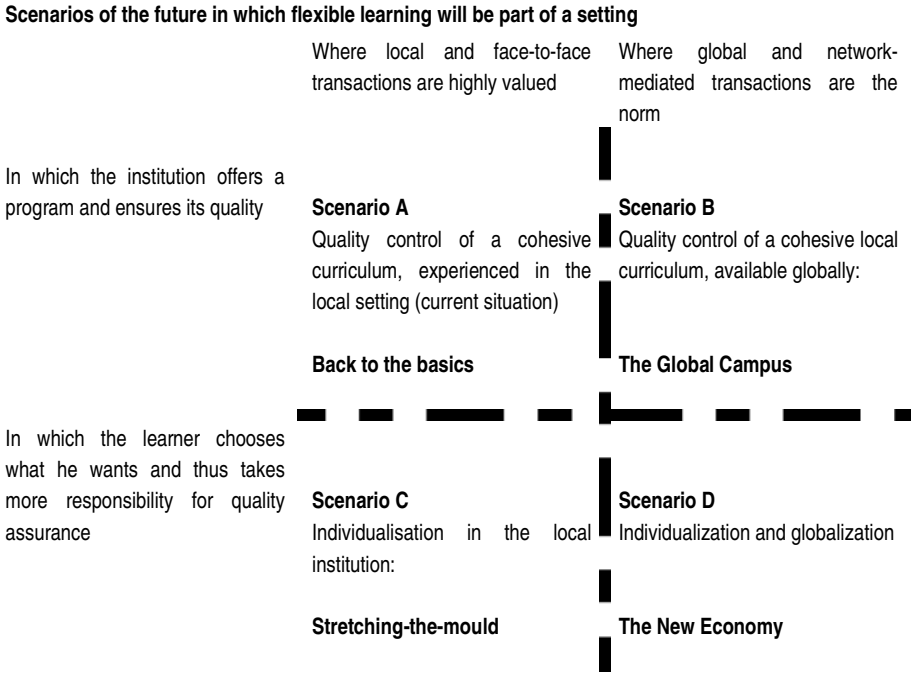

Figure 3-1: Four scenarios for educational delivery

Below a description of these four scenarios for educational delivery is given, directly taken from Collis and Gommer (2001).

Scenario A: Back to Basics

In this scenario, higher education institutions focus on the traditional, campus-based students, in which learning takes place through face-to-face contacts andthrough direct interaction with instructors. *Virtual this and that* are seen as just ahype; real learning takes place in a fine campus setting with its library, computerlabs, instructors with office hours, and other students to interact with. The basicassumption is that experts in the institution are in a better position than the student to indicate what courses are useful and in which order they should be taken. Technology appears here in sensible ways; using word processors, email and WWW browsers, getting course information via WWW environments. WWW sites are also good for consultation of external course resources and to make communication easier. But the basics are still what matters: a well planned curriculum and regular face-to-face contacts.

Scenario B: The Global Campus
Students want to study in a well-planned program but they want to stay in their own locations and continue their own lives at the same time as they are studying. They are able to participate on-line in the program of a university, even if they don't physically ever come to that institution (or only come once or a few times). Technology here becomes very important. First of all, the student will need to use technology to find out about the programme of the university. Second, the student needs to use the technology to register for the programme. And third and foremost, the student will need technology for stable access to all the course materials, assignments, and for communication and interaction with fellow students and instructors.

Scenario C: Stretching-the-mould
The student has no particular interest in being involved in a program or course offered at a distance, but would appreciate more flexibility in his local study setting. He or she might like to substitute some courses from the home institution by courses from another (foreign) institution. This choice may be related to the fact that the alternative course takes another academic, pedagogical, cultural or linguistical approach, or to student's desire to interact with a wider (international) environment. The student may also think that the alternative course is more efficient, relevant, or of higher quality. For all of these options technology is an important if not essential condition. The institution responds to the learner by increasing flexibility in a number of ways, not only relating to place and time, but also to content, assignments, prerequisites, resources, and other aspects of course participation. It may cooperate with foreign partner institutions in order to widen the choice for international on-line options within a common course management and credit transfer and recognition system.

Scenario D: The New Economy
The student wishes to make his or her own decisions about what, when, how, where, and with whom he or she learns. The student will often be a working professional, and has a good idea of the types of courses or learning experiences that would be useful to his work setting. The employer is stimulating and supporting lifelong learning efforts. The student approaches an intermediary or advisory person (via the WWW), who provides assistance in defining level and learning needs. The student will search the WWW himself (or use a portal) to locate appropriate learning options. These may come from different institutions around the world, according to their particular profile and expertise. The student will choose on the basis of the relevance, quality, efficiency, and flexibility of the various options. The student can stay at home and continue professional and family responsibilities.

The student is a life-long learner looking for just-in-time internationally competitive provision. In principle the student does not study for a degree, but he or she will require certification of acquired competencies and/or credit accumulation for professional recognition purposes.

3.5 The contingency model

Looking at the overall research question of this study "how do higher education institutions differ in their strategic choices with respect to integrating new technologies into their educational delivery processes and how can these differences be explained?", the main goal of this research is to explain why higher education institutions differ in their strategic choices. As described in Section 3.4, these strategic choices can be collapsed into four broad states: back-to-the basics, stretching-the-mould, global campus and new economy. Based on the description of both the independent variables (external and internal contingencies) and the dependent variable (strategies), the conceptual framework of Chapter Two can be elaborated to the following stage:

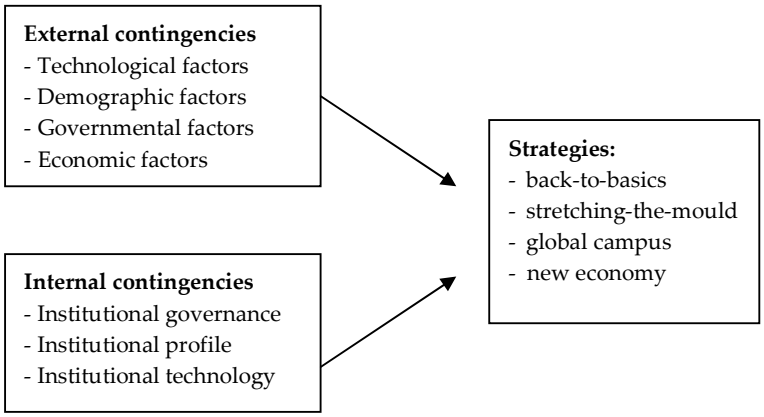

Figure 3-2: Contingency model

Looking at this contingency model it is expected that the independent variables internal and external contingencies (factors) influence the dependent variable (strategic choices of higher education institutions). Based on contingency theory, there can be relationships between the external environment (external contingencies) and the strategic choices that higher education institutions make as well as between the internal environment (internal contingencies) and the strategic choices of higher education institutions. Both the independent variables and the dependent variable are further operationalised in the following chapter.

4 Methodology and operationalisation

4.1 Introduction

This study focuses on the differences between higher education institutions with respect to their strategic choices in integrating e-Learning in their educational delivery and support processes and more specifically on the factors (contingencies) that are of influence on these choices. In the previous chapter the premises of contingency theory and the environmental school of strategy formation were used to develop a contingency model that characterizes the possible relationships between the independent variables (the external and internal contingencies) and the dependent variable (strategic choice of higher education institutions). In this chapter these independent and dependent variable are further operationalised. Before doing this, an overview is given of the methodology and research instruments used for gathering the data for this study. This chapter ends with a description of the statistical methods used for analysing the data.

4.2 Research instruments

The main question of this study is "how do higher education institutions differ in their strategic choices with respect to integrating new technologies into their educational delivery and support processes and how can these differences be explained?" From this main question, the following three sub-questions were derived:

1. What strategies are emerging?
2. What are the differences between higher education institutions with respect to their strategic choices?
3. Which (internal and external) factors explain these differences?

To find answers to each of these sub-questions, a contingency model based upon the premises of both the contingency theory as well as the environmental school of strategy formation was developed (see Section 3.5). Data for the independent variables (external and internal contingencies) and the dependent variable (strategic choice) were gathered in different ways.

1. Independent variables: data on internal contingencies were gathered via a standardised Web-based survey, complemented with web-based research on institutional features. Data on external contingencies were derived from the same standardised Web-based survey, web-research, higher education literature and databases such as the OECD statistical database and the CHEPS higher education monitor. This country (system) level data is described in Appendix 2.
2. Dependent variable: data to characterise the dependent variable were gathered via the standardised Web-based survey.

As described in Section 1.5 the author of this study was part of the research team that undertook the international comparative study on Models for Technology and Change in Higher Education. The data gathered in this study was also the main input for describing most of the internal contingencies of this thesis. In addition, items were developed for the dependent variable relating to the potential strategies of higher education institutions.

The study on Models of Technology and Change in Higher Education applied an international comparative methodology and included the following countries: Australia, Finland, Germany, the Netherlands, Norway, Sweden, the United Kingdom and the USA. Furthermore the study applied a multi-actor approach, addressing three types of actors: decision-makers, support staff and instructors. Based on a model containing clusters of variables for predicting current and future strategies for ICT and educational delivery, a Web-based questionnaire was developed (see Appendix 1). Respondents were asked to indicate their perception about various clusters of questions on e-Learning practices. Part of the questions were asked in terms of two points of reference: current practice (2001) and predicted practice in the year 2005.

Three Web-based questionnaires were developed: one for each of the actor groups. All of the questionnaires contained a core set of common ICT-related items: environmental conditions and settings, implementation, teaching practices and experiences and effects. In addition, extra questions were added per questionnaire to reflect particular issues of interest to the individual researchers. The responses of these extra questions were not used in the Models of Technology and Change in Higher Education outcomes, but for individual researchers' projects. This thesis, focusing on strategic choices of higher education institutions, is one of these projects[5].

[5] Two other projects are De Boer (2004) who focused on flexibility and Gervedink-Nijhuis (2005) who focused on the role of the instructor.

The extra questions used for this thesis focused only on the decision-makers within the higher education institutions and included variables such as decision-making structures, ICT-policy related issues and type, size and history of the institution. These, as well as the core common set of items, are discussed in greater detail in Section 4.4.2.

4.3 Population and response of the study

In the Models of Technology and Change in Higher Education study all higher education institutions in the participating countries (including both university and non-university types of higher education institutions) were addressed. Only in the USA was a sample (N=200) used. The institutions in the various countries were approached with the help of national contact persons or organisations. The addresses of institutional contact persons (usually ICT coordinators) were provided by national contact organisations.

The Internet address for the Web-based questionnaire was sent along with an introductory letter to these institutional ICT coordinators. In this letter, the institutional ICT coordinators were asked to:

- Provide general information on the institution (fact data).
- Distribute the questionnaire and the instruction letter for individual respondents to representatives of the three categories of respondents within their organisation (i.e. decision-makers, instructors and support staff).
- Disseminate the decision-maker questionnaire to members of the executive board, and to all deans and directors of departments.
- Send the respective questionnaires to a random sample of 10 of instructors and support staff. Support staff included both educational support services and technical support services relating to ICT in teaching and learning.

In total 693 respondents submitted responses to the Web-based questionnaire. Their distribution over actor groups and countries is shown in *Table 4.1, Table 4.2* and *Table 4.3.*

Table 4.1: Distribution of respondents over actor groups

Actor groups	Number of respondents	Percentage of total response
Instructors	349	50.4
Decision makers	190	27.4
Support staff	154	22.2
Total	693	100.0

Table 4.2: Distribution of respondents over countries

Countries	Number of respondents	Percentage of total response
Germany	364	52.5
Norway	86	12.4
Australia	76	11.0
Netherlands	57	8.2
Finland	52	7.5
United Kingdom	31	4.5
USA	24	3.5
Miscellaneous	3	0.4
Total	693	100.0

The analysis shows that instructors were the largest response group, which can be explained by the fact that coordinators were asked to disseminate the instructor questionnaire within their institution to approximately 10 instructors. Furthermore, more than half of the total number of respondents is German, which can be explained by the fact that one of the co-funders of the study, the German Bertelsmann Foundation, was involved in distributing the questionnaires within the German institutions.

With respect to the representativeness of this study, *Table 4-3* shows that the respondents represent 174 higher education institutions, distributed over seven countries. This means that approximately 25% of the German institutions, 50% of the Dutch institutions, 20% of the Australian universities, 30% of all Finnish institutions, 50% of all Norwegian institutions and 27% of the UK universities responded to the survey.

Table 4-3: Distribution of institutions over countries

Countries	Number of institutions	Percentage of total response
Germany	64	36.8
UK	27	15.5
Netherlands	26	14.9
Norway	17	9.8
USA	17	9.8
Finland	16	9.2
Australia	7	4
Total	174	100

As described above, the data gathered for the Models of Technology and Change in Higher Education study was also used as input for this thesis. However, as the focus of this present study is on strategic choices of higher education institutions and not on individual responses of different actors (as was the focus of the Models of Technology and Change in Higher Education study) the data had to be aggregated to an "institutional" response. This process is described below.

From individual to institutional responses

The data derived from the Models of Technology and Change in Higher Education study included 693 individual respondents from 174 higher education institutions. Before aggregating these individual responses into institutional ones a missing value analyses was conducted. This was important because some multivariate statistical procedures such as regression analysis will not work as well or at all on data sets with missing values (Garson, 2005).

According to Garson (2005) the following three things can be done with missing values:

- Leave the data as they are
- Drop these cases from the analyses when the number of cases with missing data is small (e.g. <5 – 10% in larger samples)
- Replace the missing value by imputing mean values

In this study multivariate analyses was used to analyse the data (see Section 4.7 for more details) so it was decided to first do a missing value analysis, using the following steps:

1. All respondents with missing values for one of the four responses related to the dependent variable (back-to-the basics, stretching-the-mould, global campus or new economy strategy) were deleted from the dataset. After doing this the number of respondents declined to 607 and was distributed over 144 higher education institutions.
2. The next step was to conduct a new missing value analysis to see in which cases more than 15% of respondents' answers to the questionnaires were missing. For this only those variables were included that were answered by all respondents. This further reduced the sample to 582 respondents coming from 135 higher education institutions.

Based on their mean scores, these respondents were then aggregated into institutional responses. In general for aggregation to another level of measurement at least two respondents from the same level are needed. However, as described in the beginning of this chapter, extra questions for decision-makers were added to the common set of questions of the Web-based questionnaire.

Therefore even those institutions with only one respondent, being a decision-maker, were added to the sample of aggregated institutional respondents. This process led to a sample for this thesis of 91 higher education institutions.

4.4 Operationalisation: the independent variables

In the preceding chapter the main external (technological, demographic, governmental and economical factors) and internal (institutional governance, technology and teaching practices) contingencies were identified. To define variables that could measure the contingencies, these contingencies were first classified into a number of characteristics. The characteristics were then operationalised into various independent variables that were used for exploring the contingency model, as described in Section 3.5. As was shown in Section 4.2, data for describing the internal contingencies was gathered via a Web-based questionnaire, complemented with web-research on institutional features. Individual respondents (a decision-maker, support staff or instructor) were asked about their perceptions on a variety of issues.

The data for some of the external contingencies (part of the governmental and economic factors) was also derived from the Web-based questionnaire. However, as for most of the external contingencies no specific institutional data could be gathered via the Web-based questionnaire and additional research showed that this information is scarce or not gathered at all[6], most of the data for the external contingencies was measured at country (system) level. For each operationalised independent external and internal variable the data collection, the way of measurement and if applicable the question number of the Web-based questionnaire is described below. The main clusters of contingencies were already defined and motivated in Chapter three.

4.4.1 External contingencies

Technological factors

The technology push, which can be seen in many countries all over the world, is one of the main drivers of change of the last decade. Especially when one takes into account that the development and implementation of technology can enhance access to the Internet. This means access for students to learning resources, but also access for institutions to new types of learners. To operationalise technological factors, one can look at what the OECD (2003) calls the "ICT readiness" of a country.

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[6] For example the OECD (2005) argues that "the difficulty in gathering part of their institutional data, e.g. the percentages of on-line students, or international students, is very often the lack of central institutional collation of this information" (p.37).

Well-known characteristics for describing this readiness are:

- The connectivity of a country
- Access to Internet

According to the United Nations (2003) the term connectivity can be measured by the number of Internet hosts per capita (a measure of the Internet penetration of a country and the degree of national connectivity- a host is a domain name that has an IP address). The OECD (1998) considers that "host count is the most precise available data on the presence of the Internet in a country". Hosts are assumed to be in the country shown by their country code (e.g. .nl for the Netherlands). A second indicator for measuring the connectivity of a country is the number of personal computers (PCs) per capita (PCs represent an upper limit for Internet access). For measuring access to the Internet one has to look at the number of Internet users. The data on connectivity was collected by statistics of the United Nations (UNCTAD, 2003) and the data on access to the Internet by statistics of the OECD (2003).

Demographic factors
Demographic changes can have an influence on both the increasing demand for higher education as well as on the composition of the student population. To operationalise this student population the following variables were included in the analysis:

- Participation rate in higher education per country
- The percent of international students per country
- The percent of lifelong learning students per country

Data with respect to participation rate and percent of international students came from the CHEPS Higher Education Monitor, year 2002. Data concerning the number of life-long learning students came from the OECD statistical database, year 2002.

Governmental factors
As described in the previous chapter, the relationship between higher education institutions and the state (governance structure) and their interaction in the particular area of e-Learning can be operationalised into the following broad categories:

- National main steering model
- Influence of governmental actors

For measuring the first characteristic, the countries involved are categorised according to their main governance structure; a sovereign state model, an institutional state model, a corporate-pluralist state model and a classical liberal state model (e.g. Gornitzka *et al.*, 1999). As steering models are a relatively stable phenomenon, data from the mid 1990s still can be relied upon.

The second characteristic, influence of governmental actors, was one of the few external contingencies that was part of the Web-based questionnaire. For measuring this characteristic data derived from the Models of Technology and Change in Higher Education was used. Respondents were asked, on the basis of a 5-point scale, to indicate to what extent they thought that institutional ICT policy was influenced by one of the following governmental actors: a supra-national body (e.g. EU), the national/federal government, the national ministry of education or a sub-national (regional or state-level) government (see Appendix 1, question 30).

Economic factors
Like the relationship between the state and higher education institutions, economic factors can also influence the strategic choices of higher education institutions. The economic external contingency was classified by the following characteristics:

- Public spending on higher education
- Competition/collaboration in higher education

The first is measured by looking at the percentage of GDP spent on education and the percentage of the total education budget spent on higher education. Data from the year 2002 was collected from the CHEPS Higher Education Monitor and from the OECD statistical database.

The second economic characteristic deals with competition and collaboration. Both characteristics were part of the Models of Technology and Change in Higher Education study, thus the data from this study was readily available. Respondents were asked, on the basis of a 5-point scale, to indicate to what extent competition and cooperation from one of the following actors influenced ICT-related policy in their institution: national higher education institutions, international higher education institutions, national commercial providers and foreign commercial providers (see Appendix 1, questions 29 and 31).

4.4.2 Internal contingencies

Below the internal contingencies are operationalised into a number of variables. As stated before, the data for measuring these variables was taken from the Models of Technology and Change in Higher Education study and are perceptions of the respondents.

Institutional governance
The institutional governance of higher education institutions can be characterised by one of three aspects defined by Gallagher (2001):

- Leadership
- Management
- Administration (aimed at the process of implementation)

Leadership was measured by looking at both the important actors in setting strategic directions as well as the results of these strategic directions. Respondents were asked, on the basis of a 5-point scale, to indicate which group of actors showed the most leadership with respect to ICT-related policies (see Appendix 1, question 12). A second question for measuring leadership related to the type of decision-making with respect to the formal stated ICT-policy. Respondents were asked to indicate whether this was a process of top-down or bottom-up decision-making process or a combination of those two (see Appendix 1, question 7).

Management was measured by looking at the allocation of responsibilities. The respondents of the web-based survey were asked to indicate which actor had the primary formal responsibility for ICT-related policy: rector, dean, head of department or the support centre (see Appendix 1, question 6). Respondents were also asked to indicate what kind of committees there were for communicating/discussing ICT-related policy issues: ad hoc or standing, regularly or very active committees (see Appendix 1, question 13). A last question used to measure management relates to the involvement of different actors in these committees: rector, dean, head of department, support centre or individual professors (see Appendix 1, question 14).

Administration was measured by looking at the structure of the implementation process. Respondents of the web-based survey were asked to indicate the most important actor with respect to the implementation of ICT-related policy: rector, dean, head of department, support centre or individual professors (see Appendix 1, question 9).

Furthermore respondents were asked to indicate (as many as relevant) policy instruments that were used for the implementation of ICT-related policy: financial instruments, regulation, information or organisational instruments (see Appendix 1, question 10). Respondents were also asked to indicate aspects that could be seen as a problem with respect to implementing ICT-related policy: not enough financial resources, inadequate national regulations, not enough internal support or lack of skilled staff (see Appendix 1, question 11).

Institutional profile
As described in Section 3.3.2 Birnbaum (1983) identifies seven forms of diversity that can be used to identify the internal contingency institutional profile. Six of these types of diversity were used in this study:

- Systematic diversity: type of higher education institution and the size of the institution
- Structural diversity: location of the higher education institution
- Programmatic diversity: type of degrees offered and mission of a higher education institution
- Procedural diversity: type of delivery of education and institutional policies
- Reputational diversity: history of the higher education institution
- Constitutional diversity: student characteristics

Type of higher education institution was measured by indicating whether the higher education institution was a university or a non-university (see Appendix 1, fact questions). Institution size related to the total number of students (including PhD's) of a higher education institution (see Appendix 1, fact questions). For measuring this variable, the following scale was used:

1= 20- 1000 students
2=1001-5000 students
3=5001-10000 students
4=>10000 students

The location of higher education institutions was measured by indicating whether a higher education institution was situated either in a city or a regional area or that it offered education via multiple campuses (see Appendix 1, fact questions).

Type of programs offered was measured by looking at whether a higher education institution offered only bachelors programmes, bachelor and master programmes or bachelor, masters and PhD programmes (see Appendix 1, fact questions).

Mission was measured by asking respondents to indicate, on the basis of a 5-point scale, which aspects were part of the institution's mission: teaching 18-24 years old, providing life-long learning, teaching international students, being innovative in teaching and learning, focus on either internally or externally funded research or focusing on interaction with business and industry (see Appendix 1, question 1).

For measuring the type of delivery of education, respondents were asked two questions. The first question related to aspects of offering "good" education. Respondents were asked, on the basis of a 5-point scale, to indicate to what extent they think the following aspects contribute to offering good education within their institution: face-to-face contact, appropriate use of ICT for teaching and learning support, individualisation for different student characteristics, time and place independent learning, communication among students, pedagogy related to group work and contact with the instructor when needed by the students (see Appendix 1, question 2). The second question related to the type of delivery of education, focused on student demand for flexibility in offering education. Respondents were asked to indicate, on the basis of a 5-point scale, to what extent their institution's ICT related policy was influenced by student demand for flexibility in: education, location of learning or pace of learning (see Appendix 1, question 16).

For measuring institutional policy, respondents were asked several questions. The first related to ICT-related policy objectives. Respondents were asked to indicate, on the basis of a 5-point scale, which vision (or goal) was part of ICT-related policy in their institution: increasing efficiency, enhancing quality of teaching and learning, enhancing flexibility, enhancing cost-effectiveness, generating institutional income, creating opportunities for life-long learning or international students, widening access to the traditional (18-24 years old) students, enhancing competitiveness or enhancing the status and reputation of the institution (see Appendix 1, question 5). By means of a second question related to the institutional policy, respondents were asked to estimate the percentage of the institution's annual budget spend on ICT. The following scale was used:

< 1%
1-5%
5-10%
10-15%
> 15%

Respondents were also asked to indicate, on the basis of a 5-point scale, how important in their view the use of ICT for the strategic position of their institution was (see Appendix 1, question 33). Respondents were also asked to indicate, on the basis of a 5-point scale, to what extent ICT use in education played a role in the institution's personnel policy: whether it counted towards promotion and tenure, whether it was an integral part of regular staff assessments, whether it was part of regular external quality assurance exercises, whether ICT competencies were systematic criteria for selection and recruitment of new staff, whether professionalisation of staff in ICT competencies was mandatory, whether financial incentives to individual staff were provided for development of ICT use in education and whether ICT use in education was mandatory (see Appendix 1, question 22).

For measuring institutions' history (year of foundation) the following scale was used:

1 <1900
2 =1901-1950
3 > 1950

For measuring the student characteristics at the institutional level, respondents were asked to indicate the percentage of on-line students, on- and off-campus students, international students, lifelong learning students and full-time and part-time students. However, when analysing the returned questionnaires only a small number responded to these questions. An additional search (mainly Web-based) revealed little supplementary data for these indicators. This is confirmed by the OECD (2005) who argues that there is a lack of central collation of this sort of information. So, instead of focusing on hard data about the percentages of different student groups, data about the expected student demand was used to measure the student characteristic. Respondents were asked, on the basis of a 5-point scale, to indicate to what extent their institutional ICT-related policy was affected by the demand for more/wider access of: traditional students, lifelong learning students and international students (see Appendix 1, question 16).

Future institutional profile characteristics
As described in section 2.3, Mintzberg *et al*. (1998) argue that when looking at strategy both past and present perspectives as well as future oriented perspectives are important. Therefore, for some of the institutional profile variables also future perspectives were asked to the respondents.

First of all, respondents were asked to indicate, on the basis of a 5-point scale, which mission- related activities will involve or determine the use of ICT in the year 2005: teaching 18-24 years old, providing life-long learning, teaching international students, innovation in teaching and learning, focus on either internally or externally funded research or focusing on interaction with business and industry (see Appendix 1, question 39).

Secondly, respondents were asked about their perspective on the future demand of students for learning opportunities. Respondents were asked, on the basis of a 5-point scale, to indicate to what extent they think their 2005 institutional ICT policy will be affected by students' demand for different types of flexibility in: education, location of learning and pace of learning (see Appendix 1, question 42). Furthermore, respondents were asked to indicate, on the basis of a 5-point scale, which objective will be part of their institutional ICT policy in 2005: increasing efficiency, enhancing quality of teaching and learning, enhancing flexibility, enhancing cost-effectiveness, generating institutional income, creating opportunities for life-long learning or international students, widening access to the traditional (18-24 years old) students, enhancing competitiveness or enhancing the status and reputation of the institution (see Appendix 1, question 47).

A last question on future perspectives dealt with the expected changes in future student demand. Respondents were asked, on basis of a 5-point scale, to indicate to what extent their 2005 institutional ICT policy will be affected by the demand for more/wider access of: traditional students, lifelong learning students and international students (see Appendix 1, question 42).

Institutional technology
For describing the technology used within higher education institutions the following variables were used:

- Level of infrastructure
- Types of technology
- Teaching practices

To measure the level of infrastructure, respondents of the web-based survey were asked to indicate, on the basis of a 5-point scale, the level of their institution's technology infrastructure (see Appendix 1, question 25). With respect to types of technology, respondents were asked two questions. The first question related to the different types of technology used within their institution. Respondents were asked, on the basis of a 5-point scale, to indicate to what extent they think which technologies were used within their institution: e-mail, web-resources, wireless solutions, web-based course management systems, planning tools, web-based courses and (video) conferencing tools (see Appendix 1, question 23).

Second, respondents were asked, also on the basis of a 5-point scale, to indicate to what extent technology was used for: teaching 18-24 years old, providing life-long learning, teaching international students, being innovative in teaching and learning, focus on either internally or externally funded research or focusing on interaction with business and industry (see Appendix 1, question 24).

With respect to the last variable, teaching practices, respondents were asked three questions, all based on a 5-point scale. First, they were asked to indicate what type of teaching practices were more or less common in their institution: lectures, practice activities, studying via (non-Web) computer software, studying via Web-based environments and group work related teaching (see Appendix 1, question 27). Second, respondents were asked to indicate to what extent ICT was being used for these different teaching practices. Finally, respondents were asked to indicate the impact of ICT on general working practices within their institution over the last two years (see Appendix 1, question 26).

In *Table 4-4* and *Table 4-5* an overview is given of the external and internal contingency variables used in this study.

Table 4-4: Overview of external contingency variables, including data source

Contingency	Characteristics	Variables	Source
Technological factors	Connectivity of a country	Number of Internet hosts per capita	UNCTAD
		Number of PCs per capita	UNCTAD
	Access to Internet	Number of Internet users	UNCTAD/OECD
Demographic factors	Student markets	Participation rate of higher education	CHEPS HEM
		% of international students	CHEPS HEM
		% of life-long learning students	CHEPS HEM
Governmental factors	National steering model	Types of steering models	Gornitzka *et.al*
	Influence of governmental actors	Actors involved	MoT study
Economic factors	Public spending	% GDP spent on education	CHEPS HEM, OECD database
		% Education budget spent on higher education	CHEPS HEM, OECD database
	Competition / collaboration	Actors involved	MoT study

Table 4-5: Overview of internal contingencies, characteristics and variables

Contingency	Characteristics	Variables
Institutional governance	Leadership	Actors responsible for setting strategic directions
		Type of decision-making
	Management	Actors with formal responsibility for ICT-related policy
		Actors involved in committees
		Actors involved in group communication
	Administration	Actors involved in implementation
		Policy instruments
		Problems with implementation
Institutional profile	Type of institution	Type of institution
	Size	Number of students
	Location	Location of the institution
	Type of program	Degrees offered
	Mission	Aspects in mission
	Type of delivery	Aspects offering good education
		Student demands for flexibility
	Institutional policy	Objective of ICT policy
		ICT budget
		ICT use for strategy
		ICT and personnel policy
	History	Year of foundation
	Student characteristics	Type of students
	Future mission	Aspects of the mission that involve future use of ICT
	Future type of delivery	Future students demands for flexibility
	Future institutional policy	Objective of future institutional ICT policy
	Future student characteristics	Future type of students
Institutional technology	Infrastructure	Level of infrastructure
	Types of technology	Types of technology
		Important mission aspects that involve the use of technology
	Teaching practices	Common teaching practices
		Extent ICT is being used for teaching practices
		Impact of ICT

4.5 Operationalisation: the dependent variable

As was described in Section 3.4 the dependent variable of this study is the higher education institutions' strategic choice with respect to integrating e-Learning in their educational delivery and support processes. The values this variable can take are based on the outcomes of the scenario study conducted by Collis and Gommer (2001). They identified four scenarios for learning settings: back-to-basics, stretching-the-mould, global campus and new economy (see Section 3.4). These scenarios were used in this study as to indicate the possible strategic choice of a higher education institution with respect to e-Learning. The data on which the dependent variable was defined was collected via a Web-based questionnaire. Individual respondents (a decision-maker, support staff or instructor) were asked, on the basis of a 5-point scale, to indicate the extent to which they thought that each of the following learning settings was typical in their institution: on-campus settings for course activities (back-to-basics), many variations in where and how students participate in courses, but campus-based settings remain the basis (stretching-the-mould), many students attending at a distance (global campus) and students uses the home institution as a "base" but pick and choose their courses from many different locations (new economy).

4.6 The contingency model

Many factors may be of influence on the strategic choices of a higher education institution. As was described, these can be divided into external contingencies and internal contingencies. In principle, the model forms a complex system, where between each variable interactive effects can be found. However, for this exploratory study the variables are looked at individually and not in combination with other variables. Based on (higher education) literature and numerous studies, key characteristics and variables were identified for exploring the relationship between the independent variables (external and internal contingencies) and the dependent variable (the strategic choices). The above is presented in the following contingency model:

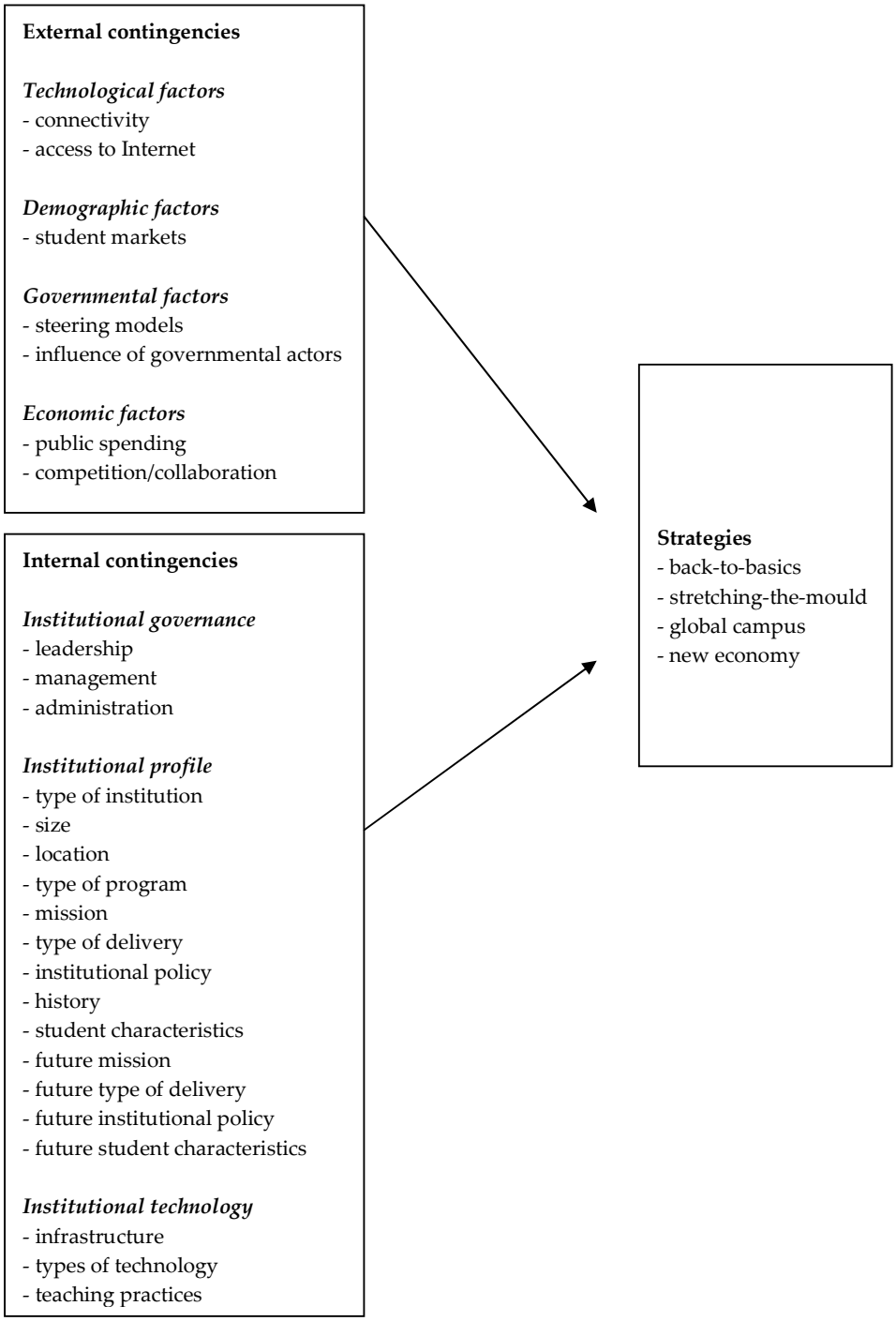

Figure 4-1: contingency model

4.7 Statistical methods

The main objective of this study is to explore differences between higher education institutions with respect to their strategic choices as well as the influence of both internal and external contingencies on these strategic choices. Exploratory relationships between the internal and external contingencies (independent variables) and the strategies (dependent variable) were defined and put forward in a contingency model (described in the preceding chapter). This contingency model was then tested using different statistical techniques. As this study was exploratory in nature and did not focus on traditional hypothesis testing, the following Exploratory Data Analysis (EDA) techniques were used to identify differences and possible relationships between variables:

- One-way ANOVA to explore statistically significant differences between higher education institutions' characteristics
- Exploratory Factor Analyses to reduce the number of independent variables
- Regression analysis to explore relationships between the independent and dependent variable

4.7.1 Step 1: One-way ANOVA

In order to empirically test the differences between higher education institutions, these institutions were categorized into three mutually exclusive and homogenous groups, based on their scores on the dependent variable (see Section 5.3 for more detailed information). The means and standard deviations of these variables are described in Chapter five. Based on these statistics a first impression of the differences between the three strategy groups can be described. To see whether these differences are also statistically significant, one-way ANOVA (analysis of variance) tests were conducted7. One-way ANOVA was used specifically to test whether the scores of the groups formed by the categories of the dependent variable were similar (specifically that they have the same pattern of dispersion as measured by comparing estimates of group variances). If the groups showed a statistically significant difference, then it could be concluded that the independent variable has an effect on the dependent variable (Garson, 2005). The results of this ANOVA test are presented in Chapter five together with the summary statistics.

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[7] One of the most used statistical test to find statistically significant differences is the t-test . However, as the t-test can only look at the differences between two sample groups, and in this study three groups were compared, one-way ANOVA (analysis of variance) tests were employed.

One of the assumptions behind one-way ANOVA is that the variables are measured in interval scale. As was described in preceding chapters, some of the internal contingency variables were measured by either nominal or ordinal scales (e.g. type of institution and history of the institution). For these types of variables chi-square tests were used.

4.7.2 Step two: Regression and factor analyses

Regression analysis was then done to explore the direction and pattern of the statistically significant relations between the independent variables and the three strategy groups. First, however, factor analysis was done to reduce the number of variables that were included in the regression analyses. In principle there are two types of factor analysis (Garson, 2005): one is exploratory, in which the main goal is to uncover an underlying structure of a relatively large set of variables. The researcher's *a priori* assumptions are that any variable (or indicator) may be associated with any factor, there is no prior theory and factor loadings that intuitively structure the data. The second type is confirmatory, which seeks to determine if the number of factors and the loadings of measured (indicator) variables conform to what is expected on the basis of pre-established assumptions. The *a priori* assumption is that each factor is associated with a specified subset of indicator variables. As this study is exploratory in nature, an exploratory factor analysis was used to reduce the number of variables.

The first step in conducting an exploratory factor analyses is making an initial decision about the number of factors underlying the structure of the included variables. Two statistical criteria were used to determine the number of factors to extract: 1) the absolute magnitude of the factors' eigenvalues (> 1 criteria[8]), and 2) the relative magnitude of the eigenvalues (e.g. scree plot). Second, those factors with eigenvalues greater than one were rotated. Rotation made the factors more interpretable, and helped in making final decisions about the number of underlying factors. For this rotation, the most popular form, VARIMAX, was conducted.

Based on the outcomes of the VARIMAX rotation the final number of factors was determined and labelled. This labelling took place on the basis of those variables with a high loading on the specific factor; the greater the value of a variable's loading, the more important that variable was in interpreting and labelling the factor. As loadings above 0.6 are usually considered "high" and those below 0.4 are "low" (Garson, 2005) in this study only those variables loading higher than 0.4 were included in the factor analysis.

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[8] This > 1 criterion was proposed by Kaiser (1960), and is probably the one most widely used and therefore also called the Kaiser criterion

Assumptions behind factor analyses

Since the purpose of factor analysis is to reduce the number of variables by way of linking variables together, those variables with a correlation coefficient greater than 0.3 must be related to one another (Garson, 2005). Should any variable show no substantial correlation with any of the others, they are removed from further analyses. Furthermore it is advisable to check that the correlation matrix is neither singular nor multicollinear[9]. In Chapter six the results of the Factor Analyses are presented.

Regression analyses

The factor structure suggested by the Principal Component Analyses (PCA, see Chapter six for empirical results) was then used as the input for regression analysis. The goal of regression analyses is to see whether the scores of the dependent variable can be predicted by the scores of the independent variables. In a simple two-variable regression analysis the relationship between the dependent and independent variables is estimated as a standard linear relationship. A key assumption of standard two-variable or multivariate regression analysis is that the dependent variable is measured by either interval or ratio level.

If the dependent variable has only two possible values, for example yes (or 0) or no (or 1) standard multiple regression does not work because predicted values of y would not be constrained to lie between 0 and 1. Since the, in origin ratio-scaled dependent variable of this study was recoded into dichotomous or so-called dummy variables, taking either value 1 (if yes) or value 0 (if no)[10], logistic regression was used. Logistic regression predicts a dependent variable on the basis of independent variables and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables (Garson, 2005). To accomplish this goal, a model was created that included all predictor variables that were useful in predicting the dependent variable.

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[9] The former is the condition where the variables are very highly correlated which can arise when two sets are measuring essentially the same thing. The latter, an extreme case of the former, would obtain the unlikely event of some of the variables being exact linear functions of the other variables. Should the matrix show multicollinearity, some of the variables must be omitted from the analysis (Garson, 2005).

[10] *Multinomial logistic regression* exists to handle the case of dependents with more classes than two. When multiple classes of the dependent variable can be ranked, then *ordinal logistic regression* is preferred to multinomial logistic regression

Several different options are available when constructing the model: variables can be entered into the model in the order specified by the researcher or logistic regression can test the fit of the model after each coefficient is added or deleted, called stepwise regression. Stepwise regression is used in the exploratory phase of research but it is not recommended for theory testing (Menard 1995). As this study is exploratory and makes no *a priori* assumptions regarding the relationships between the variables, stepwise regression was used to find out more about the direction and pattern of these relationships. There are two types of stepwise regression: forward and backward. In forward regression the first model only has one predictor, the second has two, etc. At each step it adds the variable that increases the explained variance (R^2) the most. The process of adding variables continues until adding more variables does not lead to a significant increase in the model R^2 value. In backward regression the analysis begins with a full or saturated model and variables are eliminated from the model in an iterative process. The fit of the model is tested after the elimination of each variable to ensure that the model still adequately fits the data. When no more variables can be eliminated from the model, the analysis is complete (Garson 2005 and Menard, 1995). In this study both types were conducted.

Assumptions behind logistic regression analyses

Logistic regression has the advantage that all of the independent or predictor variables can take any form; continuous, discrete, dichotomous, or any combination. Furthermore, logistic regression makes no assumption about the distribution of the independent variables. They do not have to be normally distributed, linearly related or of equal variance within each group. In logistic regression the relationship between the predictor and response variables is not a linear function and does not assume homoscedasticity (Garson, 2005, Menard, 1995).

5 Empirical results: basic statistics

5.1 Introduction

In the preceding chapter a contingency model was developed to explore the relationships between the independent variables (external and internal contingencies) and the dependent variable (strategic choice of higher education institutions). In this and the coming chapter this model is used to answer the main question: "How do higher education institutions differ in their strategic choices with respect to integrating e-Learning in their educational delivery and support processes and how can these differences be explained?" Before exploring the possible differences between higher education institutions (sub-question two) sub-question one, "What strategies emerge" is addressed. Afterwards the sample of higher education institutions analyzed in this study is sub-divided into groups according to their dependent variable values (being strategic choices of higher education institutions). This chapter concludes with an overview of those independent variables showing statistically significant differences between higher education institutions.

5.2 What strategies emerge?

The first sub-question, "What strategies emerge", is answered by looking at the responses to the question related to the dependent variable: higher education institutions' strategic choices with respect to integrating e-Learning in their educational delivery and support process. Respondents were asked, on the basis of a 5-point scale, to indicate to what extent each of the following learning settings was typical in their institution: on-campus settings for course activities (back-to-basics), many variations in where and how students participate in courses, but campus-based settings remain the basis (stretching-the-mould), many students attending at a distance (global campus) and students uses the home institution as a "base" but pick and choose their courses from many locations (new economy). *Table 5.1* shows that respondents believed that their institutions' strategy could be mostly best characterised by a back-to-basics strategy (mean 4.74, SD 0.62).

Table 5-1: The extent to which typical strategies occur in higher education institutions (N=91)

	Mean (SD)
Back-to-Basics	4.74 (0.62)
Stretching-the-Mould	3.30 (0.96)
Global Campus	2.12 (1.13)
New Economy	1.93 (0.81)

1=little or none, 3=some, 5=very much the case

The stretching-the-mould strategy is perceived by the respondents as somewhat present. Both the global campus and new economy strategy have low scores (a mean of 2.12 and 1.93 and a SD of 1.13 and 0.81 respectively). This indicates that higher education institutions in general describe their strategy as a back-to-basics or stretching-the-mould strategy instead of a global campus or new economy strategy.

A correlation analysis was conducted to evaluate whether these four strategies were statistically independent from one another. In *Table 5-2* an overview of the correlations between the four strategies is presented.

Table 5-2: Overview of correlations between the four strategies

		Back-to-basics	Stretching-the-mould	Global campus	New economy
Back-to-basics	Pearson Correlation	1	-,036	-,583	-,404
	Sig. (2-tailed)	,	,738	,000*	,000*
	N	91	91	91	91
Stretching-the-mould	Pearson Correlation	-,036	1	,302	,324
	Sig. (2-tailed)	,738	,	,004*	,002*
	N	91	91	91	91
Global campus	Pearson Correlation	-,583	,302	1	,346
	Sig. (2-tailed)	,000*	,004*	,	,001*
	N	91	91	91	91
New economy	Pearson Correlation	-,404	,324	,346	1
	Sig. (2-tailed)	,000*	,002*	,001*	,
	N	91	91	91	91

* Correlation is significant at the 0.01 level (2-tailed).

The main finding from the table is the negative correlations between the global campus and new economy strategies vis-à-vis the back-to-basics strategy. Not only are these the only statistically significant negative correlations but they are also the strongest correlation coefficients. This finding supports the notion that the back-to-basics strategy is not complementary with the other strategies. Looking at the correlations between the other three strategies, *Table 5-2* shows that all three strategies are positively correlated with each other ($r > 0.3$), which suggests that they are not mutually exclusive. As was described in Section 4.7.2, there are two options to deal with when a correlation coefficient is higher than 0.3: either to leave out the variables or to aggregate variables (Garson, 2005). In this study the latter was done, which is discussed below.

Following the "rule" as described above, three variables (stretching-the-mould, global campus and new economy) should be aggregated into one new variable. However, considering correlation alone may mask other attributes of the responses that warrant an alternative grouping. One plausible alternative is to consider the mean values and the distributions of the responses, which is the typical statistical approach to determining whether two data sets are drawn from the same population. As was seen in *Table 5-1*, the mean scores for the global campus and new economy strategies are much closer than each compared to the stretching-the-mould strategy. What is more, a look at the frequency distribution of the responses (*Table 5-3*) confirms that the distribution of the global campus and new economy responses are both right-skewed; more than 70% of the respondent scores are lower than 3, about 15% of the respondents value the presence of a global campus and new economy strategy as somewhat present (score 3) and less than 15% of the respondents show values scores higher than 3.

Table 5-3: Overview of value distribution of the stretching-the-mould, global campus and new economy strategies

	Stretching-the-mould		Global campus		New economy	
	Freq	%	Freq	%	Freq	%
Little or none (1)	2	2	32	35	29	32
A bit (2)	16	18	33	36	43	47
Some (3)	35	38	13	14	15	16
Regular (4)	28	30	9	10	4	5
Very much (5)	10	11	4	5	-	0
Total	91	100	91	100	91	100

This latter point is best seen graphically. Figures 5.1 to 5.3 show the distributions as bar charts.

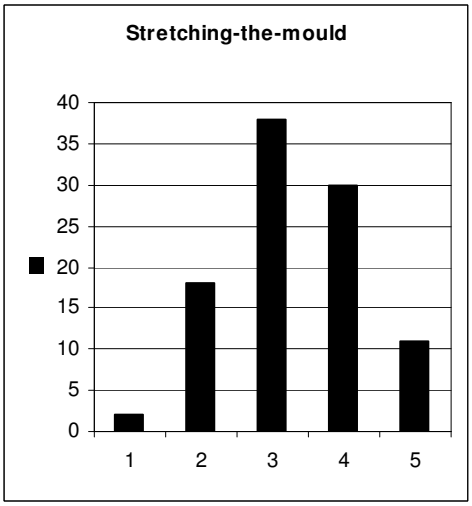

Figure 5-1: bar chart of the stretching-the-mould strategy

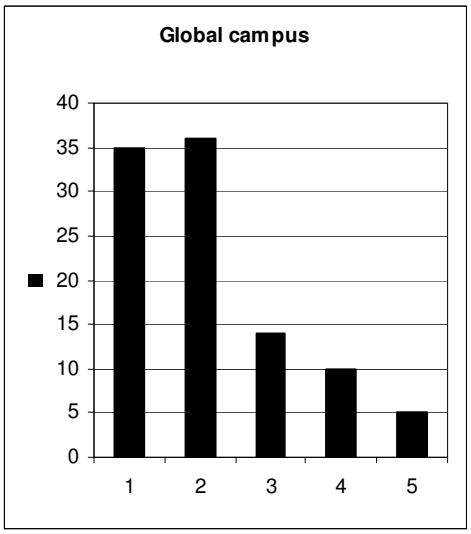

Figure 5-2: bar chart of the global campus strategy

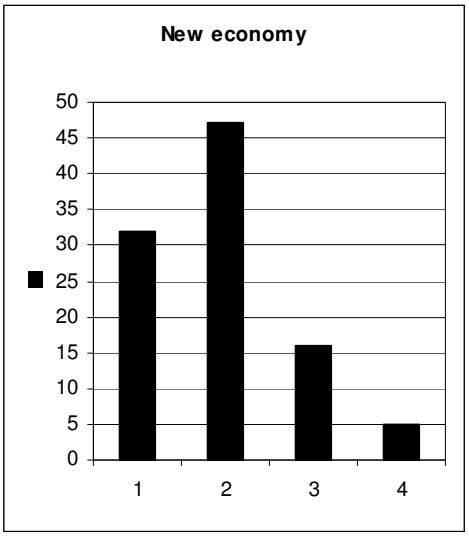

Figure 5-3: bar chart of the new economy strategy

Whereas the stretching-the-mould responses are more normally distributed, the responses to the other two are indeed right-skewed. Thus, although the correlation coefficient between the stretching-the-mould and both the global campus and new economy strategy is greater than 0.3, it is evident that an underlying bias is present.

Based on the above, correlations between the global campus and new economy > 0.3 and largely similar mean distributions, one can conclude that the global campus and new economy strategies can effectively not be differentiated from one another and as they almost completely coincide they can thus be safely collapsed into one variable that effective measures the same thing. Therefore, these two strategies were aggregated into one "new" strategy: labeled the world campus strategy.

5.3 Three strategy groups

The empirical analysis suggests that higher education institutions can adopt three basic strategies: 1) back-to-basics, 2) stretching-the-mould or 3) world campus. The next step was to determine whether institutions focusing on one specific strategy (e.g. back-to-basics) differ from institutions with another (e.g. worldcampus). To do this the sample of respondents (N=91) was first grouped. The central method was to rely on the dependent variable score; the institution's highest score on one of the three strategies allocated it to that strategy group.

It is assumed that an institution can only be in one specific group (mutually exclusiveness) and, in order to apply statistical techniques as regression analysis, the groups should show as much an equal distribution between the groups as possible (Garson, 2005).

However, when looking at the value score distribution of the higher education institutions, *Table 5-4* shows that grouping based on the highest value scores leads to three very unequal groups. Most higher education institutions (83%) largely endorse the back-to-basic strategy, whereas no institution rated the worldcampus strategy question as a five.

Table 5-4: Overview of value distribution of back-to-basics, stretching-the-mould, and worldcampus strategies

Strategy	**Back-to-basics**		**Stretching-the-mould**		**Worldcampus**	
Value score	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
Little or none (1)	-	-	2	2	18	20
A bit (2)	1	1	16	18	40	44
Some (3)	6	7	35	38	23	25
Regular (4)	8	9	28	30	10	11
Very much (5)	76	83	10	11		
Total	91	100	91	100	91	100

To account for this and to create a more redefined picture, all higher education institutions indicating a value of three or more for the worldcampus strategy were treated as part of the "worldcampus strategy group". Of the remaining higher education institutions those with a score of four or more on the stretching-the-mould strategy were considered to be part of the "stretching-the-mould strategy group". All other institutions were allocated to the "back-to-basics strategy group".

This all lead to the following three strategy groups:

- a group of higher education institutions with a predominantly back-to-the basics strategy (N=43)
- a group of higher education institutions with a predominantly stretching-the-mould strategy (N=22)
- a group of higher education institutions with a predominantly world campus strategy (N=26)

It has to be noted, however, that categorising the groups as described above, means that data from the individual respondents (as was collected via the Web-based questionnaire) were lost. Mainly because the individual respondents were asked, on the basis of a 5-point scale, to indicate the extent to which they thought each of the four scenarios was describing the present situation of their institution, instead of choosing only one of them. Furthermore, the author is aware of the fact that the worldcampus strategy group is formed by a blended group of higher education institutions; some of them indeed focusing on a worldcampus strategy (value score 4), others preferring a combination of back-to-basics, stretching-the-mould and worldcampus strategies. It is also taken into account that the worldcampus strategy can be the description of only a (small) part of the institution instead of being the institution-wide strategy. However, for reasons described in this section (mutually exclusiveness and homogenous groups), it was decided to include those "combining strategies" higher education institutions into the worldcampus strategy group.

Looking at the contingency model that was developed in the preceding chapters, it is expected that possible differences between strategic choices of these three groups can be explained by looking at the influence of external and internal contingencies. In the tables below, for each of the independent variables used for operationalising the external and internal contingencies, the basic statistics are described: the mean and standard deviation for those variables measured at interval scale as well as the percentage of each answer category for those variables measured at nominal or ordinal level.

These statistics present a first understanding of the differences between the three strategy groups. However, to examine whether the differences between the means are also statistically significant ($p > .05$) one-way ANOVA tests were conducted for the interval measured variables (see Chapter four for more detailed information). As some variables were also measured by nominal and ordinal scales, chi-square tests were also employed. In Appendix two a complete overview of the SPSS results for both the ANOVA and chi-square tests are described.

Before these differences are described, first an overview is given of the basic sample characteristics. It has to be noted that these basic sample characteristics are also part of the internal contingency "institutional profile" and in that respect are part of the independent variables of this study.

Basic sample characteristics

As was described above, the sample for this study was subdivided into three groups of higher education institutions. For each of these groups the following basic characteristics are described: type of institution, size, history, location and type of program. *Table 5-5* provides an overview of these basic characteristics.

Table 5-5: Overview of the basic sample characteristics by strategy group

Strategy		B-t-B		S-t-M		Worldc	
Characteristics	**Variables**	**N**	**%**	**N**	**%**	**N**	**%**
Type of institution	Universities of professional education	22	51	13	59	12	46
	Universities	21	49	9	41	14	54
History	< 1900	13	30	5	23	5	20
	1901-1950	3	7	4	18	7	27
	> 1950	27	63	13	59	14	54
Size	< 1000	4	9	2	9	2	8
	1001-5000	16	37	8	36	7	28
	5001-10000	9	21	5	23	5	20
	> 10000	14	33	7	32	11	44
Education and research	Emphasis on research	-	-		-	1	4
	Balance between research and education	28	65	12	55	14	58
	Emphasis on education	15	35	10	45	9	38
Type of program offered	Bachelor degrees	8	19	7	32	4	17
	Bachelor and Master degrees Bachelor, Master and PhD-degrees	6	14	3	14	3	13
		29	67	12	54	17	70

As *Table 5-5* shows, there are few differences between the three strategy groups. Looking at the characteristic "type of institution", one can see that the stretching-the-mould strategy group has more universities of professional education than universities, while the world-campus strategy group shows the highest percentage of universities in the sample. The fact that the stretching-the-mould strategy group has more universities of professional education, explains why this strategy groups has a higher percentage of institutions only offering a bachelor's degree; 32% compared to 19% in the back-to-basics group and 17 % in the world-campus strategy group.

Furthermore small differences can be seen with respect to the history of the higher education institutions; in comparison with the world-campus strategy group, more "younger" higher education institutions (established after 1950) are part of the back-to-basics and stretching-the-mould strategy group. When the size (number of students) of the three samples is compared, one can see that higher education instituitons with more than 10,000 students are more often locted in the world-campus group, while both the back-to-basics and stretching-the-mould strategy groups show higher percentages of the middle-sized (number of students between 1001-10,000) higher education institutions.

5.4 External contingencies

As was described in Section 3.2, the independent external contingencies were categorized into four main contingencies: technological factors, demographic factors, governmental factors and economic factors. Each of these contingencies was split up into characteristics and operationalised. As described in Section 4.4, the data for some of these external contingencies (part of the governmental and economic factors) was also derived from the Web-based questionnaire. However, for most of the external contingencies no specific institutional data was gathered via the Web-based questionnaire. Instead most of the data of the external contingencies was measured at the country (system) level.

5.4.1 Technology

As was described in Chapter four, the technology contingency describes the "ICT-readiness" of a country by looking at the characteristics "connectivity" and "access to the Internet".

Connectivity

The first characteristic, connectivity, was measured by the number of Internet hosts per capita and number of PCs per capita are described. *Table 5-6* shows that, with respect to the number of Internet hosts, differences can be found between the three strategy groups. In the back-to-basics strategy group the mean score for the number of Internet hosts are considerably lower than the other two strategy groups. However, the One-Way ANOVA test does not show that this difference is statistically significant.

Table 5-6: Overview of external technology variables

	B-t-B		S-t-M		Worldc	
	Mean	SD	Mean	SD	Mean	SD
Internet hosts connectivity	706.30	675.12	990.82	774.83	1029.81	763.24
pc connectivity	44.74	3.84	45.67	4.36	47.34	5.44
Internet access	4716.30	457.67	4476.82	637.29	4530.15	740.37
household access	46.79	5.66	49.64	6.28	47.27	5.18

With respect to the number of PC's per 10,000 inhabitants *Table 5-6* shows that there are small differences between the three strategy groups. However, results of the One-Way ANOVA test show that these differences are statistically significant.

Access

The second characteristic is access to the Internet. This was measured by looking at the percentage of the total number of households which have access to Internet and by the number of Internet users per 10,000 inhabitants. The results of *Table 5-6* show that with respect to the percentage of households having access to Internet the differences between the three strategy groups are small.

The One-Way ANOVA tests also showed that this difference is not statistically significant. The same counts for the differences between the three strategy groups with respect to the number of Internet users per 10,000 inhabitants; here again the One-Way ANOVA test show that the difference is not statistically significant.

5.4.2 Demography

A second external contingency is demography. As described in Section 4.3 the external contingency demography is characterized by the diversity of a country's student population.

To measure this, the following variables were used; participation rate per country, the percent of international students per country and the percent of life-long learning students per country. The results of *Table 5-7* show that with respect to the participation rate the back-to-basics strategy group shows a lower mean scores compared to the stretching-the-mould and world-campus strategy group. The results of the One-Way ANOVA test show that these differences are statistically significant.

Table 5-7: Overview of the external demography variables

	B-t-b		S-t-M		Worldc	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
participation rate	33.98	9.07	39.23	10.41	40.97	11.78
% international students	10.49	3.81	8.00	3.64	9.50	5.34
% LLL > 30	8.06	5.29	11.45	7.08	13	7.67

With respect to the percentage of international students by country, *Table 5-7* shows that the back-to-basics strategy group has the highest mean score, compared to the stretching-the-mould and world-campus strategy group. This is confirmed by the one-way ANOVA test. The percentage of life-long learners also differs between the three strategy groups and the one-way ANOVA test confirms that this difference is also statistically significant.

5.4.3 Governance

The third external contingency is governance. As was described in Section 4.3 the relationship between higher education institutions and the state (governance structure) can be described by the following characteristics: national main steering model and national policy.

Steering model

For measuring the characteristic steering model, for each country the main national steering model was described (a bureaucratic, collegial or market model). However, using one-way ANOVA tests to show possible significant differences between the three strategy groups, is not providing relevant results in this stage. Therefore, the categorisation on the basis of the main steering model was first used as a dummy variable in the regression analysis (see Chapter six). Results showed that this dummy variable was not a differentiating factor between the three strategy groups.

Influence of governmental actors

With respect to the characteristic influence of governmental actors, respondents were asked to indicate, on the basis of a 5-point scale, how much their institutional ICT-related policy is influenced by the following actors: supra-national body, national/federal government, national ministry of education and sub-national (regional or state-level) government. The results in *Table 5-8* show that differences can be seen with respect to the influence of the national government, the national ministry of education and the influence of a sub-national government. However, only "national government" was found to have statistically significant differences in the one-way ANOVA tests.

Table 5-8: Influence of governmental actors on the ICT-policy of higher education institutions

Actors	B-t-B Means (SD)	S-t-M Means (SD)	Worldc Means (SD)
Supra-national body (e.g. EU)	2.08 (0.89)	1.98 (0.91)	1.92 (0.86)
National/federal government	2.96 (1.02)	2.49 (0.86)	2.39 (0.88)
National Ministry of Education	3.22 (1.04)	2.96 (0.72)	2.92 (0.98)
Sub-national (regional or state-level) government	2.54 (1.13)	2.73 (1.29)	2.79 (1.26)

1= Not at all, 3=some, 5=Very much/intensively

5.4.4 Economy

The last external contingency included in this study is economy. As described in Section 4.3 the economic external contingency is operationalised by looking at variables concerned with both public spending and competition/collaboration

Public spending

The first characteristic of the external economy contingency, public spending, is measured by the following variables: the national public expenditure on education as a percentage of the national GDP and the percentage of the national expenditure spent on higher education. The results of *Table 5-9* show that for both variables differences can be seen between the three strategy groups. The results of the one-way ANOVA tests also show that these differences are statistically significant.

Table 5-9: Overview of public spending variables, by strategy group

	B-t-B		S-t-M		Worldc	
	Mean	SD	Mean	SD	Mean	SD
% of GDP on education	5,06	0,73	5,62	1,17	5,83	1,25
% of education on higher education	24,52	1,34	25,14	2,65	26,35	3,13

Competition and collaboration

The second economic characteristic dealt with competition and collaboration. Respondents of the survey were asked to indicate how much competition from the following actors influenced the institution's ICT-related policy: national and foreign higher education institutions and national and foreign business and industry. *Table 5-10* suggests that there are differences between the three strategy groups: compared to the back-to-basics and the world-campus strategy group, the stretching-the-mould strategy group show higher scores on almost all of the variables. However, the ANOVA tests show that these differences are not statistically significant.

Table 5-10: Influence of competition on ICT-policy

	B-t-B	S-t-M	Worldc
Actors	Means (SD)	Means (SD)	Means (SD)
National higher education institutions	3.26 (0.97)	3.42 (1.00)	3.50 (0.78)
Foreign higher education institutions	2.47 (0.77)	2.59 (1.16)	2.48 (0.96)
National business and industry	2.36 (0.87)	2.56 (0.94)	2.37 (0.79)
Foreign business and industry	1.97 (0.65)	2.24 (1.12)	1.93 (0.69)

1= Not at all, 3=some, 5=Very much/intensively

When one looks at the influence of cooperation of the same actors described in *Table 5.10* the results of *Table 5-11* suggests that most differences can be found between the back-to-basics and world-campus strategy groups. Although the back-to-basics strategy group has higher mean scores for every variable shown in *Table 5-11*, only with respect to the influence of international higher education institutions do the results of the one-way ANOVA tests show a statistically significant difference.

Table 5-11: Influence of cooperation on ICT-policy

Actors	B-t-B Means (SD)	S-t-M Means (SD)	Worldc Means (SD)
National higher education institutions	3.45 (0.86)	3.12 (0.99)	3.04 (0.62)
Foreign higher education institutions	2.64 (0.83)	2.40 (0.81)	2.03 (0.76)
National business and industry	2.74 (0.98)	2.46 (0.99)	2.35 (0.85)
Foreign business and industry	1.98 (0.81)	1.71(0.75)	1.64 (0.57)

1= Not at all, 3=some, 5=Very much/intensively

5.5 Internal contingencies

In the preceding section, for each strategy group the external contingencies, based on their operationalised characteristics and variables, were described. In this section an overview of the internal contingencies is presented. As was described in Section 3.3, the independent internal contingencies were categorized into three main contingencies: institutional governance, institutional profile and institutional technology. Each of these contingencies was split up into characteristics and operationalised by independent variables (see *Table 4-5*).

5.5.1 Institutional governance

As was described in Chapter four, looking at institutional governance, the structure of the decision-making processes is described. The main question for this internal contingency is whether the three strategy groups differ with respect to the aspects of leadership, management and administration.

Leadership

The first characteristic, leadership, is described by looking at which actors are perceived as being important in setting strategic institutional directions. Respondents were asked, on the basis of a 5-point scale, to indicate which group of actors showed the most leadership with respect to ICT-related policies: rectors, deans, head of departments, support centre or individual professors. *Table 5-12* shows that in all three strategy groups the individual professor/instructor and the support centre were seen as the most important actors with respect to leadership in the development and implementation of ICT policy, whereas the role of the rector and the dean was of minor importance.

Table 5-12: Leadership of actors in the development and implementation of ICT policy

Extent of leadership shown by actors	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Professors or instructors	3.86 (0.66)	3.62 (0.86)	3.61 (0.85)
Support centre	3.53 (0.88)	3.76 (0.63)	3.57 (0.80)
Heads of departments	3.08 (0.81)	3.23 (0.68)	3.47 (0.93)
Rector	3.04 (0.99)	3.06 (1.04)	3.01 (0.99)
Deans	2.51 (0.84)	2.90 (0.80)	2.87 (1.07)

1=weak, 3=moderate, 5=strong

Looking at the differences between the three strategy groups, *Table 5-12* shows that the leadership of professors and instructors was perceived as being more important in the back-to-basics strategy group (M=3.86) than in the stretching-the-mould and world-campus strategy group (M=3.62 and M=3.61 respectively). Furthermore, *Table 5-12* shows that the leadership of heads of department as well as deans was rather low in the back-to-basics strategy group compared to the stretching-the-mould and world-campus strategy group. Although *Table 5-12* suggests differences between the three strategy groups, ANOVA results show that these differences are not statistically significant.

The second aspect of describing leadership is the type of decision-making involved with respect to formally stated ICT-policy. Respondents were asked to indicate whether this was a process of top-down (central) or bottom-up (decentral) decision-making or a combination of those two. *Table 5-13* shows that there are almost no differences between the three strategy groups: respondent in all three groups stated that the most common form of decision-making in their institution was a combined approach in which central initiated ICT policy served as a framework for decentralized, faculty-specific plans. Furthermore the bottom-up initiated ICT-policies were also common in all three strategy groups. Only with respect to the existence of top-down formulated institution-wide ICT-policy, can one note a difference between the three strategy groups: respectively 12% and 9% for the back-to-basics and stretching-the-mould groups and none for the world-campus group.

Table 5-13: Type of ICT-related policy

Formally stated ICT-policy	B-t-B	S-t-M	Worldc
None of not aware of	7%	5%	4%
Bottom-up: faculty or department –level policies with no link to institutional level decision-making	23%	23%	31%
Combined: institution-wide policy serving as a framework for faculty-specific plans	58%	63%	65%
Top down: institution-wide policy to be implemented in all faculties	12%	9%	-
Total	100%	100%	100%

However, looking at the overall picture of the distribution between either bottom-up, top-down or a combined approach for decision-making of formally ICT-related policy, the chi-square test does not show any statistically significance between the three strategy groups.

Management

Management is described by looking at the allocation of responsibilities with respect to ICT-related policy. First of all, based on their perceptions, all respondents[11] were asked to indicate which actor had the primary formal responsibility for ICT-related policy.

Table 5-14 shows that, although in all three strategy-groups the central level (rector) was seen as the main actor responsible for ICT-related policy, the percentage decreased from 57% in the back-to-basics strategy group to 39% in the world-campus strategy group.

Table 5-14: Formal responsibility of actors for ICT-related policy

Type of actor	B-t-B	S-t-M	Worldc
Rector	57%	50%	39%
Deans	18%	7%	33%
Support centre	10%	7%	6%
Heads of departments	5%	36%	22%
Other	10%	-	-
Total	100%	100%	100%

[11] For clarification; when we speak of respondents, we mean the aggregated response by higher education institution.

Table 5-14 also shows that, looking at the distribution of the formal responsibility among the different actors, the world-campus strategy group has a more dispersed pattern than the other two strategy groups. Within higher education institutions belonging to the world-campus strategy group, the dean was perceived to have more or less the same formal responsibility for ICT-related policy as the rector. The back-to-the basics strategy group clearly shows that the rector was perceived to be the actor with the most responsibility for ICT-related policy. However, the chi-square test, used for testing the differences between the three strategy groups does not show a statistically significant difference between the three strategy groups.

A second topic related to management deals with the type of committees for discussing/communicating ICT-related policy that were present within higher education institutions. Respondents were asked to indicate the existence of ad hoc, standing, regular or very active committees. The results from
Table 5-15 show that for all three strategy-groups the most common form of committee was the regularly active standing committee. Looking at the differences between the three strategy-groups, it can be seen that respondents of the back-to-the-basics strategy group felt that they had less active committees than the other two strategy groups. However, like the results described above, again the chi-square results show that these differences were not statistically significant.

Table 5-15: Most common committee for discussing ICT-related policy

Type of committee	B-t-B	S-t-M	Worldc
Minimally active, ad hoc committee	5%	-	-
Minimally active, standing committee	16%	9%	-
Regularly active, ad hoc committee	10%	18%	22%
Regularly active, standing committee	63%	46%	56%
Very active, ad hoc committee	5%	27%	11%
Very active, standing committee		-	11%
Total	100%	100%	100%

The last aspect used to measure management was the involvement of different actors in the committees described above. Respondents could indicate whether this was the rector, dean, head of department, support centre or individual professor. The overall picture of *Table 5-16* shows that there are only minimal differences between the three strategy groups. This is confirmed by the results of the chi-square test that shows that there are no statistically significant differences between the three strategy groups.

Table 5-16: Group of actors involved in communication mechanisms

Type of actor	B-t-B	S-t-M	Worldc
Support centre	20%	25%	20%
Rector	19%	18%	23%
Heads of departments	19%	14%	13%
Individual prof/instructor	16%	24%	23%
Students	14%	5%	8%
Deans	12%	14%	13%
Total	100%	100%	100%

Administration

A third characteristic relates to the administration procedures that provide the structure for implementing ICT policy. This characteristic is described by looking at the implementation process. First which actor was perceived by respondents as the most important with respect to the ongoing implementation of ICT-related policy: the rector, dean, head of department, support centre or individual professor.

Table 5-17: Formal importance of actors in implementation of ICT policy

Type of actor	B-t-B	S-t-M	Worldc
Heads of departments	38%	21%	30%
Support centre	24%	15%	23%
Rector	19%	14%	12%
Individual prof/instructor	14%	43%	23%
Deans	5%	7%	12%
Total	100%	100%	100%

The results in *Table 5-17* show that respondents of the stretching-the-mould strategy group indicate that the individual professor/instructor was perceived as the most important actor for the implementation of ICT-related policy. Compared to the other two strategy groups (14% for the back-to-basics and 23% for the world-campus strategy group) this was a high percentage. *Table 5-17* also shows that, with respect to the world-campus strategy group, the actors perceived as being important for the implementation of ICT-related policy were more equally distributed among the different types of actors than the other two strategy groups. Like the results described above, again the chi-square results show that these differences are not statistically significant.

A second topic is the use of policy instruments. Respondents were asked to indicate as many as relevant policy instruments used for the implementation of ICT-related policy: financial instruments, regulation, information or organisational instruments. *Table 5-18* shows that in all three strategy groups the financial instruments were seen as the most often used policy instruments followed by the use of organisational instruments and information.

Table 5-18: Policy instruments used for implementation of ICT-related policy

Policy instruments	B-t-B	S-t-M	Worldc
Financial instruments	35%	35%	30%
Organisational instruments	29%	27%	33%
Information	27%	30%	30%
Regulation	9%	8%	7%
Total	100%	100%	100%

Respondents were also asked to indicate aspects that can be seen as problematic with respect to implementing ICT-related policy: not enough financial resources, inadequate national regulations, not enough internal support or lack of skilled staff. As can be seen in *Table 5-19*, there is little difference between the three strategy groups; respondents of all three groups indicated that one of the most common problems associated with the implementation of ICT-related policy was having not enough financial resources, followed directly by a lack of skilled staff. This was also confirmed by the results of the chi-square tests.

Table 5-19: Problems associated with the implementation of ICT-related policy

Policy instruments	B-t-B	S-t-M	Worldc
Not enough financial resources	37%	37%	34%
Lack of skilled staff	34%	37%	34%
Not enough internal support	27%	26%	27%
Inadequate national regulations	2%	-	5%
Total	100%	100%	100%

With respect to both the use of policy instruments and the problems associated with the implementation of ICT-related policy few differences between the three strategy groups were found. This is also confirmed by the chi-square tests that showed no significant differences between the three strategy groups.

5.5.2 Institutional profile

As is described in chapter four, the contingency institutional profile is operationalised based on the classification of Birnbaum's (1983), discussion of diversity. Part of the variables used for operationalising were also used for describing the basic sample characteristics of the three strategy groups: type of institution, size, history and type of programs offered (see *Table 5-5*). Although the three strategy groups show differences with respect to these basic sample characteristics, the chi-square tests conducted show that these differences were not statistically significant. Below the other variables used to operationalise the contingency institutional profile, such as mission, type of delivery and institutional policy are described.

Mission

With respect to the mission of higher education institutions respondents were asked to indicate, on the basis of a 5-point scale, which aspects were an important part of the mission of the institution: teaching 18-24 years old, providing life-long learning, teaching international students, being innovative in teaching and learning, focus on either internally or externally funded research or focusing on interaction with business and industry. The results in *Table 5-20* show that in all three strategy groups teaching 18-24 years old was an important aspect of the mission, as well as innovation in teaching and learning.

Table 5-20: The importance of various aspects in the mission of the institution

Importance for mission	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Teaching 18-24 year olds	4.80 (0.40)	4.78 (0.24)	4.51 (0.62)
Innovation in teaching and learning	4.11 (0.61)	4.05 (0.66)	4.17 (0.66)
Externally funded research	3.61 (0.98)	3.45 (1.03)	4.04 (0.95)
Teaching international students	3.55 (0.97)	3.62 (0.90)	3.56 (0.93)
Interaction with business and industry	3.55 (0.98)	3.66 (090)	3.84 (0.92)
Internally funded research	3.24 (0.94)	3.34 (0.97)	3.64 (0.95)
Providing lifelong learning	3.04 (0.94)	3.85 (0.90)	3.88 (1.01)

1=Low, 3=Moderate, 5=High

Looking at the differences between the three strategy groups, *Table 5-20* shows that teaching 18-24 years old was perceived as being the most important aspect for the institutions' mission in the back-to-basics strategy group. ANOVA results show that this difference with the world-campus groups is also statistically significant. The same can be reported for externally and internally funded research and providing lifelong learning; these differences were also statistically significant. Although *Table 5-20* shows a difference between the back-to-basics and world-campus strategy group with respect to the importance of interaction with business and industry, ANOVA results show that these differences were not statistically significant.

Type of delivery

Another characteristic for describing institutional profile deals with the way higher education is offered to students. Respondents were asked, on the basis of a 5-point scale, to indicate to what extent the following aspects contributed to offering good education: face-to-face contact, appropriate use of ICT for teaching and learning support, individualization for different student characteristics, time and place independent learning, communication among students, pedagogy related to group work or contact with the instructor.

Although *Table 5-21* shows that many differences between the three strategy groups can be seen, one-way ANOVA tests show that these differences are only statistically significant in two cases: time and place independent learning and individualization for different student characteristics.

Table 5-21: Aspects contributing to offering good education

Delivery aspects	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Face to face contact	4.64 (0.44)	4.59 (0.39)	4.47 (0.51)
Contact with the instructor when needed by the students	4.22 (0.64)	4.29 (0.40)	4.40 (0.47)
Communication among students	4.10 (0.61)	4.30 (0.41)	4.09 (0.64)
Pedagogy related to group work	3.81 (0.62)	3.89 (0.67)	3.89 (0.61)
Appropriate use of ICT for teaching and learning support	3.77 (0.60)	3.91 (0.62)	3.89 (0.63)
Time and place independent learning	3.13 (0.58)	3.30 (0.50)	3.47 (0.79)
Individualisation for different student characteristics	3.09 (0.51)	3.50 (0.55)	3.51 (0.82)

1=very little, 3=some, 5=very much

Another variable with respect to type of delivery is the demand of students for flexibility in offering education. Respondents were asked to indicate, on the basis of a 5-point scale, to what extent their institution's ICT-related policy was affected by student demands for different types of flexibility. *Table 5-22* shows that with regard to differences between the three strategy groups the demand for flexibility in delivery of education and the demand for flexibility in locations of learning show differencs between the three strategy groups. ANOVA results show that only with respect to the demand for flexibility in locations of learning, the differences between the three strategy groups are statistically significant.

Table 5-22: Effect of student's flexibility demands on ICT-related policy

Type of demand	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Flexibility in delivery of education	3.18 (0.76)	3.29 (0.64)	3.44 (0.94)
Flexibility in locations of learning	2.95 (0.83)	3.34 (0.59)	3.53 (0.87)
Flexibility in pace of learning	3.08 (0.69)	2.84 (0.72)	3.12 (0.79)

1 = very little, 3 = some, 5 = very much

Institutional policy

With respect to institutional policy two main subjects are of importance. First respondents were asked to indicate, on the basis of a 5-point scale, which vision (or goal) was part of ICT-related policy in their institution: increasing efficiency, enhancing quality of teaching and learning, enhancing flexibility, enhancing cost-effectiveness, generating institutional income, creating opportunities for life-long learning or international students, widening access to the traditional (18-24 years old) students, enhancing competitiveness or enhancing the status and reputation of the institution. *Table 5-23* shows that, when comparing the three strategy groups only three objectives, enhancing quality, enhancing status and reputation and increasing efficiency showed minimal differences between the three strategy groups.

With respect to the seven objectives that show rather different mean scores between the three strategy groups the results of *Table 5-23* show that the differences between the back-to-basics strategy group and the world-campus strategy group were largest. ANOVA tests show that these differences were also statistically significant.

Table 5-23: Main objectives of ICT-related policies

Objectives of ICT policy	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Enhancing quality	4.09 (0.61)	4.02 (0.64)	4.17 (0.59)
Enhancing status and reputation of the institution	3.71 (0.66)	3.93 (0.82)	3.99 (0.53)
Enhancing flexibility	3.54 (0.66)	3.98 (0.51)	4.01 (0.61)
Enhancing competitiveness	3.58 (0.75)	3.77 (0.76)	3.95 (0.57)
Increasing efficiency	3.63 (0.62)	3.71 (0.73)	3.77 (0.54)
Widening access to traditional students	3.19 (0.78)	3.42 (0.64)	3.70 (0.77)
Enhancing cost-effectiveness	2.88 (0.92)	3.33 (0.71)	3.29 (0.78)
Creating opportunities for life-long learning	3.05 (0.78)	3.31 (0.80)	3.57 (0.86)
Creating opportunities for international students	2.71 (0.82)	3.12 (0.98)	3.21 (0.84)
Generating institutional income	2.17 (0.81)	2.29 (0.80)	2.86 (0.61)

1=none or low, 3=some, 5=High

A second aspect of the institutional policy dealt with the percentage of an institution's annual budget spent on ICT. As the results of *Table 5-24* show, differences between the three strategy groups can be seen; almost 75% of the respondents in the back-to-basics strategy group indicated that a maximum of 10% of the institution's annual budget was spent on ICT. This percentage was lower for both the stretching-the-mould and world-campus strategy group (respectively 54% and 50%).

Table 5-24: Percentage of a the annual institutional budget spent on ICT

Budget	B-t-B	S-t-M	Worldc
< 1%	-	-	-
1-5%	22%	28%	33%
5-10%	52%	36%	17%
10-15%	17%	36%	28%
>15%	9%		22%
Total	100%	100%	100%

Furthermore, 22% of the respondents of the world-campus strategy group indicated that more than 15% of their institution's annual budget was spent on ICT. This is rather high compared to the 9% of the back-to-basics strategy group and 0% in the stretching-the-mould strategy group. However, chi-square tests indicate that the differences between the three strategy groups were not statistically significant.

To measure the importance of using ICT for the strategic position of an institution, respondents were asked to indicate, on the basis of a 5-point scale, to what extent they perceived ICT of being important for the institution.

Table 5-25: Importance of using ICT for the strategic position of the institution

	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Importance of strategy	4.23 (0.43)	4.35 (0.36)	4.50 (0.37)

1=very low, 3=average, 5=very high

The results of *Table 5-25* show the differences between the three strategy groups. The one-way ANOVA test shows that these differences are also statistically significant.

A fourth aspect for defining institutional policy dealt with personnel policy. Respondents were asked to indicate, on the basis of a 5-point scale, to what extent ICT use in education played a role in their institution's personnel policy. The results in *Table 5-26* show that all but two variables used for operationalising the characteristic personnel policy (use of financial incentives and ICT competencies seen as systematic criteria for selection and recruitment of new staff) differed between the three strategy groups.

Table 5-26: The role of ICT in personnel policy

Role of ICT	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
ICT competencies are systematic criteria for selection and recruitment of new staff	2.55 (0.82)	2.65 (0.79)	2.81 (1.11)
ICT use in education is part of regular external quality assurance exercises	1.98 (0.70)	2.47 (0.77)	2.56 (0.87)
Professionalisation of staff in ICT competences is mandatory	1.75 (0.63)	2.23 (0.82)	2.07 (0.69)
ICT use in education is an integral part of regular staff assessments	1.72 (0.60)	1.99 (0.68)	2.26 (0.78)
Financial incentives to individual staff are provided for development of ICT use in education	1.83 (0.77)	2.07 (0.71)	1.91 (0.68)
ICT use in education is mandatory	1.62 (0.63)	1.95 (0.62)	2.20 (1.00)
ICT use in education counts towards promotion and tenure	1.64 (0.65)	1.81 (0.64)	2.22 (0.71)

1 = Not at all, 2 = a little, 3= some, 4= much, 5= very much

With respect to including ICT in education as part of either regular external or internal quality assurance, the mean scores differ most between the back-to-basics and world-campus strategy groups. The same applies to mandatory use of ICT in education and ICT use in education counting towards promotion and tenure. Looking at the mandatory professionalisation of staff in ICT competences, a rather large difference can be found between the back-to-basics and stretching-the-mould strategy group. ANOVA tests confirm that the differences mentioned above are also statistically significant.

Student characteristics

The last characteristic used for describing the institutional profile contingency deals with the effect of student demands on an institutions' current ICT-related policy. Respondents were asked to indicate to what extent their institution's ICT-related policy was affected by the following types of student demands: lifelong learners, international students and traditional students (18-24 years old).

Table 5-27 shows that, although differences between the three strategy groups can be seen for all three types of student demands, ANOVA tests suggest that only the difference between the three strategy groups with respect to the demand for lifelong learners is statistically significant.

Table 5-27: Effect of changes in student characteristics

Type of demand	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Lifelong learners	2.68 (0.89)	2.96 (0.92)	3.17 (1.05)
International students	2.69 (0.94)	2.92 (1.11)	2.67 (1.13)
Increased access for traditional students	2.59 (0.79)	2.95 (0.91)	2.95 (1.20)

1 = very little, 3 = some, 5 = very much

5.5.3 Future institutional profile

For some of the institutional profile characteristics respondents were asked to provide future perspectives. *Table 5-28* shows that with respect to future ICT-related activities there were hardly any substantial differences between the three strategy groups. This was confirmed by the results of the one-way ANOVA tests, which showed that there were no statistically significant differences.

Table 5-28: Extent to which future mission related activities involve the use of ICT in future

Activities which involve use of ICT	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Innovation in teaching and learning	4.02 (0.73)	4.21 (0.72)	4.20 (0.54)
Externally funded research	3.36 (1.30)	3.63 (1.09)	3.28 (1.21)
Teaching 18-24 years old	4.09 (0.80)	4.22 (0.96)	4.15 (0.55)
Internally funded research	3.14 (1.28)	3.37 (0.98)	3.13 (1.14)
Interaction with business and industry	3.49 (1.06)	3.58 (1.19)	3.17 (0.90)
Teaching international students	3.35 (1.00)	3.52 (1.07)	3.35 (0.90)
Providing lifelong learning	3.85 (0.96)	3.90 (1.04)	3.91 (0.75)

1=Low, 3=Moderate, 5=High

With respect to the effect of perceived future demand for flexibility in offering education, the differences between the three strategy groups were small. As can be seen in *Table 5-29* for most of the variables the difference between the three strategy groups was less than 0.2. ANOVA tests confirm that these differences are not statistically significant.

Table 5-29: Effect of student's flexibility demands on ICT-related policy

Changing demand	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Flexibility in delivery of education	3.85 (0.89)	3.81 (0.68)	3.65 (0.68)
Flexibility in locations of learning	3.83 (0.86)	3.81 (0.72)	3.60 (0.73)
Flexibility in pace of learning	3.74 (0.86)	3.70 (0.79)	3.54 (0.69)

1 = very little, 3 = some, 5 = very much

This same picture arises if one looks at the perceived objectives of future-oriented ICT policy. As the results of *Table 5-30* show, substantial differences can only be found for the objectives "widening access to traditional students" and "creating opportunities for international students". However, ANOVA test results show that these differences were not statistically significant.

Table 5-30: Expected major objectives of future ICT policies

Objectives of ICT policy	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Enhancing quality	4.20 (0.81)	4.20 (0.76)	4.22 (0.58)
Enhancing status and reputation of the institution	4.14 (0.90)	4.37 (0.72)	4.10 (0.61)
Enhancing flexibility	4.20 (0.75)	4.20 (0.66)	3.94 (0.63)
Enhancing competitiveness	3.87 (0.98)		3.84 (0.69)
Increasing efficiency	4.07 (0.77)	4.23 (0.63)	3.94 (0.73)
Widening access to traditional students	3.73 (0.98)	3.90 (0.72)	3.58 (0.84)
Enhancing cost-effectiveness	3.67 (0.95)	3.65 (0.98)	3.44 (0.58)
Creating opportunities for life-long learning	3.66 (0.95)	3.70 (1.01)	3.60 (0.84)
Creating opportunities for international students	3.31 (0.93)	3.62 (1.04)	3.17 (0.96)
Generating institutional income	3.30 (1.02)	3.29 (1.06)	3.18 (0.89)

1=none or low, 3=some, 5=High

With respect to the effect of perceived future demand for students, the differences between the three strategy groups were small. As can be seen in *Table 5-31* for most of the variables the difference between the three strategy groups is less than 0.3. ANOVA tests confirm that these differences are not statistically significant.

Table 5-31: Effect of changes in student demands on future ICT-related policy

Changing demand	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Lifelong learning	3.67 (0.81)	3.98 (0.91)	3.80 (0.69)
International students	3.29 (0.93)	3.30 (1.03)	3.08 (0.85)
Increased access for traditional students	3.31 (0.91)	3.27 (0.89)	3.24 (0.89)

1 = very little, 3 = some, 5 = very much

For some of the institutional profile characteristics respondents were asked to provide both current and future perspectives. The survey results were presented in the tables above. However, as it is expected that the difference between current and future responses can also have an influence on the strategic choices higher education institutions make (as this concerns the respondents perception on the change within their internal environment) these differences also have to be taken into account.

Table 5-32 shows that with respect to future ICT-related activities there are hardly any substantial differences between the three strategy groups. This is confirmed by the results of the ANOVA tests, which show that there are no statistically significant differences.

Table 5-32: The enacted difference between now and future activities involving the use of ICT

Activities which involve use of ICT	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Innovation in teaching and learning	0.76 (1.05)	0.73 (1.05)	0.38 (0.98)
Externally funded research	0.31 (1.56)	0.49 (1.44)	-0.35 (1.50)
Teaching 18-24 years old	1.01 (1.08)	0.88 (0.99)	0.87 (0.93)
Internally funded research	0.30 (1.46)	0.49 (1.69)	-0.12 (1.61)
Interaction with business and industry	0.94 (1.34)	0.88 (1.39)	-0.10 (1.26)
Teaching international students	0.84 (1.35)	0.75 (1.33)	0.55 (1.06)
Providing lifelong learning	1.57 (1.33)	1.16 (1.31)	0.78 (1.23)

1=Low, 3=Moderate, 5=High

Table 5-33 shows that with respect to the perceived difference between current and future demand for flexibility in offering education, differences between the three strategy groups can be seen. ANOVA tests showed that the differences between current and future student demands for flexibility in delivery of education and location of learning were also statistically significant.

Table 5-33: Differences between current and future changes in student demands for flexibility

Changing demand	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Flexibility in delivery of education	0.77 (1.14)	0.52 (0.90)	0.22 (1.11)
Flexibility in locations of learning	0.88 (1.11)	0.47 (0.88)	0.07 (1.07)
Flexibility in pace of learning	0.65 (1.19)	0.86 (0.93)	0.42 (1.05)

1 = very little, 3 = some, 5 = very much

With respect to the perceived difference between current and future student demand, the differences between the three strategy groups were also small (see *Table 5-34*). This was confirmed by the one-way ANOVA tests, which showed no statistically significant variables.

Table 5-34: Differences between current and future student demand

Changing demand	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Lifelong learning	0.99 (1.20)	1.01 (1.17)	0.63 (1.21)
International students	0.60 (1.45)	0.38 (1.36)	0.41 (1.08)
Increased access for traditional students	0.72 (1.27)	0.32 (1.06)	0.29 (1.15)

1 = very little, 3 = some, 5 = very much

Table 5-35 shows that with respect to the perceived difference between current and future major objectives of ICT policies differences between the three strategy groups can be seen. ANOVA tests showed that for the variables widening access for traditional students, enhancing flexibility, creating opportunities for lifelong learning, enhancing cost-effectiveness and generating institutional income the differences were also statistically significant.

Table 5-35: Differences between current and future major objectives of ICT policies

Objectives of ICT policy	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Enhancing quality	0.44 (0.99)	0.18 (0.88)	0.05 (0.66)
Enhancing status and reputation of the institution	0.42 (1.18)	0.44 (1.11)	0.11 (0.98)
Enhancing flexibility	0.67 (0.96)	0.23 (0.93)	-0.07 (0.72)
Enhancing competitiveness		0.42 (1.10)	-0.11 (0.98)
Increasing efficiency	0.44 (0.99)	0.52 (0.92)	0.16 (0.88)
Widening access for traditional students	0.55 (1.27)	0.88 (0.99)	-0.13 (1.05)
Enhancing cost-effectiveness	0.79 (1.29)	0.32 (0.96)	0.16 (0.88)
Creating opportunities for life-long learning	0.61 (1.12)	0.39 (1.25)	0.03 (1.00)
Creating opportunities for international students	0.84 (1.35)	0.50 (1.57)	-0.04 (1.03)
Generating institutional income	1.13 (1.35)	0.99 (1.40)	0.32 (1.24)

1=none or low, 3=some, 5=High

5.5.4 Institutional technology

The third internal contingency is institutional technology. As described in Chapter four this contingency is operationalised by level of infrastructure, types of technology and use of ICT for teaching practices.

Level of infrastructure

To measure the level of infrastructure respondents were asked to indicate, on the basis of a 5-point scale, the level of their institutions technology infrastructure. As *Table 5-36* shows, both the stretching-the-mould and world-campus strategy group had higher mean scores than the back-to-basics strategy group. ANOVA results show that this difference were also statistically significant.

Table 5-36: The level of the institution's technology infrastructure

	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Level of infrastructure	3.38 (0.56)	3.89 (0.55)	3.75 (0.75)

1=very low, 3=average, 5=very high

Types of technology

A second aspect dealt with the types of technology used within higher education institutions. Respondents were asked, on the basis of a 5-point scale, to indicate which of the following technologies were used within their institution: e-mail, web-resources, wireless solutions, web-based course management systems, planning tools, web-based courses and (video) conferencing tools. *Table 5-37* shows that for many of these variables differences between the three strategy groups were evident. With respect to using a web-based course management system, web-courses and conferencing tools the largest differences could be found between the back-to-basics strategy group and the world-campus strategy group.

Table 5-37: Different types of technology used within higher education institutions

Types of technology	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
E-mail systems	3.94 (0.81)	3.89 (0.66)	4.03 (0.71)
Web resources	3.87 (0.68)	3.93 (0.60)	3.97 (0.72)
Web-based course management systems	2.29 (0.81)	2.58 (0.86)	2.75 (1.01)
Externally available courses or modules, accessible via the Web	1.84 (0.55)	1.91 (0.59)	2.27 (0.60)
Conferencing tools (video, audio, chat)	1.67 (0.59)	1.86 (0.51)	2.25 (0.91)
Wireless solutions	1.56 (0.68)	1.95 (0.72)	1.90 (0.59)

1=very low, 3=average, 5=very high

With respect to the use of wireless solutions, both the stretching-the-mould and world-campus groups showed the same difference with the back-to-basics group. However, both differences were not statistically significant. ANOVA results showed that only with respect to the use of a web-based course management system both the difference between the stretching-the-mould and the world-campus strategy group with the back-to-basics strategy group were statistically significant. The same counts for the differences between the world-campus strategy groups and the back-to-basics strategy group; statistically significant differences were found for the use of wireless solutions, video conferencing tools and web-accessible courses.

Respondents were also asked, on the basis of a 5-point scale, to indicate to what extent technology was used for either: teaching 18-24 years old, providing life-long learning, teaching international students, being innovative in teaching and learning, focus on either internally or externally funded research or focusing on interaction with business and industry. *Table 5-38* shows that several variables had different scores between the three strategy groups: the variables innovation in teaching and learning, externally and internally funded research, interaction with business and industry and providing lifelong learning, report different results for the three strategy groups. ANOVA test results confirmed that these differences were also statistically significant.

Table 5-38: Extent to which current activities involve the use of ICT

Activities which involve use of ICT	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Innovation in teaching and learning	3.27 (0.66)	3.48 (0.73)	3.81 (0.84)
Externally funded research	3.05 (1.04)	3.15 (1.06)	3.62 (1.09)
Teaching 18-24 years old	3.07 (0.64)	3.35 (0.59)	3.28 (0.83)
Internally funded research	2.84 (0.98)	2.88 (0.95)	2.95 (1.04)
Interaction with business and industry	2.55 (0.86)	2.70 (0.88)	3.27 (1.07)
Teaching international students	2.51 (0.85)	2.76 (0.97)	2.79 (0.88)
Providing lifelong learning	2.28 (0.72)	2.74 (0.76)	3.12 (1.03)

1=Low, 3=Moderate, 5=High

Teaching practices

A third characteristic involved the current teaching practices within higher education institutions. Respondents were asked to indicate to what extent the following teaching practices were common in their institution: lectures, practice activities, studying via (non-Web) computer software, studying via Web-based environments or group work related teaching.

Table 5-39 shows that with respect to the variables: studying via a Web-based environment, participation in group work and studying via (non-Web) software, differences between the three strategy groups were found. ANOVA tests showed that these differences were statistically significant between the back-to-basics and stretching-the-mould strategy group. The only statistically significant difference between the world-campus and back-to-basics strategy group was the variable studying via a Web-based environment.

Table 5-39: Current teaching practices

Current teaching practices	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Lectures	4.59 (0.46)	4.60 (0.48)	4.36 (0.81)
Practice activities (labs, field work, etc.)	4.05 (0.73)	4.21 (0.57)	4.01 (0.79)
Participation in group work, project work	3.52 (0.86)	3.78 (0.45)	3.75 (0.75)
Studying via (non-Web) computer software	2.27 (0.77)	2.57 (0.87)	2.61 (0.96)
Studying via Web-based environment	2.17 (0.61)	2.57 (0.63)	2.82 (0.90)

With respect to the characteristic "teaching practices", respondents were also asked to indicate, on the basis of a 5-point scale, for which teaching practices ICT was used within their institution: course preparation or organisational purposes, communication with and among students and instructors, supporting group activities, classroom activities or a web-environment outside the classroom. *Table 5-40* shows that in all three strategy groups ICT was mainly used for course preparation/organisational purposes and for communication with and among students and instructors. For these variables, as well as the variables ICT used for supporting group activities and classroom activities, the ANOVA tests show that there were no statistically significant differences between the three strategy groups.

Table 5-40: The extent to which ICT is used within the institution

Extent of ICT used for	B-t-B Mean (SD)	S-t-M Mean (SD)	Worldc Mean (SD)
Course preparation or organisational purposes	3.93 (0.57)	3.99 (0.64)	3.98 (0.69)
Communication with and among students and instructors	3.52 (0.80)	3.59 (0.72)	3.82 (0.84)
Supporting group activities and project work	3.03 (0.77)	3.27 (0.69)	3.26 (0.68)
Classroom activities	2.99 (0.50)	3.25 (0.75)	3.29 (0.97)
A Web environment outside classroom activities	2.56 (0.69)	3.02 (0.66)	3.22 (1.00)

1=rarely, 3=some, 5=extensively

The only variable that showed a statistically significant difference between the three strategy groups was the use of a Web environment outside classroom activities. The one-way ANOVA test presented that both the stretching-the-mould and the world-campus strategy groups showed a statistically significant difference with the back-to-basics strategy group.

5.6 Differences between higher education institutions

In the preceding section both the external and internal contingencies and their characteristics and variables used for empirically testing were presented by strategy group. To find statistically significant differences between the three strategy groups, one-way ANOVA tests (interval measured variables) and chi-square tests (nominal measured variables) were conducted. In *Table 5-41* and *Table 5-42* an overview of the variables showing statistically significant differences between the three strategy groups is described.

First both tables show that most statistically significant differences can be found between the back-to-basics and world-campus strategy group (indicated in the "btb-worldc" column, second on the right side of the tables, by *+btb or +wc*). The differences in means between the back-to-basics and stretching-the-mould strategy groups are less prominent. The same applies to the differences between the stretching-the-mould and world-campus strategy group. Here again *Table* 5-41 and *Table 5-42* show less differences than between the back-to-basics and world-campus strategy groups.

Table 5-41: Overview of external contingencies and variables showing a statistically significant difference between three strategy groups

			btb-stm	btb-worldc	Worldc-stm
External contingencies	**Characteristics**	**Independent variables**			
Technology	**Connectivity**	Number of PCs per capita		+wc	
Demography	**Diversified student population**	Participation rate		+wc	
		International students	+btb		
		Life-long learning students	+stm	+wc	
Government	**National policy**	Influence of national actor		+btb	
Economic	**Public spending**	% GDP spent on education	+stm	+wc	
		% of education on HE		+wc	
	Cooperation	With international HEI		+btb	

Table 5-42: Overview of internal contingencies and variables showing a statistically significant difference between three strategy groups

			btb-stm	btb-worldc	Worldc-stm
Internal Contingencies	**Characteristics**	**Independent variables**			
Institutional profile	**Mission**	**Aspects of the mission**			
		18-24 years		+btb	
		externally funded research			+wc
		life-long learning	+stm	+wc	
	Type of delivery	**Good education**			
		individualisation for student characteristics	+stm	+wc	
		time/place independent learning.		+wc	
		Demand for flexibility			
		location of learning		+wc	
	Institutional policy	**Objective ICT policy**			
		widening access 18-24		+wc	
		enhancing flexibility	+stm	+wc	
		lifelong learning		+wc	
		international students		+wc	
		cost-effectiveness	+stm		
		institutional income		+wc	+wc
		competitiveness		+wc	
		ICT and personnel policy			
		promotion/tenure		+wc	+wc
		professionalisation of staff is mandatory	+stm		
		ICT use mandatory		+wc	
		regular staff assessment		+wc	
		external quality assurance	+stm	+wc	

Table 4.42: continued

			btb-stm	btb-worldc	Worldc-stm
	Use ICT strategy	ICT use for strategic goals		+wc	
	Student characteristics	lifelong learning		+wc	
	Future type of delivery	**Future demand for flexibility**			
		location of learning		+btb	
		delivery of education		+btb	
	Future institutional policy	**Future objective of ICT policy**			
		widening access 18-24		+ btb	
		Flexibility		+ btb	
		Lifelong learning		+ btb	
		cost-effectiveness		+ btb	
		institutional income		+ btb	
Institutional technology	**Infrastructure**	**Level of infrastructure**	+stm	+wc	
	Types of technology	**Types of technology**			
		wireless solutions	+stm	+wc	
		video conf		+wc	+wc
		web-accessible courses	+stm	+wc	+wc
		web-based cms		+wc	
		ICT use for mission activities			
		externally funded research		+wc	
		innovation teaching and learning		+wc	
		lifelong learning	+ stm	+wc	
		business and industry		+wc	+wc

Table 4.42: continued

		btb-stm	btb-worldc	Worldc-stm
Teaching practices	**Common teaching practices**			
	Web-based environment	+stm	+wc	
	study via web	+stm	+wc	
	Extent ICT is being used			
	Web-environment		+ wc	

With respect to the external contingencies, the results of *Table 5-41* show that all four main characteristics used to define the external contingencies demonstrate statistically significant differences when comparing between the three strategy groups. Looking at the "technological factors", only one of the variables (the number or PCs per capita in a country) showed a statistically significant difference between the three strategy groups. Furthermore, one can see that participation rate, percentage of international students and percentage of lifelong learning students, all used to operationalise the "demography" contingency, show statistically significant differences between the three strategy groups. With respect to the external contingency "governmental factor" only the variable "influence of a national actor to the ICT policy of a higher education institution" shows a statistically significant difference between the three strategy groups. To measure the last external contingency, economic factors, two characteristics were used: public spending and competition/collaboration. *Table 5-42* shows that the two variables used to measure public spending, the percentage of a country's GDP spent on education and the percentage of a country's educational budget spent on higher education both were significantly different between the three strategy groups. With respect to competition/collaboration, only the variable "cooperation with other, international higher education institutions", was statistically significant.

With respect to the internal contingencies, the results of *Table 5-42* show that only a small number of the internal contingency characteristics has statistically significant differences between the three strategy groups. Looking at the three main internal contingencies (institutional governance, institutional profile and institutional technology) Table 5-42 shows that with respect to the contingency institutional governance none of the characteristics (leadership, management and administration) showed statistically significant differences between the three strategy groups.

The second contingency is institutional profile. Part of the characteristics used for operationalising institutional profile (type of institution, size, history, type of program and location) do not show statistically significant differences when conducting chi-square tests. The same counts for those characteristics used for describing some future perspectives. Characteristics that do show significant differences between the three strategy groups are: mission, type of delivery, institutional policy and two characteristics related to show the differences between the current and future perspective of respondents: difference between current and future type of delivery and the difference between current and future institutional policy. With respect to the internal contingency institutional technology, the results of *Table 5-42* show that for all characteristics statistically significant differences between the three strategy groups were evident.

As described in Section 4.7, based on one-way ANOVA and chi-square tests, the relationship between the independent variables (the external and internal contingencies) and the dependent variable (strategic choices) were examined by looking at the statistically significant differences between groups of higher education institutions. These results, however, do not say that much about the direction or pattern of this relationship. To find out more about the direction and pattern of the relationships between the statistically significant independent variables and the three strategy groups, regression analyses was conducted. However, as the total number of statistically significant independent variables in relation to the sample size is too high (the rule of thumb is 1:4) first the number of the statistically significant variables was reduced using factor analyses. The results of both the factor and regression analyses are described in the next chapter.

6 Factor analyses and regression analyses

6.1 Introduction

The preceding chapter examined the statistically significant differences of the internal contingencies between groups of higher education institutions based on one-way ANOVA and chi-square tests. To find out more about the direction and pattern of the relations between the statistically significant independent variables and the strategy groups, regression analysis was conducted. However, as indicated in the last chapter, the total number of statistically significant independent variables in relation to the sample size is too high. Therefore, before describing the outcomes of the regression analysis, the number of the variables must be reduced. For this, factor analyses were employed.

6.2 Factor analyses

The main purpose of factor analysis is to: (1) *reduce* the number of variables and (2) to *detect structure* in the relationships between variables. An exploratory factor analysis was conducted to reduce the number of independent variables (see Chapter 4). Based on the results of the one-way ANOVA and chi-square tests, only those variables showing a statistically significant difference between the three strategy groups were included in the factor analyses. This meant for example that for the internal contingency "institutional governance" no variables were included as the differences between the three strategy groups were not statistically significant.

6.2.1 External contingencies

With respect to the external contingency "demography", three variables were included in the factor analysis. Principal component analysis (PCA) was conducted to determine the number of factors. Based on both the factor solutions suggested by the PCA and Kaiser's criterion (eigenvalues >1) the variables were grouped into one factor: increasing access. *Table 6-1* reports the results of the factor rotation.

Table 6-1: Factor loadings and communality values for exploratory factor analyses for the demographic variables

Factors Variables	F1	Commonalities
Participation rate	.957	.911
Lifelong learning	.908	.840
International students	-.754	.469

Note: Loadings > 0.39 reported

The same statistical procedure as above was then applied to the external contingency "economy". Based on the input of all three economy variables one factor was constructed: expenditure on education. *Table 6-2* shows the results.

Table 6-2: Factor loadings and communality values for exploratory factor analyses for the economic variables

Factors Variables	F1	Commonalities
% of GDP on education	.866	.737
% of education on HE	.866	.760
Cooperation international HEI	-.477	.280

Note: Loadings > 0.39 reported

Internal contingencies

With respect to the internal contingency "institutional profile", in total 20 variables were included in the factor analysis. PCA was conducted to determine the number of factors. Based on both the factor solutions suggested by the PCA and Kaiser's criterion (eigenvalues >1) the variables were grouped into the six main factors that are listed below:

1. flexibility for income generation
2. human resource management
3. increasing access and enhancing competitiveness
4. lifelong learning
5. organisational or logistical flexibility[12]
6. research-oriented mission/policy

In order to determine the item-composition of each of the factors, VARIMAX rotation was used. The results of the factor scores can be seen in *Table 6-3* ; for each variable the factor loadings and communality values (h2) are described.

[12] The term organisational flexibility is also used by De Boer (2004), by describing both flexibility related to time a well as to content delivery.

Table 6-3: Factor loadings and communality values (com) of exploratory factor analyses for the institutional profile characteristic

Factors / Variables	F1	F2	F3	F4	F5	F6	Com
enhancing flexibility as object of ICT-policy	0,783						.613
generating institutional income as object of ICT-policy	0,652						.425
enhancing cost-effectiveness as object of ICT-policy	0,777						.604
creating opportunities for lifelong learning as object of ICT-policy	0,723						.523
using ICT for strategy	0,710						.505
professionalisation of staff in ICT is mandatory		0,740					.548
ICT use in education is mandatory		0,711					.505
ICT use in education is part of regular staff assessments		0,775					.601
ICT use in education is part of external quality exercises		0,667					.445
ICT use in education counts towards promotion and tenure		0,682					.466
ICT policy focus on widening access 18-24 years students			0,804				.646
ICT-policy focus on widening access for international students			0,772				.595
ICT-policy focus on enhancing competitiveness			0,788				.622
student demand for lifelong learning				0,874			.764
providing lifelong learning as part of the mission				0,874			.764
time/place independent learning is part of the educational delivery process					0,789		.567
individualization for different student characteristics is part of the educational delivery process					0,753		.623
ICT related policy affected by students' demand for flexibility in locations of learning					0,719		.517
mission focus on internally funded research						0,892	.796
mission focus on externally funded research						0,892	.796

Note: Loadings > 0.39 reported

As described in Section 5.5.3 for some of the institutional profile characteristics respondents of the survey were asked to provide both their current and future perspectives. This was done for two reasons. First because of the perceptions of respondents with respect to the amount of change they expected to come from ICT related aspects such as the influence of future demand (both flexibility as student demand) on their institutional mission and policy. Second, because of the expectation that differences in means between these current and future perspectives could be of influence on the strategic choices of higher education institutions. As was described in Section 5.5.3 no statistically significant differences between the three strategy groups were found with respect to current perspectives. However, looking at the differences between the mean values of current and future perspectives for nine of the variables statistically significant differences were found and included in the factor analysis. The same statistical procedure as described for the institutional profile was conducted. As can be seen in *Table 6-4*, two factors were constructed:

1. educational delivery flexibility
2. flexibility for the lifelong learning market

Table 6-4: Factor loadings and communality values for exploratory factor analyses for the "difference between current and now" variables

Factors	F1	F2	Commonalities
Variables			
difference between current and future for:			
ICT related policy affected by students' demand for flexibility in delivery of education (times of learning)	0.856		.766
ICT related policy affected by students' demand for flexibility in locations of learning	0.847		.740
ICT policy focus on widening access 18-24 years students	0.659		.478
ICT is used for interaction with business and industry	0.634		.478
enhancing cost-effectiveness as object of ICT-policy		0.722	.528
ICT is used for teaching lifelong learning		0.777	.614
creating opportunities for lifelong learning as object of ICT-policy		0.730	.470
enhancing flexibility as object of ICT-policy		0.717	.519
generating institutional income as object of ICT-policy		0.595	.425

Note: Loadings > 0.39 reported

An exploratory factor analysis was also done for the internal contingency "institutional technology." To determine the number of factors PCA was conducted using only the 15 variables that showed statistically significant differences between the three strategy groups. Based on the solutions suggested by the PCA and the outcomes of the Kaiser's criterion (eigenvalues > 1) the variables were grouped into three main factors:

1. advanced technology use
2. ICT use for income generation
3. pedagogical flexibility

Each of the initial factors was rotated using VARIMAX in order to determine the item-composition. *Table 6-5* shows the results of the factor scores. For each variable the factor loadings and commonality values (h2) are described.

Table 6-5: Factor loadings and communality values for exploratory factor analyses for the institutional technology characteristic

Factors Variables	F1	F2	F3	Commonalities
use of an electronic learning environment outside the classroom	0,842			.709
study via web is common practice to deliver education	0,822			.675
web-based course management systems are used for teaching purposes	0,749			.561
ICT is used for innovation in teaching and learning	0,696			.484
level of technical infrastructure	0,606			.367
wireless solutions are used for teaching purposes	0,563			.317
video conferencing tools are used for teaching purposes	0,520			.270
ICT is used for externally funded research		0,874		.764
ICT is used for interaction with business and industry		0,796		.633
ICT is used for internally funded research		0,793		.629
ICT is used for innovation in teaching and learning		0,656		.430
ICT is used for teaching lifelong learning			0,757	.573
web-accessible courses are used for teaching purposes			0,713	.508
web-based course management systems are used for teaching purposes			0,711	.505
video conferencing tools are used for teaching purposes			0,709	.502

Note: Loadings > 0.39 reported

All of the above factors were used as inputs for the regression analysis described in the next section.

6.3 Regression

As was described in Section 5.6, most statistically significant differences between the three strategy groups were found between the back-to-basics and world-campus strategy group. Therefore the focus of the regression analyses was on exploring the differences between the two strategy groups. By doing so, the dependent variable of this study (strategic choice) was dichotomous and was operationalised by labelling the back-to-basics strategy as "1" and the worldcampus strategy as "0". A logistic regression was then done to predict the dependent variable on the basis of independent variables and to determine the percentage of variance in the dependent variable explained by the independents using the most parsimonious model (Garson, 2005). The independent variables for this model were derived from the results of both the one-way ANOVA tests, as described in Chapter five, as well as from the factor analyses in the preceding section. See for an overview Figure 6-1.

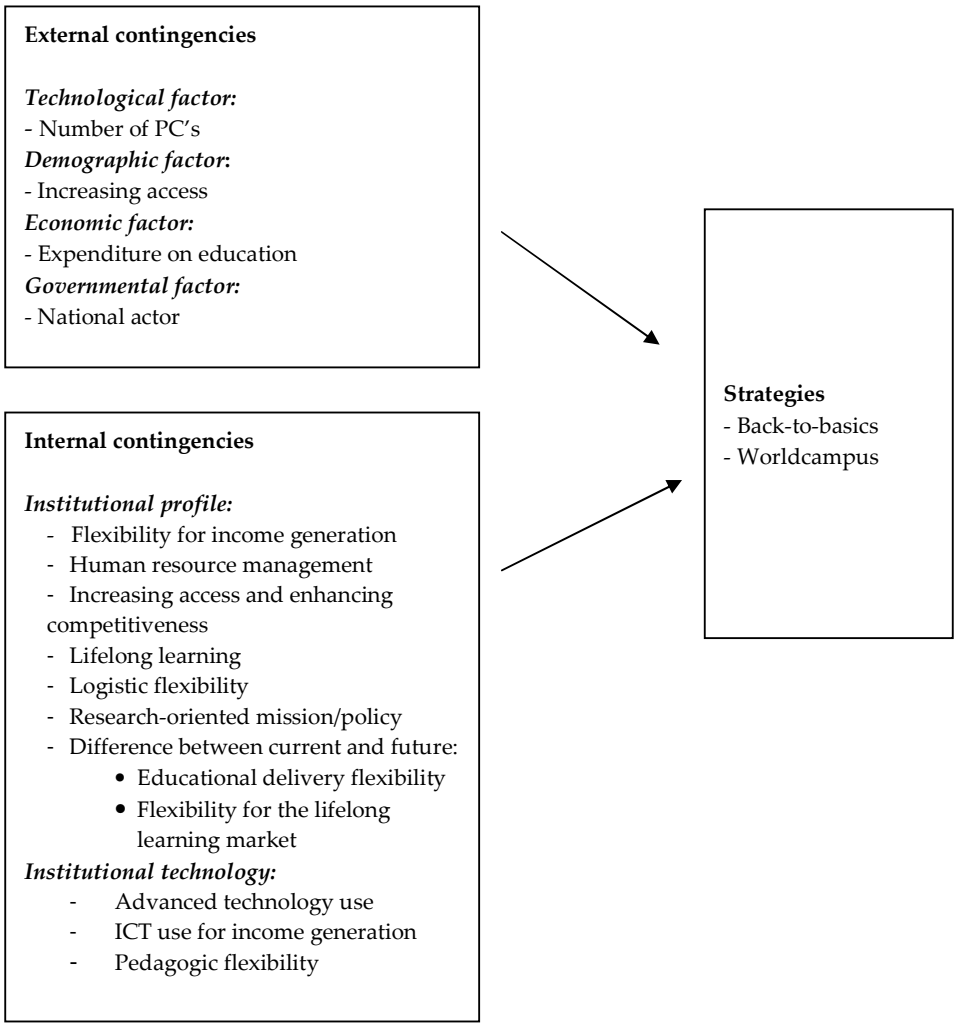

Figure 6-1: Contingency model for input regression analyses

To find the most parsimonious model, both a backward and forward stepwise logistic regression analysis was conducted that included all 15 independent variables shown in *Figure 6.1.*

The results of the backward analysis (see *Table 6-6*) show that higher education institutions that: 1) focus on offering logistic flexibility 2) use ICT to attract external funds 3) are situated in an external environment in which national government influences the institutional ICT policy and 4) in which the general focus is on increasing the higher education's participation rate[13] are more likely to choose a worldcampus strategy than a back-to-basics strategy.

Table 6-6: Results of the logistic backward regression analysis

Variable	B	S.E.	Wald	Df	Sig	Exp (B)
Logistic flexibility	-1,605	,562	8,149	1	,004	,201
ICT use for income generation	-2,603	,796	10,700	1	,001	,074
Influence of national actor on institutional ICT-related policy	,817	,452	3,262	1	,071	2,264
Increasing access	-2,486	,707	12,369	1	,000	,083

The most parsimonious model (reached after 12 steps) shows a Nagelkerke R square value of .711 and suggests that the model contributes powerfully to the prediction of higher education institutions preference for a worldcampus or back-to-basics strategy. This is supported by looking at the results of the Hosmer and Lemeshow Test, which gives a measure of goodness-of-fit: the small chi-square (7.277) and the high p-value (.507) show that the model fits the data well. Furthermore, the success rate of the probability that higher education institutions focusing on the four variables as described above, prefer a worldcampus strategy instead of a back-to-basics strategy, increases from 62% to 84%, which according to Kinnear and Gray (2004: 395) is an "enormous improvement on the 'no regression' prediction". Furthermore *Table 6-7* shows that removing any one of the four variables from the model has a significant effect on the Log Likelihood.

Table 6-7: Change in the log likelihood if the variable "influence of a national actors on the institution's ICT-related policy" is removed from the model

Variable	Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Logistic flexibility	-26.763	12.994	1	.000
ICT use for income generation	-32.463	24.394	1	.000
Influence of national actor on institutional ICT-related policy	-22.186	3.839	1	.050
Increasing access	-33.007	25.481	1	.000

[13] Preferably by increasing the number of both lifelong learning students as well as national students.

As can be noted from *Table 6-6* the variable "influence of a national actor on a higher education institutions' ICT policy" is not significant (the p-value is > .05). Therefore a forward regression analysis was conducted to see whether the model created is robust. The results of *Table 6-8* show that this is not the case. When using a forward logistic regression analysis the variable "influence of a national actor on a higher education institutions' ICT policy" is no longer part of the best fit model.

Table 6-8: Results of the logistic forward regression analysis

Variable	B	S.E.	Wald	df	Sig	Exp (B)
Increasing access	-2,363	,645	13,411	1	,000	,094
Logistic flexibility	-1,516	,533	8,077	1	,004	,220
ICT use for income generation	-2,327	,694	11,244	1	,001	,098
Constant	,591	,392	2,274	1	,132	1,805

This model (reached after 3 steps) shows a Nagelkerke R square value of .673 and similar to the backward regression results, the outcome suggests that the model contributes powerfully to the prediction of higher education institutions preference for a worldcampus or back-to-basics strategy. This is further supported by looking at the results of the Hosmer and Lemeshow Test, which gives a measure of goodness-of-fit: here again the small chi-square (5.398) and the high p-value (.714) show that this model also fits the data very well.

However, when looking at the statistically significance of the variables included in the model, the forward regression, contrary to the results of the backward analysis, show that all variables are statistically significant. Furthermore the success rate that higher education institutions 1) focusing on offering logistic flexibility 2) use ICT to attract external funds, and 3) in which the general focus is on increasing the higher education's participation rate are choosing a worldcampus strategy, is increasing from (already high) 74% to 82%. Finally when comparing *Table 6-7* and *Table 6-9* one can see that when removing one of the three variables from the model, the Model Log Likelihood is further decreasing.

Table 6-9: Increase of the log likelihood if the variable is removed from the model

Variable	Model Log Likelihood	Change in -2 Log Likelihood	Df	Sig. of the Change
Increasing access	-35,493	26,615	1	,000
Logistic flexibility	-28,395	12,419	1	,000
ICT use for income generation	-33,623	22,876	1	,000

6.4 Short summary and conclusions of the empirical results

At the end of Chapter five it was concluded that most statistically significant differences were found between the back-to-basics and world-campus strategy group. Furthermore, it was shown that two of the three main internal contingencies (institutional profile and institutional technology) demonstrated statistically significant differences when comparing between these strategy groups. For the internal contingency institutional profile the following characteristics included variables that showed statistically significant differences between the strategy groups: mission, type of delivery, institutional policy, ICT use for strategy, student characteristics and two characteristics related to show the differences between the current and future perspective of respondents: difference between current and future type of delivery and the difference between current and future institutional policy. With respect to the internal contingency institutional technology, the results of Chapter five showed that for all characteristics variables were found that showed a statistically significant difference between the strategy groups. Also with respect to the external contingencies all four main characteristics used to define the external contingencies demonstrated statistically significant variables were found when comparing between the three strategy groups.

No statistically significant differences between the three strategy groups were found for the internal contingency institutional governance and some of the institutional profile variables. With respect to the contingency institutional governance none of the characteristics, leadership, management and administration showed statistically significant differences between the three strategy groups. The same counts for some of the characteristics of the internal contingency institutional profile: type of institution, size, history, type of program and location did not show statistically significant differences when conducting chi-square tests. The same counts for those characteristics used for describing some future perspectives.

Those variables showing statistically significant differences were further examined. First, their number was reduced by conducting factor analyses. The result of these factor analyses were then used as input for the binary regression analyses. The results of these regressions revealed three variables that could be used to explain the likelihood of choosing a worldcampus strategy over a back-to-basics strategy. Offering logistic flexibility, use ICT for income generation and a focus on increasing access (preferably by increasing the number of lifelong learning students) were all shown to increase the likelihood of the preference higher education institutions opting for a worldcampus strategy.

Looking back at the origin of these variables both the variable "offering logistic flexibility" and the "use of ICT for income generation" are part of the internal environmental contingencies while the focus on "increasing access" is part of the external environmental contingencies. Thus, it can be concluded that higher education institutions are influenced by both external as well as internal contingencies. This confirms the premises of the contingency theory that states that an organisation is influenced by both external and internal contingencies.

7 Summary, conclusion and reflection

7.1 Research questions and operationalisation

To cope with a more competitive environment, in which it is expected that higher education institutions have to compete for new student markets in order to survive, the strategic use of e-Learning within higher education institutions has become of importance. In order to strengthen their position in this environment, higher education institutions are challenged to focus on a more systematic integration of e-Learning in their educational delivery and support processes in order to reach these new markets. This requires higher education institutions to define strategies for integrating e-Learning in their educational delivery and support processes. The question was whether higher education institutions make similar strategic choices and to what extent and why - because of the influence of different external and internal environmental characteristics - the institutions opt for different strategies. This led to the following main research question of this thesis:

> How do higher education institutions differ in their strategic choices with respect to integrating e-Learning into their educational delivery processes and how can these differences be explained?

Sub-questions were:

1. What strategies are emerging?
2. What are the differences between higher education institutions with respect to their strategic choices?
3. Which (internal and external) factors explain these differences?

By drawing on the premises of both the contingency theory and the environmental school of strategy formation, the possible relationships between the external and internal environment and strategies of higher education institutions for integration e-Learning in their educational delivery and support processes were explored. In short, the contingency theory states that organisations must interact with their external and internal environment in order to survive. The survival of the organisation is partially explained by the ability to cope with external environmental contingencies and partially explained by organisational features (internal contingencies).

The basic assumption of the contingency theory is that an organisation's contexts, its environment, are important for understanding their actions and structures. This implies that organisational responses to external demands can to some extent be predicted from the situation of both external and internal environmental contingencies it is confronted with. This is also the focus of the environmental school of strategy formation. Furthermore both the contingency theory as well as the environmental school of strategy formation focus on the reactive processes of organisations to their environment.

Based on the premises of both the contingency theory and the environmental school of strategy, a conceptual framework was developed in order to explore the relationship between the external and internal environment and strategic choices of higher education institutions with respect to integrating e-Learning in their educational delivery and support processes. By categorising both the independent variables (external and internal contingencies) as well as the dependent variable (strategic choice) this framework was further developed into a contingency model (see *Figure 7-1*).

Figure 7-1 shows that these contingencies were further operationalised into a number of characteristics, such as type of steering model (for governmental factors), type of higher education institution (for institutional profile) and types of teaching practices used within the higher education institution (for institutional technology). A number of variables were used to measure these characteristics (see Appendix One for the Web-based questionnaire). The dependent variable was operationalised by the following four variables: back-to-basics strategy, stretching-the-mould strategy, global campus strategy and new economy strategy.

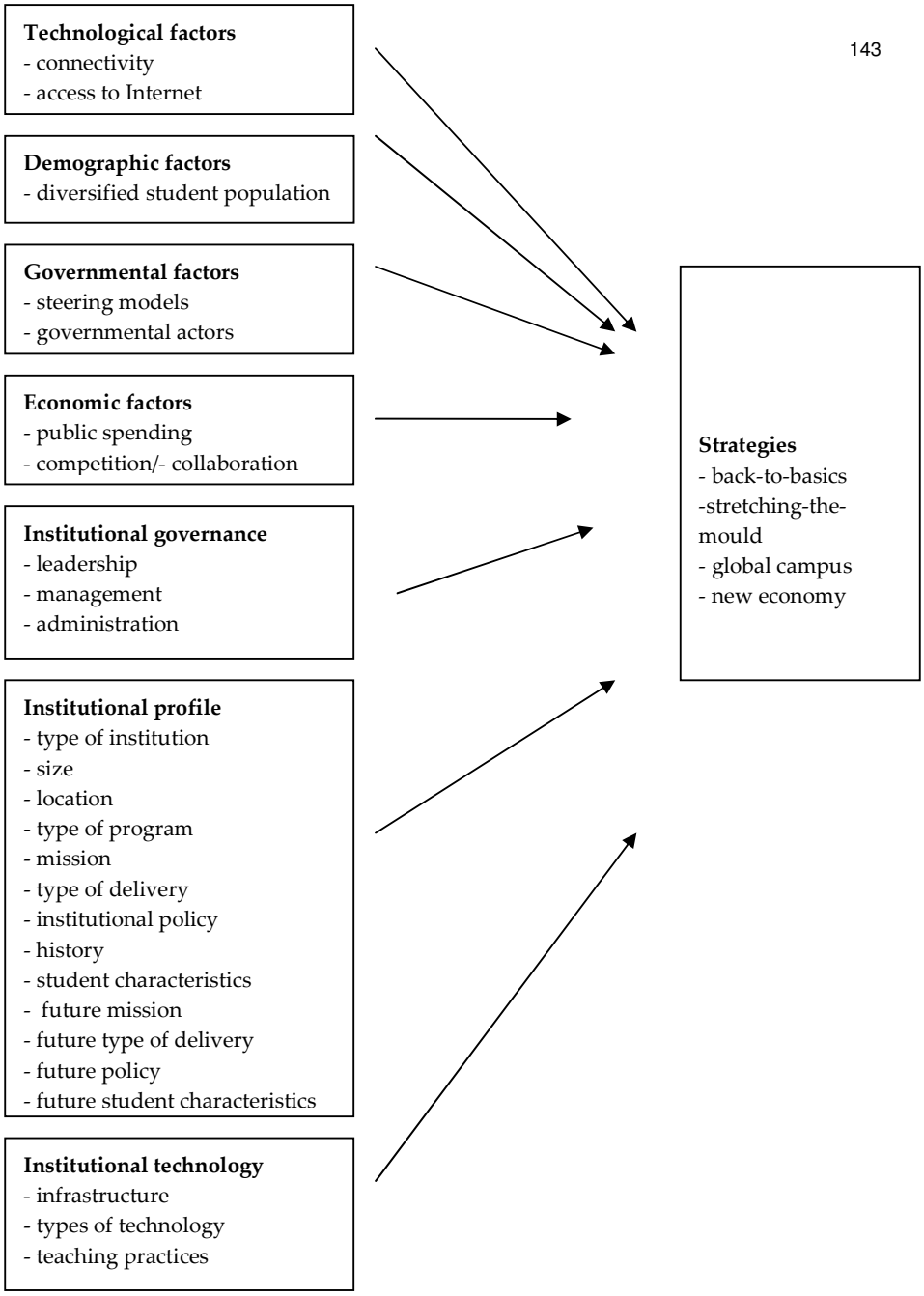

Figure 7-1: Contingency model

7.2 Empirical results

In the second part of this study the empirical results were described. First of all, the answer to sub-question 1 "What strategies emerge" was reported. Based on a correlation analysis and a mean value distribution analysis of the scores on the initial four variables, in fact three strategic choices with respect to integrating e-Learning in educational delivery and support processes were found: a back-to-basics strategy, a stretching-the-mould strategy and a worldcampus strategy. The respondents of the survey (higher education institutions) were categorised accordingly to their scores on these three strategies

- a group of higher education institutions with a predominantly back-to-the basics strategy (N=43)
- a group of higher education institutions with a predominantly stretching-the-mould strategy (N=22)
- a group of higher education institutions with a predominantly world campus strategy (N=26)

Differences between higher education institutions with respect to their strategic choices (sub-question two) were found by conducting both one-way ANOVA and chi-square tests. *Table 7-1 and Table 7-2* summarise the results of these tests. One of the first conclusions was that most differences were found between the back-to-basics strategy group and the worldcampus strategy group. This is indicated in the column second on the right of the tables (the btb-worldc column): in those cases that higher education institutions in the worldcampus strategy group have statistically higher scores on variables than those in the back-to-basics strategy group, the difference is indicated by *+wc*. In the reverse case, the statistically significant difference is shown by + *btb*. The differences in means between the back-to-basics and stretching-the-mould strategy groups are less prominent (see column btb-stm). The same applies to the differences between the stretching-the-mould and worldcampus strategy groups (see column worldc-stm).

Table 7-1: Overview of external contingencies and variables showing a statistically significant difference between three strategy groups

			btb-stm	btb-worldc	Worldc-stm
External Contingencies	**Characteristics**	**Independent variables**			
Technology	**Connectivity**	Number of PCs per capita		+wc	
Demography	**Diversified student population**	Participation rate		+wc	
		International students	+btb		
		Life-long learning students	+stm	+wc	
Government	**National policy**	Influence of national actor		+btb	
Economic	**Public spending**	% GDP spent on education	+stm	+wc	
		% of education on HE		+wc	
	Cooperation	With international HEI		+btb	

Table 7-2: Overview of internal contingencies and variables showing a statistically significant difference between three strategy groups

			btb-stm	btb-worldc	Worldc-stm
Internal Contingencies	**Characteristics**	**Independent variables**			
Institutional profile	**Mission**	**Aspects of the mission**			
		18-24 years		+btb	
		externally funded research			+wc
		life-long learning	+stm	+wc	
	Type of delivery	**Good education**			
		individualisation for student characteristics	+stm	+wc	
		time/place independen learning.		+wc	
		Demand for flexibility			
		location of learning		+wc	
	Institutional policy	**Objective ICT policy**			
		widening access 18-24		+wc	
		enhancing flexibility	+stm	+wc	
		lifelong learning		+wc	
		international students		+wc	
		cost-effectiveness	+stm		
		institutional income		+wc	+wc
		competitiveness		+wc	
		ICT and personnel policy			
		promotion/tenure		+wc	+wc
		professionalisation of staff is mandatory	+stm		
		ICT use mandatory		+wc	
		regular staff assessment		+wc	
		external quality assurance	+stm	+wc	
	Use ICT strategy	ICT use for strategic goals		+wc	
	Student characteristics	lifelong learning		+wc	

Table 7.2: continued

			btb-stm	btb-worldc	Worldc-stm
	Future type of delivery	**Future demand for flexibility**			
		location of learning		+btb	
		delivery of education		+btb	
	Future institutional policy	**Future objective of ICT policy**			
		widening access 18-24		+ btb	
		Flexibility		+ btb	
		Lifelong learning		+ btb	
		cost-effectiveness		+ btb	
		institutional income		+ btb	
Institutional technology	**Infrastructure**	**Level of infrastructure**	+stm	+wc	
	Types of technology	**Types of technology**			
		wireless solutions	+stm	+wc	
		video conf		+wc	+wc
		web-accessible courses	+stm	+wc	+wc
		web-based cms		+wc	
		ICT use for mission activities			
		externally funded research		+wc	
		innovation teaching and learning		+wc	
		lifelong learning	+ stm	+wc	
		business and industry		+wc	+wc
	Teaching practices	**Common teaching practices**			
		Web-based environment	+stm	+wc	
		study via web	+stm	+wc	
		Extent ICT is being used			
		Web-environment		+ wc	

7.2.1 Significant variables related to the external contingencies

Looking more specifically at the influence of the external contingencies *Table 7-1* shows that all four main external contingencies include characteristics that showed statistically significant differences between the strategy groups:

- For the external contingency *technological factors* the "connectivity to Internet" (measured by looking at the number of PCs per capita) showed a statistically significant difference between the back-to-basics and worldcampus strategy groups.
- For the external contingency *demographic factors* two of the three variables used to measure the diversified student market ("participation rate" and "lifelong learning students") showed statistically significant differences between the back-to-basics and worldcampus strategy group, whereas the variable "international students" showed a statistically significant difference between the back-to-basics and stretching-the-mould strategy group.
- For the external contingency *governmental factors* the variable "influence of a national actor on a higher education institutions' ICT policy" showed a statistically significant difference between the back-to-basics and worldcampus strategy groups.
- For the external contingency *economic factors* the two variables used to measure "public spending" ("percentage of a country's GDP spent on education" and "percentage of a country's educational budget spent on higher education") both showed significant differences between the back-to-basics and worldcampus strategy groups. With respect to the characteristic "competition/collaboration" only the variable "cooperation with other, international higher education institutions", showed a statistically significant difference between the back-to-basics and worldcampus strategy groups.

7.2.2 Significant variables related to internal contingencies

Looking at the three main internal contingencies (institutional governance, institutional profile and institutional technology) the one-way ANOVA and chi-square tests showed the following (see *Table 7-2*):

- Characteristics of the internal contingency *institutional profile* that included statistically significant variables were: "mission", "type of delivery", "institutional policy", "difference between current and future type of delivery" and "difference between current and future institutional policy".

- Although two of the variables used to measure these characteristics ("focus in institutional ICT policy on cost-effectiveness" and "ICT use is mandatory for staff") showed statistically significant difference between the back-to-basics and stretching-the-mould strategy groups, most of the variables demonstrated statistically significant differences between the back-to-basics and the worldcampus strategy groups.
- For the internal contingency *institutional technology* all characteristics included variables that showed statistically significant differences between the three strategy groups. Here again, most of these differences were found between the back-to-basics and the worldcampus strategy groups.

7.2.3 Non-significant variables

After having elaborated the significant variables, it is interesting to shed some light at this point on the internal variables that were not found to be significant. Especially on those that one might usually expect to have an influence, these are for example:

- For the internal contingency *institutional governance* all the characteristics: "leadership", "management" and "administration".
- For the internal contingency *institutional profile* the characteristics: "type of institution", "size", "history", "type of programme" and "location".

These findings are discussed in further detail in Section 7.3.4.

7.2.4 Regression analyses

As described above, based on one-way ANOVA and chi-square tests, the statistically significant differences between groups of higher education institutions were examined. By doing so the second sub-question of this study "What are the differences between higher education institutions with respect to their strategic choices?" was answered. These results, however, did not say anything about the direction or pattern of this relationship. So for answering the third sub-question "Which (internal and external) factors explain these differences" regression analysis was conducted. However, as the total number of statistically significant independent variables in relation to the sample size was too high (the rule of thumb is 1:4) first of all the number of the statistically significant variables were reduced by factor analysis and then put forward in a binary logistic regression analysis. Furthermore, the analysis was restricted to comparing the two most distinctive strategies: worldcampus and back-to-basics. An overview of these factors is shown in *Figure 7-2*.

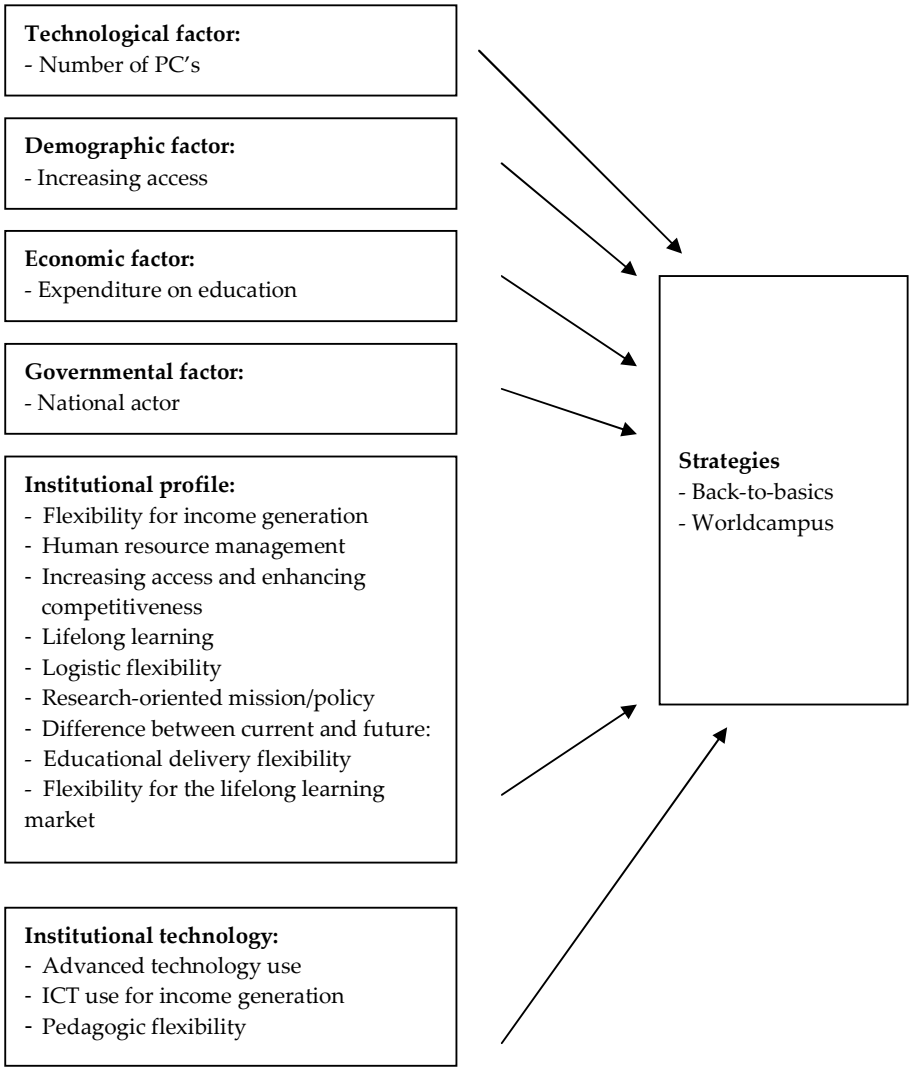

Figure 7-2: Contingency model after factor analyses

On the basis of the binary forward logistic regression results it can be concluded that one external factor "focus on increasing access" and two internal factors, "offering logistic flexibility" and "use of ICT for income generation" increase the preference of higher education institutions for a worldcampus strategy (see *Figure 7-3)*.

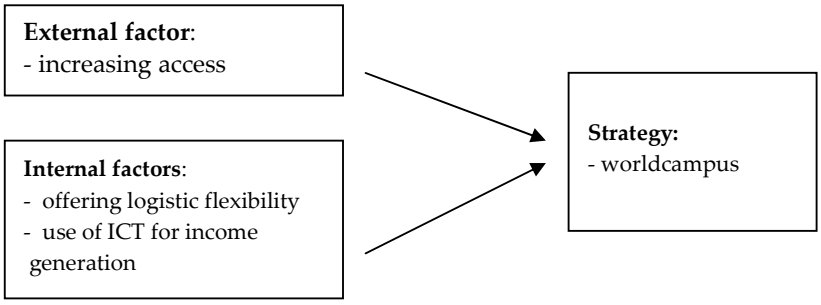

Figure 7-3: Influence of external and internal factors on the worldcampus strategy

7.3 Reflection

This section includes reflections on 1) empirical results 2) theoretical framework used and 3) implications for higher education institutions.

7.3.1 Empirical results

As described in the preceding section, one of the outcomes of the empirical analyses was that the stretching-the-mould strategy did not show that many differences with either the back-to-basics or worldcampus strategy. This is not that surprising, as the stretching-the-mould strategy can be seen as in between (or probably a combination of) the other two types of strategy. One can think of the strategies as a continuum; on the left and on the right two extreme strategies (respectively the back-to-basics and worldcampus strategy, see *Figure 7-4*) and in between the stretching-the-mould strategy. This latter strategy can actually be characterised as a strategy that is more or less emerging because of (unplanned) institutional adaptations to societal trends such as dealing with individualisation, new technologies and new student markets.

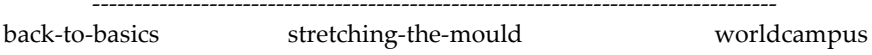

Figure 7-4: Strategy continuum

Contrary to the worldcampus strategy, which is more characterised by the focus on new technologies and new student markets, the stretching-the-mould strategy is rather an evolutionary than a revolutionary process. Strategy formation within higher education institutions having a stretching-the-mould strategy often seem not to specifically plan this type of strategy, it more or less evolves from their step-by-step response to societal trends (i.e. a more moderate or incremental way of responding to external changes).

Higher education institutions with a worldcampus strategy differ from higher education institutions with a back-to-basics strategy (and to a lesser extent from those with a stretching-the-mould strategy) because these institutions experience an environment that already is competitive and that will become more competitive in the coming years. In their strategy formation (either emergent or planned) the worldcampus higher education institutions consider integrating e-Learning in their educational delivery and support processes as the best response to these challenges. Therefore they focus on the use of e-Learning for increasing access, for offering flexible education and for income generation. In other words, they see an extensive use of e-Learning as necessary to survive in the competitive market place.

This is not to say that institutions with a back-to-basics strategy are per definition less aware or unaware of these external competitive pressures. They may in fact deliberately choose to respond to them by emphasizing their traditional base as an asset. For instance, institutions may see their historical capital city locations or their green and large campuses as such, and may therefore not choose to engage in an extensive use of e-Learning, but may consider a more moderate use as sufficient to survive.

Looking in more detail at the dimensions on which the strategies were developed (see Section 3.4.2) some of the differentiating factors described above were to be foreseen. If one looks for example at the variables that together constituted the external environmental factor "increasing access" ("participation in higher education", "focus on lifelong learners" and "focus on international students") the results of the empirical analyses indeed showed that higher education institutions with a worldcampus strategy focus more than the back-to-basics strategy group on the working professionals (life long learners), who have high requirements on flexibility. These students wish to study wherever and whenever they want, as they usually cannot come to campus during daytime (because of their job or family commitments).

However, this does not mean that higher education institutions with a worldcampus strategy overlook their "traditional, 18-24 years old students". The empirical results of this study showed that, like the back-to-basics strategy group, also the worldcampus strategy groups' main focus is still the "traditional, 18-24 years old students": a group of students that was, still is and will be the main important student market for higher education institutions for the coming years (according to the respondents). It is often argued that this is a group of students that has grown up with technology and that thus expects that technology makes their lives easier and more convenient, also in higher education. However, as Oblinger and Hawkins (2005) argue "the assumption that students want more technology may not be valid: especially younger students are less satisfied with complete on-line learning than older students. The reason appears to tie to their expectation of being in a face-to-face, social environment" (p.15). This view is also underlined by Zemsky and Massy (2004) who argue that "students do want to connect, but principally to one another; they want to be entertained, principally by games, music and movies; and they want to present themselves and their work. E-Learning at its best is seen as a convenience and at its worst as a distraction – what one student called "the fairy tale of e-Learning" (p.III). So, also for the worldcampus strategy group one can see that on-campus delivery in a face-to-face setting is still of importance, but in combination with more flexibility by which education is offered anywhere, anytime, anyplace.

The first internal environmental factor "offering logistical flexibility" was formed by three variables: "time and place independent learning", "individualization for different student characteristics" and "ICT related policy is affected by students' demand for flexibility in locations of learning". The results of the empirical analysis indeed showed that differences between institutions with respect to increasing flexibility for offering education were found. However, the difference in flexibility offered did not focus on new or different pedagogical approaches to learning, but foremost to offer flexibility for students in where and when to study; both on- and off-campus. This seems to be in contrast, or at least not to subscribe certain approaches to e-Learning in which institutions emphasize that using it will lead to new ways of learning from a pedagogical point of view. It rather seems to emphasize that students (both traditional and new target groups) demand more for practical types of flexibility (time and place) as to be able to combine studying with their other activities.

The other internal contingency factor showing the differences between the back-to-basics and worldcampus strategy group is the "use of ICT for income generation". On the basis of the dimensions on which the scenarios were based, one would expect that the worldcampus strategy group's focus is on the use of more advanced technologies. The empirical results showed that this is indeed the case.

The worldcampus strategy group applies more advanced technology, but also on this side, the focus, however, is not aimed at using this so much for educational purposes. Looking at the variables that together constituted this factor (advanced technology for: externally and internally funded research, innovation in teaching and learning and interaction with business and industry) one can see that advanced technology within the worldcampus strategy group is rather used for income generation.

All together one can argue that higher education institutions with a worldcampus strategy are more focused on increasing access, in particular for new target groups such as lifelong learners, who demand flexible learning opportunities and that they do so in order to generate more income. Integrating e-Learning in their education delivery and support processes is thus their way to survive in an increasingly competitive environment. E-Learning enables them to reach out to new markets in order to generate revenue streams other than governmental funding. In this respect they can said to be "entrepreneurial", i.e. they aim to diversify their funding base (Clark, 1998).

7.3.2 Theoretical framework

For this study an exploratory contingency model was developed that was used to describe the possible relationships between external and internal contingencies and strategic choices of higher education institutions with respect to integrating e-Learning in their educational delivery and support processes. This model was based on the main premises of the contingency theory and environmental school of strategy formation. As explained in Chapter Two and Three, many different studies about the relationship between an organisation and its environment were conducted (e.g. Burns and Stalker (1961), Miller (1992), Peterson (1997)). However, in many of these studies the operationalisation of the environment can in most cases best be classified as abstract or vague. The above authors argue for example about an environment that becomes more uncertain, more turbulent, more complex or more unstable, without indicating how these concepts could empirically be measured. By developing a contingency model in which indicators were found that were used for empirically testing the environment, this thesis tried to further explore, expand and operationalise the term external and internal environment.

Not only these abstract and vague concepts about the environment were further operationalised in this study, but they were also operationalised with respect to the field of higher education. This study showed on the basis of a literature research that the external environment could be operationalised into the following four main categories: technology, demography, government and economy. With respect to the internal environment, three categories (or so-called contingencies) were found: institutional governance, institutional profile and institutional technology. Although many authors in the field of higher education agreed upon the categorisation as used in this thesis (e.g. Wills and Yetton, 1997, Bates, 1999, Sporn, 1999, Fisser, 2001, Middlehurst, 2003 and Van der Wende and van der Ven, 2003) not so much empirical research was carried out to explore whether the variables used for operationalising actually influenced strategic choices of higher education institutions. The results of this study showed that with respect to integrating e-Learning in a higher educations' educational delivery and support processes some of the above mentioned (aggregated) factors were indeed of influence on strategic choices of higher education institutions (when comparing the back-to-basics and the worldcampus strategy group); the external contingency "increasing access" and two internal contingencies: "offering logistic flexibility" and "the use of ICT for income generation".

Furthermore, the policy domain of this thesis, e-Learning, has been a policy domain that for years was characterized by activities initiated by pioneers, and bottom-up developments, rather than by institution-wide implementations. However, with the change from bottom-up decentralised policies towards more centralised, institution-wide policies, the need for a more strategic orientation arises. Especially as both the external and internal environment of higher education institutions is changing rapidly and higher education institutions have to find ways to respond. The results of this thesis add to a small, but growing number of studies in which the focus is on strategic choices with respect to e-Learning, a field that, according to the OECD (2005), can be characterised by rare examples of quantitative international surveys.

7.3.3 Implications for higher education institutions

The results from the regression analysis showed that higher education institutions with a worldcampus strategy (compared to higher education institutions with a back-to-basics strategy) are more inclined to focus on "offering logistical flexibility", on "the use of ICT for income generation" and on "increasing access". However, the grouping of higher education institutions into the three strategy groups (see Section 5.3) showed that there are not yet that many higher education institutions that perceive such a strategy as being the typical strategy of their institution. Most institutions can (still) be characterised as having a back-to-basics strategy.

The question then is, whether it is necessary for higher education institutions to move from a back-to-basics strategy towards a more worldcampus strategy?

During the last two decades the environment in which higher education institutions have to operate has been changing. One way of dealing with this changing environment is the (institution-wide) integration of e-Learning in higher education's educational delivery and support processes. By doing so, higher education institutions are supposed to be better equipped for surviving this changing environment. Not only because of the general societal trend towards using more technology in daily live but foremost because of an increasing competition for both funding and (related to this) for students. In many countries one can already see a rapidly decreasing per capita public funding of the higher education sector. This is accompanied by many nations' governmental aims for increasing the higher education participation rate. National governments in for example Finland, the Netherlands, Sweden and the United Kingdom aim for a higher education's participation rate of 50% by the year 2010 (Onderwijsraad, 2005). This means that the search for new revenue streams can be combined with the search for new student markets, for example lifelong learners.

Many lifelong learners can be characterised as earner-learners; their main daily activity is a full-time job. In addition, their employers and/or the lifelong learners themselves want to upgrade their competences. Very often lifelong learners do not have time to come to campus to follow traditional classroom-oriented education. By using e-Learning, education can be offered in more flexible ways, so that this type of learners can stay at home or at their workplace to study instead of travelling to the institution. Next to the relevance of lifelong learners, e-Learning can also be used to offer higher education to international students, who can be charged relatively high tuition rates. For example Douglas (2005) argues that it becomes more and more politically acceptable to use international student fees to subsidise the cost of domestic students. Besides lifelong learners and international students, also the "traditional, 18-24 years old" students must not be overlooked (see also Section 7.3.1). The future traditional students will probably be the same 18-24 years on-campus students as we have today, however already many of these students can be characterised as learner-earners and their number will only grow the coming years. The learner-earners are students who combine their study with a part-time job. A job that in many cases has to be fulfilled during day-time, a time in which also the classroom activities are concentrated. By offering more flexible ways of delivering education (such as podcasting, video-streaming classroom lecturers, offering virtual group space, etc.) these students can find their own time, pace and location for studying.

Furthermore, as was described in Chapter One, for e-Learning being completely institutionalised, three stages are important: 1) it is necessary to establish an institution-wide technological infrastructure, 2) make rich pedagogical use of this infrastructure and 3) develop strategic plans to use ICT with a view to different target groups (Collis and Van der Wende, 2002). The results of this study showed that the worldcampus strategy group of higher education institutions already are in the third stage; their focus is oriented on (new) student markets, on offering flexibility and on revenue generating. It can be concluded that this group, compared to especially the back-to-basics strategy group, already identified new target groups that can be reached trough the use of technology. This identification of new student markets and changing needs and expectations, is considered to be a key step in developing an e-Learning strategy by Bates (2000), as was described in Chapter One. However, the focus on new target groups, to be reached by e-Learning, is not the only element in developing an e-Learning strategy. They for example also have to define a vision for teaching and learning and where technology fits within that vision, define appropriate programmes for the new target groups, identify areas outside the department, faculty or institution and determine the support that is necessary for technology-based teaching (Bates, 2000).

Based on the above, it can be argued that higher education institutions should seriously consider to focus on a worldcampus strategy: the environment of higher education institutions will become more competitive, both for funding and (related to this) for new students groups as lifelong learners as well as traditional 18-24 years old students. But how to move from a back-to-basics strategy towards a more worldcampus strategy? What kind of strategy formation process higher education institutions can apply?

7.3.4 From a back-to-basics to a worldcampus strategy?

As described before, this study was based on an exploratory contingency model, used to describe the possible relationships between external and internal contingencies and strategic choices of higher education institutions with respect to integrating e-Learning in their educational delivery and support processes. In Section 7.2.3 it was described that, contrary to what was expected, not all operationalised characteristics and variables were of influence on higher education's strategic choices. This is interesting; especially with respect to the institutional governance contingencies that are, according to a lot of management and organisation literature, expected to relate or influence strategy: leadership, management and administration.

For this, two possible explanations can be seen: 1) either there is no relationship, or 2) there is a relationship, but this could not be looked at in more detail because of the way the variables were measured (ordinal or nominal). The latter one could be the case, because as one looks at the basic empirical results (mean and SD) as described in Chapter five (more specifically *Table 5-12 to Table 5-19*) one can notice that, when comparing mean scores and standard deviations, it appeared that differences between the worldcampus and back-to-basics strategies were seen: the worldcampus strategy can be characterised by a more centralized-decentralisation governance structure, in which there is hardly any real top-down steering as well as top-down policy. Contrary, the back-to-basics strategy can be characterised by more central steering and formal responsibility at the top of the institution. With respect to implementation of ICT-policy, the back-to-basics strategy group indicated that the individual professor was still the most important actor, while, here again, in the worldcampus strategy group the deans and head of departments were seen as most important.

On the basis of the data and argument above one could therefore hypothesise that for moving from a back-to-basics strategy to a worldcampus strategy, a "centralised decentralisation" steering, based on consultative procedures with the decentralised middle management (such as deans or head of departments) is the preferred way of internal decision-making.

7.4 To conclude

Looking back at the main research question of this thesis "how do higher education institutions differ in their strategic choices with respect to integrating e-Learning into their educational delivery processes and how can these differences be explained?" the results of this study showed that higher education institutions that prefer a worldcampus strategy, considerable enhance the flexibility in delivery of education by using e-Learning. They do so because they aim for increasing access, i.e. for attracting more students and in this way generate more income. By doing so, it is expected that these higher education institutions are better prepared to respond to an environment that is becoming increasingly more market-oriented and competitive. An environment in which it is expected that higher education institutions have to compete for students in order to generate more and diversified revenue streams to fund their primary and secondary processes. As already can be seen in different countries (e.g. Australia) governmental funding is declining. This means that higher education institutions have to find additional ways to generate income. By focusing on new student demands, such as lifelong learners, as well as on using e-Learning to offer education to this new group of students as well as to the traditional 18-24 years old students, higher education institutions can increase their income and by doing so, are expected to have a better chance to survive the coming decades.

8 Samenvatting

8.1 Inleiding

Binnen veel hoger onderwijsinstellingen is de ontwikkeling en implementatie van e-Learning de laatste jaren steeds belangrijker geworden. Het gebruik van een grote hoeveelheid e-Learning instrumenten (bijvoorbeeld het gebruik van e-mail of een digitaal portfolio) heeft bij veel hoger onderwijsinstellingen geleid tot veranderingen, met name op het gebied van het aanbieden van het onderwijs. Maar wat wordt eigenlijk onder e-Learning verstaan? In dit proefschrift is uitgegaan van de volgende definitie: "e-Learning richt zich op het gebruik van informatie en communicatie technieken (ICT) om zowel het on-line als ook het on-campus onderwijs te verbeteren en/of te ondersteunen door middel van het vergemakkelijken van de toegang tot hulpbronnen en diensten en door uitwisseling en samenwerking op afstand" (OECD, 2005).

Tegelijkertijd met de opkomst van e-Learning is ook de omgeving van hoger onderwijsinstellingen de laatste 20 jaar veranderd. Te denken valt aan de invloed van economische, demografische en politieke factoren die ervoor gezorgd hebben dat de vrijwel stabiele omgeving waarin hoger onderwijstellingen zich bevonden aan veranderingen onderhevig is. Eén van de belangrijkste veranderingen is dat de omgeving veel competitiever is geworden, waardoor hoger onderwijsinstellingen zich veel meer dan voorheen moeten profileren om zo studenten binnen hun onderwijspoorten te krijgen. Om in een dergelijke omgeving te overleven, is het van belang om e-Learning strategisch in te zetten; door een systematischer gebruik van e-Learning dat zich met name richt op de ondersteunende processen om onderwijs aan te bieden kunnen hoger onderwijsinstellingen meerdere doelgroepen bereiken en faciliteren. Doelgroepen die zich in toenemende mate aan het differentiëren zijn; niet alleen de traditionele 18-24 jarige student dient op deze wijze bediend te worden, maar ook de nieuwe doelgroepen zoals levenlang lerenden en internationale studenten. De vraag is of hoger onderwijsinstellingen zulke strategische keuzes maken en zo ja, op welke manier? En is het zo dat hoger onderwijsinstellingen, door de invloed van externe en interne omgevingsfactoren, verschillende keuzes maken?

8.2 Onderzoeksvragen, theorie en conceptueel model

Bovenstaande heeft geleid tot de volgende probleemstelling:

Hoe verschillen hoger onderwijsinstellingen in hun strategische keuzes met betrekking tot de integratie van e-Learning in hun onderwijsleerproces en ondersteunende processen en hoe kunnen deze verschillen worden verklaard?

De onderzoeksvragen zijn:

1. Welke strategieën zijn er?
2. Wat zijn de verschillen tussen hoger onderwijsinstellingen met betrekking tot hun strategische keuzes?
3. Welke interne en externe omgevingsfactoren bepalen deze verschillen?

Theorie

Om de verschillen tussen hoger onderwijsinstellingen te verklaren is gebruik gemaakt van de veronderstellingen van de contingentie theorie. De contingentie theorie gaat ervan uit dat organisaties op zowel hun externe als interne omgeving moeten reageren om te overleven. Vanuit dit perspectief wordt het voortbestaan van een organisatie enerzijds bepaald door de mogelijkheden van organisaties om te reageren op externe omgevingsfactoren en anderzijds door hun reactie op interne (organisatorische) omgevingsfactoren.

De basisveronderstelling van de contingentie theorie is dat door inzicht te krijgen in de context van een organisatie (de omgeving) de activiteiten en structuren van een organisatie beter kunnen worden begrepen. Dit veronderstelt dat reacties van organisaties op externe en interne omgevingsfactoren tot op zekere hoogte voorspeld kunnen worden doordat organisaties zich ervan bewust zijn welke van deze externe en interne omgevingsfactoren van invloed zijn op de organisatie. Dit is ook de focus van de *environmental school of strategy formation*. Verder hebben zowel de contingentie theorie als de *environmental school of strategy formation* een sterke focus op re-actieve processen van organisaties op hun omgeving.

Op basis van bovenstaande basisveronderstelling is een conceptueel raamwerk voor dit proefschrift ontwikkeld. De achterliggende gedachte is dat de reacties van hoger onderwijsinstellingen met betrekking tot de integratie van e-Learning in hun onderwijsleerproces en ondersteunende processen kunnen worden bepaald door zowel externe als interne omgevingsfactoren.

8.3 Operationalisering en methodologie

De onafhankelijke variabelen hebben betrekking op de externe en interne omgevingsfactoren en de afhankelijke variabele heeft betrekking op de strategische keuze die hoger onderwijsinstellingen maken. Deze variabelen zijn verder geoperationaliseerd, waarvan hieronder een korte samenvatting is gegeven.

Onafhankelijke variabelen

Voor zowel de externe als de interne omgevingsfactoren is op basis van een uitgebreid literatuuronderzoek een aantal hoofdfactoren naar voren gekomen:

De externe omgevingsfactoren zijn:

- technische factoren
- demografische factoren
- economische factoren
- politieke (overheids) factoren

De interne omgevingsfactoren zijn:

- interne bestuursstructuren
- instellingstechnologie
- instellingsprofiel

De bovenstaande factoren zijn op basis van een uitgebreid literatuuronderzoek verder geoperationaliseerd en uitgewerkt in te meten variabelen.

Afhankelijke variabele
De afhankelijke variabele is gebaseerd op een scenario studie van Collis en Gommer (2001). Collis en Gommer hebben op basis van twee dimensies (on-campus versus afstandsonderwijs en collectief versus individueel aanbieden van onderwijs) de onderstaande vier scenario's ontwikkeld:

- back-to-basics
- stretching-the-mould
- global campus
- new economy

8.4 Empirische resultaten

De meeste data voor dit proefschrift zijn afkomstig van een eerder uitgevoerd onderzoek naar het strategisch gebruik van e-Learning in het hoger onderwijs (Collis en Van der Wende, 2002). De, van 693 individuele respondenten afkomstige data uit dit onderzoek, zijn voor dit proefschrift geaggregeerd naar 91 hoger onderwijsinstellingen. Daarnaast is aanvullende informatie verzameld via literatuur- en webgebaseerd onderzoek en is gebruik gemaakt van zowel de CHEPS Hoger Onderwijs Monitor als databases van de OECD. Voor het verwerken van deze informatie is gebruikt gemaakt van verschillende statistische technieken: one-way ANOVA, chi-square testen en correlatie,- factor, - en regressie analyses. Aan de hand van de onderzoeksvragen, zijn de uitkomsten van deze statistische testen hieronder beschreven.

8.4.1 Onderzoeksvraag 1: Welke strategieën zijn er?

Om onderzoeksvraag 1 "Welke strategieën zijn er" te beantwoorden is een correlatie analyse uitgevoerd om na te gaan in hoeverre de vier waarden van de afhankelijke variabele (de strategieën) onafhankelijk van elkaar zijn.

Uit deze correlatie analyse is naar voren gekomen dat de back-to-basics strategie de enige strategie is die onafhankelijk (geen correlatie) is van de andere drie strategieën. De correlatie resultaten geven aan dat de overige drie strategieën met elkaar correleren; dit betekent dat óf deze variabelen weggelaten kunnen worden of dat twee óf meer variabelen met elkaar samengevoegd kunnen worden. Om te kijken of dit mogelijk was, zijn de gemiddelde scores en de verdeling van de scores van de respondenten met elkaar vergeleken. De uitkomsten hebben laten zien dat de twee strategieën global campus en new economy min of meer dezelfde verdeling hebben. Om deze reden en omdat deze twee strategieën met elkaar correleren kunnen ze (statistisch gezien) worden samengevoegd in een "nieuwe" strategie: de worldcampus strategie. Na samenvoeging van deze twee strategieën is opnieuw gekeken naar de correlatie met de stretching-the-mould strategie. De statistische resultaten hebben opgeleverd dat door samenvoeging van de twee strategieën er nu wel sprake is van onafhankelijkheid met de stretching-the-mould strategie. Het antwoord op onderzoeksvraag 1 is dan ook dat er drie strategieën zijn te onderscheiden: de back-to-basics strategie, de stretching-the-mould strategie en de worldcampus strategie.

8.4.2 Onderzoeksvraag 2: Wat zijn de verschillen tussen hoger onderwijsinstellingen met betrekking tot hun strategische keuzes?

Om te verkennen of er verschillen zijn tussen hoger onderwijsinstellingen, zijn op basis van de scores van de 91 hoger onderwijsinstellingen de volgende drie groepen instellingen samengesteld:

- een groep instellingen met een overwegende back-to-basics strategie (N=43)
- een groep instellingen met een overwegende stretching-the-mould strategie (N=22)
- een groep instellingen met een overwegende worldcampus strategie (N=26).

Om de verschillen tussen deze drie groepen hoger onderwijsinstellingen met betrekking tot hun strategische keuzes voor de integratie van e-Learning in hun onderwijsleerproces en ondersteunende processen te verkennen, is gekeken naar de relatie tussen de onafhankelijke variabelen (de externe en interne omgevingsfactoren) en de afhankelijke variabele (de drie strategieën). Hiervoor is gebruik gemaakt van one-way ANOVA testen (voor de variabelen gemeten op interval niveau) en chi-square testen (voor de variabelen gemeten op ordinaal of nominaal niveau).

Er is een aantal conclusies te trekken. Ten eerste richten de meeste statistisch significante verschillen tussen hoger onderwijsinstellingen zich op die instellingen met een back-to-basisc strategie en een worldcampus strategie.

De statistisch significante verschillen tussen de back-to-basics en stretching-the-mould strategie groepen zijn minder prominent aanwezig . Hetzelfde geldt voor de statistisch significante verschillen tussen de stretching-the-mould en worldcampus strategie groepen: ook hier zijn wel enkele verschillen, maar minder prominent dan de verschillen tussen de back-to-basics en worldcampus groep. De meest in het oog springende statistisch significante verschillen tussen deze twee strategieën zijn hieronder opgesomd.

Statistisch significante variabelen
Met betrekking tot de invloed van de externe omgevingsfactoren bevatten alle vier de externe contingenties (technologie, demografie, politiek en economie) variabelen die van invloed zijn op het verschil tussen een back-to-basics en een worldcampus strategie.

- Voor de externe omgevingsfactor technologie is dit de variabele "het aantal PC's per hoofd van de bevolking" .
- Voor de externe omgevingsfactor demografie zijn dit de variabelen "participatiegraad" en "levenlang lerenden".
- Voor de externe omgevingsfactor politiek/overheid is dit de variabele "invloed van een nationale actor op het ICT beleid van een hoger onderwijsinstelling".
- En voor de externe omgevingsfactor economie zijn dit wat betreft de overheidsuitgaven de variabelen "percentage van de uitgaven aan GDP besteed aan onderwijs" en "percentage van het onderwijsbudget dat is besteed aan het hoger onderwijs" en wat betreft competitie/samenwerking is dit de variabele "samenwerking met internationale hoger onderwijsinstellingen".

Met betrekking tot de interne omgevingsfactoren kan uit de statistische analyses geconcludeerd worden dat twee van de drie interne omgevingsfactoren (instellingsprofiel en instellingstechnologie) variabelen bevatten die van invloed zijn op het verschil tussen een back-to-basics en een worldcampus strategie.

- Voor de interne omgevingsfactor instellingsprofiel zijn dit de variabelen "missie", "wijze van onderwijs aanbieden", "instellingsbeleid", "verschil in perceptie tussen huidige en toekomstige wijze van onderwijs aanbieden" en "verschil in perceptie tussen huidig en toekomstig instellingsbeleid".
- Voor de interne omgevingsfactor instellingstechnologie bevatten alle hoofdfactoren die zijn gebruikt voor de operationalisering (infrastructuur, soorten technologie en onderwijsmethoden) variabelen die het verschil aangeven tussen een back-to-basics en een worldcampus strategie.

Niet significante variabelen
Zoals hierboven is beschreven bevatten veel van de voor de operationalisering gebruikte factoren variabelen die statistisch significant verschillen tussen de back-to-basics en worldcampus strategie groepen. Het is echter ook interessant om te kijken welke variabelen juist geen verschil aangeven tussen deze twee groepen. Het betreft hier met name variabelen die zijn gebruikt voor het meten van de interne omgevingsfactor interne bestuursstructuren (gericht op leiderschap, management en administratie/implementatie) en op een gedeelte van de factoren die zijn gebruikt voor de operationalisering van de interne omgevingsfactor instellingsprofiel; type instelling, leeftijd, grootte, type programma en locatie. Deze resultaten worden verder bediscussieerd in de paragraaf over reflectie.

8.4.3 Onderzoeksvraag 3: Welke interne en externe omgevingsfactoren bepalen deze verschillen?

Het verkregen overzicht van de statistisch significante variabelen die het verschil tussen twee groepen hoger onderwijsinstellingen met betrekking tot de door hun gekozen strategie aangeven, zegt echter niet zoveel over de richting of het patroon van dit verschil. Om de derde onderzoeksvraag dan ook te beantwoorden is een regressie analyse uitgevoerd. Echter, doordat het aantal statistisch significante variabelen in relatie tot de onderzoekspopulatie veel te groot was (stelregel is 1 : 4) is eerst door middel van een factor analyse het aantal variabelen verminderd door bij elkaar passende (dus correlerende) variabelen samen te voegen. Op deze manier zijn nieuwe, uit verschillende variabelen bestaande, factoren geconstrueerd

Op basis van de regressieresultaten kan geconcludeerd worden dat er één externe factor “focus op verhoging van de instroom” en twee interne factoren “flexibel onderwijs aanbieden” en “ICT gebruik ten behoeve van inkomstengeneratie” het verschil tussen hoger onderwijsinstellingen met een back-to-basics en een worldcampus strategie bepalen. Hoger onderwijsinstellingen die zich dus meer focussen op verhoging van de instroom, waarbij ze tevens ICT gebruiken om hun onderwijs flexibel aan te bieden om zo meer inkomsten te genereren, kiezen dus eerder voor een worldcampus strategie dan een back-to-basics strategie.

8.5 Reflectie
Uit bovenstaande is af te leiden dat de meeste verschillen tussen groepen hoger onderwijsinstellingen zijn waar te nemen tussen die instellingen die kiezen voor een back-to-basics of een worldcampus strategie. Dit is ook wel te verklaren, omdat de stretching-the-mould strategie qua positionering geplaatst kan worden tussen de beide andere strategieën.

Instellingen met een back-to-basics strategie zijn zich minder bewust van de veranderingen die plaatsvinden in de omgeving. Dit betekent dat deze instellingen zich minder vaak en vaak niet expliciet richten op de integratie van e-Learning in hun onderwijsleer- en faciliterende processen. Ook de stretching-the-mould strategie is meestal niet gepland, maar, in tegenstelling tot de instellingen met een back-to-basics strategie, spelen instellingen met een stretching-the-mould strategie wel in op veranderingen in hun omgeving. De stretching-the-mould strategie is vaak een reactie op maatschappelijke trends, zoals individualisering, kennissamenleving en de opkomst van nieuwe technologie.

De stretching-the-mould strategie is dan ook meer een evolutionair dan een revolutionair proces; stapje voor stapje, geregeerd door maatschappelijke ontwikkelingen, maar niet het resultaat van een weloverwogen doordachte strategie.

Daarentegen kan gesteld worden dat hoger onderwijsinstellingen met een worldcampus strategie zich vaker en beter bewust zijn van het feit dat de omgeving van de instelling is veranderd. Deze hoger onderwijsinstellingen zijn zich er van bewust dat er sprake is van toenemende concurrentie; concurrentie die vooral is gericht op het binnenhalen van studenten om zo meer inkomsten te genereren. Hoger onderwijsinstellingen met een worldcampus strategie zijn zich er van bewust dat juist door de inzet van e-Learning het aanbieden van hoger onderwijs voor nieuwe groepen studenten aantrekkelijk kan worden gemaakt. Juist door de inzet van e-Learning kan onderwijs voor deze nieuwe doelgroepen flexibel worden aangeboden. Deze studenten hebben behoefte aan het “any time, any where” onderwijsprincipe, zodat ze in hun eigen tempo en onafhankelijk van de hoger onderwijsinstelling kunnen studeren. Hoger onderwijsinstellingen met een worldcampus strategie zijn zich er beter van bewust dat door het aantrekken van nieuwe groepen studenten ze meer inkomsten kunnen genereren. Door zich te richten op nieuwe doelgroepen als levenlang lerenden en internationale studenten kunnen instellingen hogere collegegelden vragen en op deze wijze hun inkomsten verhogen. Door de strategische inzet van e-Learning kunnen instellingen zich beter positioneren in een steeds heftiger concurrerender omgeving waarin, om te overleven, de verhoging van de instroom van het aantal studenten steeds belangrijker zal worden.

Echter, bovenstaande betekent niet automatisch dat hoger onderwijsinstellingen met een worldcampus strategie zich niet meer zouden (moeten) richten op de traditionele, 18-24 jarige studenten. Integendeel, de resultaten van dit proefschrift tonen aan dat ook de worldcampus hoger onderwijsinstellingen zich er terdege van bewust zijn dat het juist deze doelgroep is die ze blijvend moeten bedienen.

Het onderwijs kan daarentegen wel flexibeler worden aangeboden, alhoewel er de laatste tijd alweer tegengeluiden zijn te horen die aangeven dat studenten dan wel opgegroeid zijn met de laatste innovatieve en technologische toepassingen, maar dat het helemaal nog niet zo zeker is dat ze de toepassingen hiervan ook in hun onderwijs verwachten. De nabije toekomst zal ons hierover meer informatie verschaffen: de "Net generation" staat namelijk aan de vooravond van hun instroom in het hoger onderwijs en de vraag is of hoger onderwijsinstellingen gereed zijn om deze doelgroep goed te bedienen. De resultaten van dit proefschrift laten zien dat met betrekking tot flexibiliteit het in de eerste plaats gaat om het flexibel aanbieden van onderwijs en niet zozeer om het onderwijs "an sich" te veranderen of te innoveren.

8.6 Conclusie

Concluderend kan gezegd worden dat hoger onderwijsinstellingen met een worldcampus strategie zich meer focussen op het verhogen van de instroom, speciaal gericht op nieuwe doelgroepen die ervan uitgaan dat onderwijs flexibel wordt aangeboden. Dit doen ze om meer inkomsten te genereren. Gezegd kan worden dat juist deze hoger onderwijsinstellingen meer oog voor de veranderingen in hun omgeving hebben; steeds meer zien we dat de overheidsfinanciering voor hoger onderwijsinstellingen minder wordt en dat instellingen op andere manieren inkomsten moeten genereren. Door zich te richten op een hogere instroom, die in veel gevallen ook een hoger collegegeld moeten betalen, en door het gebruik van e-Learning kan men andere doelgroepen bereiken en dus inkomsten genereren

8.7 Implicaties voor hoger onderwijsinstellingen

De focus op nieuwe doelgroepen, het flexibel aanbieden van onderwijs en op deze wijze genereren van inkomsten geeft het verschil tussen hoger onderwijsinstellingen aan. Echter, de statistische resultaten van dit proefschrift hebben laten zien dat nog niet veel instellingen zich bewust zijn van deze nieuwe doelgroepen. Scores van respondenten (op een schaal van 1-5) op de keuze voor een worldcampus strategie beperkten zich vaak tot een 3 of 4. De vraag is dan ook of hoger onderwijsinstellingen zich moeten gaan focussen op een worldcampus strategie en zo ja, hoe?

De resultaten van dit proefschrift laten zien dat hoger onderwijsinstellingen zich bevinden in een steeds competitiever wordende omgeving. Dus, ja, om inkomsten te genereren en om op deze wijze de participatiegraad in het hoger onderwijs te verhogen (meer studenten, betekent meer inkomsten voor hoger onderwijsinstellingen) is er wat voor te zeggen dat hoger onderwijsinstellingen zich gaan richten op nieuwe doelgroepen, zoals bij een worldcampus strategie. De levenlang lerenden zijn zo'n nieuwe doelgroep die uitermate geschikt is om in te stromen in het hoger onderwijs.

Niet alleen de overheid, maar ook het bedrijfsleven is zich ervan bewust dat, om de omslag van een productie- naar een kenniseconomie te maken, er sprake moet zijn van werknemers die zich in zo'n kenniseconomie goed staande kunnen houden. Werknemers die zich dus moeten laten om-of bijscholen om zo aan de groeiende behoefte aan kenniswerkers tegemoet te komen. Het zijn vaak de "earner-learners" die zich in deze groep bevinden. Een groep waaraan juist door middel van e-Learning onderwijs flexibel kan worden aangeboden. Ditzelfde geldt voor de groeiende groep van "learner-earners"; traditionele, 18-24 jarige studenten, die doordat ze vaak een part-time baan met hun schoolcarrière combineren, behoefte hebben aan flexibel aangeboden onderwijs, dat ze in hun eigen tempo en onafhankelijk van de instelling zichzelf eigen kunnen maken.

Dus ja, om te overleven in een steeds competitiever wordende omgeving is het voor die instellingen die hun instroom willen vergroten en meer inkomsten willen genereren, een overweging waard om na te gaan hoe e-Learning in hun onderwijsleer- en faciliterende processen geïntegreerd kan worden om flexibel onderwijs aan te bieden aan nieuwe en bestaande (18-24 jarigen) doelgroepen.

Hiervoor is echter meer nodig dan alleen de focus op nieuwe doelgroepen en het flexibel aanbieden van onderwijs. De interne bestuursstructuur en managementverhoudingen binnen hoger onderwijsinstellingen zijn zeker factoren om rekening mee te houden. Deze factoren zijn in dit onderzoek opgenomen als nominale factoren, waardoor de individuele relatie tussen de verschillende variabelen en de keuze voor een strategie niet gemeten kon worden. Echter als gekeken wordt naar de individuele empirische resultaten van deze nominaal gemeten variabelen dan valt op dat de worldcampus strategie groep van hoger onderwijsinstellingen gekarakteriseerd wordt door een gecentraliseerde-decentrale bestuursstructuur waarin bijna geen top-down sturing of beleid in de instelling aanwezig is; veel wordt uitgewerkt en valt onder de verantwoordelijkheid van het midden management (bijvoorbeeld de decaan). Dit in tegenstelling tot de hoger onderwijsinstellingen uit de back-to-basics strategie groep. Deze instellingen worden gekenmerkt door centrale sturing en verantwoordelijkheden bij de top van de instelling. Met betrekking tot de implementatie van e-Learning wordt in deze instellingen de individuele professor als belangrijkste actor aangewezen, terwijl bij de worldcampus strategie groep van hoger onderwijsinstellingen dit opnieuw het middenmanagement is.

Dit leidt tot de volgende hypothese: om van een back-to-basics strategie naar een worldcampus strategie te komen, moet sprake zijn van een gecentraliseerde-decentrale sturing, gebaseerd op interacties met en consultaties tussen de verschillende bestuurslagen binnen de instelling, vooral gericht op het middenmanagement.

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10 Appendix 1: Questionnaire

Survey for decision makers

This questionnaire is intended for anyone involved in decision making relating to ICT and change in a higher education institution. The questionnaire consists of 48 questions, organised into nine sections. It takes on an average about 20 minutes to fill in the questionnaire. When you are finished with the questionnaire and push "Submit" you will see your answers as submitted in our database. Server "time outs"

Many computers have a function that automatically breaks the internet connection when you stay on one web page for a longer time. If this happens when you are filling out the questionnaire, your answers will not be received, and you will not get an error message. In order to avoid this happening, we suggest that you may want to work "offline":

1. go to the menu "file" and click on "Work Offline"
2. fill in the questionnaire
3. at the end of the questionnaire (but before clicking the "submit" button), go to the menu "file" and click a second time on "Work Offline"
4. click on the "submit" button.

Personal data

Please fill in the name of your institution:
……

Indicate the city and country of your institution:
……

What is your position within your institution?:

☐ Central-level decision maker (member of executive board, rector, (vice) president, vice chancellor, etc.)
☐ Dean of faculty
☐ Head of school / institute / department
☐ Support or advisor to decision makers
☐ Other, namely:

Please fill in the name of the faculty or unit in which you are working:
……

Mission and general ICT aspects

1: Indicate in your view how important the following aspects are in the mission (statement) of your institution:

	low		Moderate		high
Teaching 18-24 year old students	☐	☐	☐	☐	☐
Providing continuing education (or "lifelong learning") to persons in the workforce	☐	☐	☐	☐	☐
Teaching international students	☐	☐	☐	☐	☐
Innovation in teaching and learning	☐	☐	☐	☐	☐
Internally funded research	☐	☐	☐	☐	☐
Externally funded research	☐	☐	☐	☐	☐
Interaction with business and industry	☐	☐	☐	☐	☐

2: In your view, to what extent do the following aspects contribute to good education in your institution?

Face to face contact	Very little		Some		Very much
Appropriate use of ICT for teaching and learning support	☐	☐	☐	☐	☐
Individualisation for different student characteristics	☐	☐	☐	☐	☐
Time and place independent learning	☐	☐	☐	☐	☐
Communication among students	☐	☐	☐	☐	☐
Pedagogy related to groupwork	☐	☐	☐	☐	☐
Contact with the instructor when needed by the students	☐	☐	☐	☐	☐

3. In your opinion, what is the current balance in your institution between "face-to-face" and "via the Internet" with respect to administrative procedures for students?	only face-to-face		balanced, both in use		only via the Internet
	☐	☐	☐	☐	☐

4: To what extent do you consider your institution as being successful with regard to the overall use of ICT?	Weak		Average		Strong
	☐	☐	☐	☐	☐

5: What is your impression of the percentage of your institution's annual budget that is spent on ICT?	<1%	1-5%	5-10%	10-15%	>15%
	☐	☐	☐	☐	☐

Policy and leadership processes

6. Which group of actors has the primary formal responsibility for the ICT-related policy in your institution (including decisions on budget expenditures)?

☐ Rector, (vice) president, executive board
☐ Dean of faculty
☐ Head of school / institute / department
☐ Support centre for ICT
☐ Other, namely:
……

7: Which of the following best describes the formally stated policy with respect to ICT in your institution?
☐ There is none
☐ Perhaps there is policy but I am not aware of it
☐ Bottom-up: faculty or department-level policies with no link to institutional-level decision-making
☐ Combined: institutional-wide policy serving as a framework for faculty-specific plans
☐ Top-down: institutional-wide policy to be implemented in all faculties

8: To what extent is each of the following an objective of ICT-related policy in your institution?

	None/low		Moderate		high
Increasing efficiency	☐	☐	☐	☐	☐
Enhancing the quality of teaching and learning	☐	☐	☐	☐	☐
Enhancing flexibility	☐	☐	☐	☐	☐
Enhancing cost-effectiveness	☐	☐	☐	☐	☐
Generating institutional income	☐	☐	☐	☐	☐
Creating more opportunities for continuing education (lifelong) learners	☐	☐	☐	☐	☐
Creating more opportunities for international students	☐	☐	☐	☐	☐
Widening access to the traditional (18-24 year-old) student base	☐	☐	☐	☐	☐
Enhancing competitiveness	☐	☐	☐	☐	☐
Enhancing the status and reputation of the institution	☐	☐	☐	☐	☐

9: Which of the following groups of actors do you consider of most importance with respect to the ongoing implementation of the ICT-related policy in your institution?

☐ Rector, (vice) president, executive board
☐ Dean of faculty
☐ Head of school / institute / department
☐ Support centre for ICT
☐ Individual professor or instructor
☐ Other, namely:
……

10: Which of the following policy instruments are used for the implementation of ICT-related policy in your institution? (indicate as many as are relevant)

☐ Financial instruments
☐ Regulation
☐ Information
☐ Organisational instruments

11: Which of the following aspects are problems confronting the implementation of ICT-related policy in your institution? (indicate as many as are relevant)

☐ Not enough financial resources
☐ Inadequate national regulations
☐ Not enough internal support
☐ Lack of skilled staff

12: In your view, how much leadership do the following groups of actors show in the process of developing and implementing ICT-related policy in your institution?

	low		Moderate		high
Rector / president / executive board	☐	☐	☐	☐	☐
Deans of faculties	☐	☐	☐	☐	☐
Heads of school / institutes / departments	☐	☐	☐	☐	☐
Support centre for ICT	☐	☐	☐	☐	☐
Individual professors or instructors	☐	☐	☐	☐	☐

13:Which one of the following is the most common communication mechanism for discussing ICT-related policy issues in your institution?

☐ Minimally active, ad hoc committee(s)
☐ Minimally active, standing committee(s)
☐ Regularly active, ad hoc committee(s)
☐ Regularly active, standing committee(s)
☐ Very active, ad hoc committee(s)
☐ Very active standing committee(s)

14: Which of the following groups of actors are involved in the most common communication mechanism? (indicate as many as are relevant)

☐ Rector, (vice) president, executive board
☐ Dean of faculty
☐ Head of school / institute / department
☐ Support centre for ICT
☐ Individual professor or instructor
☐ Students

Student aspects

15: With regard to undergraduate (or initial degree) programmes in your institution, which of the following best describes the current amount of choice available to students?

☐ Programmes are fully planned, little or no individual choices for students once they choose a programme
☐ Programmes are fully planned, but some individual choices for students once they choose a programme
☐ Programmes are fully planned, but many choices for students once they choose a programme
☐ Programmes are flexible, students can choose from a range of combinations
☐ Programmes are highly flexible, students can more or less choose their own combinations

16: In your opinion, to what extent is your institution's current ICT-related policy affected by student demands in the following areas?

	Very little		Some		Very much
Demand for more/wider access to traditional campus-based education	☐	☐	☐	☐	☐
Demand for continuing education (lifelong learning)	☐	☐	☐	☐	☐
Demand from international students	☐	☐	☐	☐	☐
Demand for more flexibility in locations of learning	☐	☐	☐	☐	☐
Demand for more flexibility in times of learning events	☐	☐	☐	☐	☐
Demand for more flexibility in pace of learning	☐	☐	☐	☐	☐

17: In your view, to what extent is each of the following a typical learning setting in your institution?

	Little or none		Some		Very much
On-campus settings for course activities	☐	☐	☐	☐	☐
Many variations in where and how students participate in courses, but campus-based settings remain the basis	☐	☐	☐	☐	☐
Many students are attending at a distance	☐	☐	☐	☐	☐
Students use the home institution as a "base" but pick and choose their courses from many locations	☐	☐	☐	☐	☐

18:In your opinion, the level of support for students with respect to the use of ICT for learning in your institution is:	Very low		Average		Very high
	☐	☐	☐	☐	☐

Staff aspects

19: In your view which of the following best describes the experience of instructors in your institution with respect to the use of ICT in their teaching?

☐ In general, a very low level of experience
☐ In general, a minimal level but with occasional pioneers
☐ In general, instructors make occasional experiments
☐ In general, instructors are regular users of standard applications
☐ In general, instructors are regular users of standard applications and also pioneers with new applications

20: How would you describe the climate for change among instructors in your institution when it comes to the use of ICT in teaching?	Very negative		Neutral		Very positive
	☐	☐	☐	☐	☐

21:In your opinion, the level of support for instructors with respect to the use of ICT for teaching purposes in your institution is?	Very low		Average		Very high
	☐	☐	☐	☐	☐

22: To what extent does ICT play a role in the following aspects of your institution's personnel policy?

	Not at all		Some		Very much
ICT use in education counts towards promotion and tenure	☐	☐	☐	☐	☐
ICT use in education is an integral part of regular staff assessments	☐	☐	☐	☐	☐
ICT use in education is part of regular external quality assurance exercises	☐	☐	☐	☐	☐
ICT competencies are systematic criteria for selection and recruitment of new staff	☐	☐	☐	☐	☐
Professionalisation of staff in ICT competencies is mandatory	☐	☐	☐	☐	☐
Financial incentives to individual staff are provided for development of ICT use in education	☐	☐	☐	☐	☐
ICT use in education is mandatory	☐	☐	☐	☐	☐

Technology aspects

23:To what extent do the following technologies influence general teaching practice in your institution?

	Very little		Some		Very much
E-mail systems	☐	☐	☐	☐	☐
Web resources	☐	☐	☐	☐	☐
Wireless solutions	☐	☐	☐	☐	☐
Web-based course management systems	☐	☐	☐	☐	☐
Planning tools, such as network-accessible agendas	☐	☐	☐	☐	☐
Externally available courses or modules, accessible via the Web	☐	☐	☐	☐	☐
(Video) conferencing tools	☐	☐	☐	☐	☐

24: Indicate in your view the extent to which the following aspects involve the use of ICT in your institution?

	low		Moderate		high
Teaching 18-24 year- old students	☐	☐	☐	☐	☐
Providing continuing education (or "lifelong learning") to persons in the workforce	☐	☐	☐	☐	☐
Teaching international students	☐	☐	☐	☐	☐
Innovation in teaching and learning	☐	☐	☐	☐	☐
Internally funded research	☐	☐	☐	☐	☐
Externally funded research	☐	☐	☐	☐	☐
Interaction with business and industry	☐	☐	☐	☐	☐

25: The general level of technology infrastructure in my institution is:	Very low		Average		Very high
	☐	☐	☐	☐	☐

26:In your opinion, to what extent is ICT being used in your institution ...

	Rarely		Some		Exten-sively
For course preparation or organisational purposes?	☐	☐	☐	☐	☐
In classroom activities?	☐	☐	☐	☐	☐
Via a Web environment used outside of classroom activities?	☐	☐	☐	☐	☐
For communication with and among students and instructors?	☐	☐	☐	☐	☐
To support group activities and project work?	☐	☐	☐	☐	☐

27:In your opinion, to what extent are the following teaching practices common in your institution?

	Very un-common		Some-what		Very common
Lectures	☐	☐	☐	☐	☐
Practice activities (labs, field work, practical exercises)	☐	☐	☐	☐	☐
Studying via (non-Web) computer software	☐	☐	☐	☐	☐
Studying via Web-based environments	☐	☐	☐	☐	☐
Participation in project work, group work	☐	☐	☐	☐	☐

External environment

28: In your opinion, to what extent has competition from each of the following actors changed compared to five years ago?

	Strongly decreased		Stable		Strongly increased
National higher education institutions	☐	☐	☐	☐	☐
Foreign higher education institutions	☐	☐	☐	☐	☐
National commercial providers	☐	☐	☐	☐	☐
Foreign commercial providers	☐	☐	☐	☐	☐

29: In your opinion, how much does competition from each of the following actors currently influence the ICT-related policy in your institution?

	Not at all		Some		Very much
National higher education institutions	☐	☐	☐	☐	☐
Foreign higher education institutions	☐	☐	☐	☐	☐
National commercial providers	☐	☐	☐	☐	☐
Foreign commercial providers	☐	☐	☐	☐	☐

30: In your opinion, how much is the internal ICT-related policy of your institution influenced by (policies of) the following external actors?

	Very little		Some		Very much
Supra-national body (e.g. EU, UNESCO)	☐	☐	☐	☐	☐
National / federal government	☐	☐	☐	☐	☐
National ministry of education	☐	☐	☐	☐	☐
Sub-national (regional or state-level) government	☐	☐	☐	☐	☐

31: In your opinion, to what extent does your institution cooperate with the following external partners with respect to ICT-related activities?

	Not at all		Some		Inten-sively
Other national higher education institutions	☐	☐	☐	☐	☐
Foreign higher education institutions	☐	☐	☐	☐	☐
National business and industry or other for-profit organisations	☐	☐	☐	☐	☐
Foreign business and industry or other for-profit organisations	☐	☐	☐	☐	☐

32: In ICT matters, which of the following do you consider to be the most successful form of cooperation for your institution?

☐ Bilateral cooperation with other national higher education institutions
☐ Bilateral cooperation with foreign higher education institutions
☐ Multilateral cooperation with other national higher education institutions (national consortium)
☐ Multilateral cooperation with other foreign higher education institutions (international consortium)
☐ Cooperation with national business and industry or for-profit organisations
☐ Cooperation with international business and industry or for-profit organisations

Why do you consider this as the most successful form of cooperation?
……

Perceived impact of technology use

33: How important in your view is the use of ICT for the strategic position of your institution?	very unimportant		neutral		very important
	☐	☐	☐	☐	☐

34: In your view, to what extent is the use of ICT important for the quality of education programmes and services in your institution?	very unimportant		neutral		very important
	☐	☐	☐	☐	☐

35: In your view, the impact of ICT on the efficiency of teaching activities in your institution is...?	very negative		neutral		very positive
	☐	☐	☐	☐	☐

36: In your view, the level of satisfaction among personnel in your institution with respect to their working conditions related to the use of ICT is...?	very low		neutral		very high
	☐	☐	☐	☐	☐

37: In your view, the impact of ICT on learning effectiveness in your institution is...?	very negative		neutral		very positive
	☐	☐	☐	☐	☐

38: In your view, the impact of ICT on general working practices in your institution over the last two years has been...?	very negative		neutral		very positive
	☐	☐	☐	☐	☐

Predictions for the year 2005

39: In your view, to what extent will the following aspects involve the use of ICT in your institution in the year 2005?

	low		Moderate		high
Teaching 18-24 year old students	☐	☐	☐	☐	☐
Providing continuing education (or "lifelong learning") to persons in the workforce	☐	☐	☐	☐	☐
Teaching international students	☐	☐	☐	☐	☐
Innovation in teaching and learning	☐	☐	☐	☐	☐
Internally funded research	☐	☐	☐	☐	☐
Externally funded research	☐	☐	☐	☐	☐
Interaction with business and industry	☐	☐	☐	☐	☐

40: With regard to undergraduate (or initial degree) programmes in your institution, which of the following do you predict will best describe the amount of choice available to students in the year 2005?

☐ Programmes are fully planned, little or no individual choices for students once they choose a programme
☐ Programmes are fully planned, but some individual choices for students once they choose a programme
☐ Programmes are fully planned, but many choices for students once they choose a programme
☐ Programmes are flexible, students can choose from a range of combinations
☐ Programmes are highly flexible, students can more or less choose their own combinations

41: What do you predict will be the balance in your institution between "face-to-face" and "via the Internet" with respect to administrative procedures for students in the year 2005?	only face- to-face		balanced, both in use		only via the Internet
	☐	☐	☐	☐	☐

42: In your view, to what extent will your institution's ICT-related policy be affected by the following types of student demands in the year 2005?

	Very little		Some		Very much
Demand for more/wider access to traditional campus-based education	☐	☐	☐	☐	☐
Demand for continuing education (lifelong learning)	☐	☐	☐	☐	☐
Demand from international students	☐	☐	☐	☐	☐
Demand for more flexibility in locations of learning	☐	☐	☐	☐	☐
Demand for more flexibility in times of learning events	☐	☐	☐	☐	☐
Demand for more flexibility in pace of learning	☐	☐	☐	☐	☐

43: In your view, to what extent will each of the following be a typical learning setting in your institution in the year 2005?

	Very unlikely		Some		Very likely
On-campus settings for course activities	☐	☐	☐	☐	☐
Many variations in where and how students participate in courses, but campus-based settings remain the basis	☐	☐	☐	☐	☐
Many students are attending at a distance	☐	☐	☐	☐	☐
Students use the home institution as a "base" but pick and choose their courses from many locations	☐	☐	☐	☐	☐

44: In your opinion, which of the following policy instruments will be used for the implementation of ICT-related policy in your institution in the year 2005? (indicate as many as are relevant)

☐ Financial instruments
☐ Regulation
☐ Information
☐ Organisational instruments

45: Which of the following aspects do you predict will be problems confronting the implementation of ICT-related policy in your institution in the year 2005? (indicate as many as are relevant)

☐ Not enough financial resources
☐ Inadequate national regulations
☐ Not enough internal support
☐ Lack of skilled staff

46: In your opinion, to what extent will each of the following actors influence ICT-related policy in your institution in the year 2005?

	Not at all		Some		Very much
National higher education institutions	☐	☐	☐	☐	☐
Foreign higher education institutions	☐	☐	☐	☐	☐
National commercial providers	☐	☐	☐	☐	☐
Foreign commercial providers	☐	☐	☐	☐	☐

47: In your opinion to what extent will each of the following be a major objective in ICT-related policy in your institution in the year 2005?

	None / low		Mode-rate		high
Increasing efficiency	☐	☐	☐	☐	☐
Enhancing the quality of teaching and learning	☐	☐	☐	☐	☐
Enhancing flexibility	☐	☐	☐	☐	☐
Enhancing cost-effectiveness	☐	☐	☐	☐	☐
Generating institutional income	☐	☐	☐	☐	☐
Creating more opportunities for continuing education (lifelong) learners	☐	☐	☐	☐	☐
Creating more opportunities for international students	☐	☐	☐	☐	☐
Widening access to the traditional (18-24 year-old) student base	☐	☐	☐	☐	☐
Enhancing competitiveness	☐	☐	☐	☐	☐
Enhancing the status and reputation of the institution	☐	☐	☐	☐	☐

48: In your opinion, to what extent will the following forms of external cooperation influence the success of your institution in the area of ICT in the year 2005?

	Not at all		Some		Inten-sively
Other national higher education institutions	☐	☐	☐	☐	☐
Foreign higher education institutions	☐	☐	☐	☐	☐
National business and industry or other for-profit organisations	☐	☐	☐	☐	☐
Foreign business and industry or other for-profit organisations	☐	☐	☐	☐	☐

.

11 Appendix 2: General country information

Table 11-1: Overview of technology variables by country

	Connectivity		Access		
2002	Hosts per 10,000	Pc's per 10,000	Households with access to Internet, % of all households*	Internet users per 10,000	e-readiness of a country
Australia	1428	56.45	46	5666	8.25
Finland	2436	44.17	44	5089	8.38
Netherlands	2162	46.66	58	5219	8.43
Germany	315	43.13	43	4726	8.15
UK	545	40.57	50	4230	8.43
Norway	1245	52.83	55	3456	8.28

* Internet access via any device (desktop computer, portable computer, TV, mobile phone, etc).

Table 11-2: Overview of demographic variables by country, 2002

	Participation rate (1)	% Intern students	% LLL (2)	% LLL (3) >25	% LLL (4)>30
Australia	49	20		28	17
Finland	55.5	3	18.9	25	15
Netherlands	47.8	4	16.4	15	11
Germany	28	12	5.7	15	5
United Kingdom	38.1	8	22.3	18	11
Norway	50	6	13.3	33	23

(1): Participation rate is based on net entry rate (synthetic cohort, age group 17-25),

(2)* Percentage of the adult population aged 25 to 64 participating in education and training (Eurostat, structural indicators)

(3) Percentage based on the number of new entrants in higher education, aged older than 25; (OECD, statistical database)

(4) Percentage based on the number of new entrants in tertiary education, aged older than 30 (OECD, statistical database)

Table 11-3: Overview of national steering models

	Main steering model
Australia	Supermarket
Finland	Supermarket
Netherlands	Towards supermarket
Germany	Institutional, sovereign
United Kingdom	Supermarket
Norway	Supermarket

Table 11-4: Overview of the public spending variables, by country

	Public expenditure on education as a % of GDP	% of national expenditure spent on higher education
Australia	4.90	24.2
Finland	6.39	32.5
Netherlands	5.08	25.2
Germany	4.78	24.5
UK	5.25	20.6
Norway	7.63	27.5

Source: www.itu.int; OECD, key indicators, http://statbel.fgov.be/figures/d75_nl.asp#3, Economic Intelligence Unit, IBM

12 Appendix 3: one-way ANOVA results

LSD test Institutional profile – 3 strategies

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Mission	teaching 18-24 years old	world	s-t-m	-0.27641	0.128982	0.034873	-0.53273	-0.02008
			b-t-b	-0.29047	0.110614	0.010188	-0.5103	-0.07065
		s-t-m	world	0.276409	0.128982	0.034873	0.020084	0.532733
			b-t-b	-0.01407	0.116712	0.904353	-0.24601	0.217876
		b-t-b	world	0.290474	0.110614	0.010188	0.070652	0.510296
			s-t-m	0.014065	0.116712	0.904353	-0.21788	0.246007
	teaching lifelong learners	world	s-t-m	0.040161	0.275131	0.884278	-0.5066	0.586927
			b-t-b	0.845005	0.235951	0.00056	0.376102	1.313907
		s-t-m	world	-0.04016	0.275131	0.884278	-0.58693	0.506604
			b-t-b	0.804843	0.248959	0.001726	0.310089	1.299598
		b-t-b	world	-0.845	0.235951	0.00056	-1.31391	-0.3761
			s-t-m	-0.80484	0.248959	0.001726	-1.2996	-0.31009

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	teaching international students	world	s-t-m	-0.05405	0.273309	0.843675	-0.5972	0.48909
			b-t-b	0.013595	0.234388	0.953879	-0.4522	0.479391
		s-t-m	world	0.054055	0.273309	0.843675	-0.48909	0.597199
			b-t-b	0.067649	0.24731	0.785079	-0.42383	0.559127
		b-t-b	world	-0.01359	0.234388	0.953879	-0.47939	0.452202
			s-t-m	-0.06765	0.24731	0.785079	-0.55913	0.423828
	innovation in teaching and learning	world	s-t-m	0.121345	0.183818	0.510892	-0.24396	0.486644
			b-t-b	0.060885	0.157641	0.700263	-0.25239	0.374163
		s-t-m	world	-0.12134	0.183818	0.510892	-0.48664	0.243955
			b-t-b	-0.06046	0.166332	0.717111	-0.39101	0.270091
		b-t-b	world	-0.06088	0.157641	0.700263	-0.37416	0.252394
			s-t-m	0.06046	0.166332	0.717111	-0.27009	0.391011

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Internally funded research	world	s-t-m	0.30035	0.275688	0.278927	-0.24752	0.848221
			b-t-b	0.403894	0.236428	0.091102	-0.06596	0.873745
		s-t-m	world	-0.30035	0.275688	0.278927	-0.84822	0.247522
			b-t-b	0.103545	0.249463	0.6791	-0.39221	0.5993
		b-t-b	world	-0.40389	0.236428	0.091102	-0.87374	0.065956
			s-t-m	-0.10354	0.249463	0.6791	-0.5993	0.39221
	Externally funded research	world	s-t-m	0.587078	0.28481	0.042225	0.021079	1.153077
			b-t-b	0.422479	0.244251	0.087191	-0.06292	0.907876
		s-t-m	world	-0.58708	0.28481	0.042225	-1.15308	-0.02108
			b-t-b	-0.1646	0.257717	0.524689	-0.67676	0.347559
		b-t-b	world	-0.42248	0.244251	0.087191	-0.90788	0.062918
			s-t-m	0.164599	0.257717	0.524689	-0.34756	0.676758

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	interaction with business and industry	world	s-t-m	0.185594	0.273192	0.498697	-0.35732	0.728506
			b-t-b	0.293267	0.234288	0.213982	-0.17233	0.758865
		s-t-m	world	-0.18559	0.273192	0.498697	-0.72851	0.357318
			b-t-b	0.107673	0.247205	0.66422	-0.38359	0.598941
		b-t-b	world	-0.29327	0.234288	0.213982	-0.75886	0.17233
			s-t-m	-0.10767	0.247205	0.66422	-0.59894	0.383595
Type of delivery	**Good education**							
	face-to-face education	world	s-t-m	-0.1242	0.129785	0.34121	-0.38212	0.133722
			b-t-b	-0.17084	0.111303	0.128385	-0.39203	0.050347
		s-t-m	world	0.124199	0.129785	0.34121	-0.13372	0.382119
			b-t-b	-0.04664	0.117439	0.692194	-0.28003	0.186741
		b-t-b	world	0.170843	0.111303	0.128385	-0.05035	0.392034
			s-t-m	0.046645	0.117439	0.692194	-0.18674	0.28003

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	appropriate use of ICT for teaching and learning support	world	s-t-m	-0.0139	0.178194	0.938019	-0.36802	0.340227
			b-t-b	0.127223	0.152818	0.407373	-0.17647	0.430916
		s-t-m	world	0.013896	0.178194	0.938019	-0.34023	0.368019
			b-t-b	0.141119	0.161243	0.383852	-0.17932	0.461555
		b-t-b	world	-0.12722	0.152818	0.407373	-0.43092	0.17647
			s-t-m	-0.14112	0.161243	0.383852	-0.46156	0.179318
	Individualization for student characteristics.	world	s-t-m	0.01669	0.180866	0.926687	-0.34274	0.376123
			b-t-b	0.417351	0.155109	0.008532	0.109103	0.725598
		s-t-m	world	-0.01669	0.180866	0.926687	-0.37612	0.342743
			b-t-b	0.400661	0.163661	0.016346	0.075419	0.725903
		b-t-b	world	-0.41735	0.155109	0.008532	-0.7256	-0.1091
			s-t-m	-0.40066	0.163661	0.016346	-0.7259	-0.07542

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	time/place independent learning	world	s-t-m	0.177081	0.183354	0.336797	-0.1873	0.541458
			b-t-b	0.339646	0.157243	0.033491	0.027159	0.652133
		s-t-m	world	-0.17708	0.183354	0.336797	-0.54146	0.187296
			b-t-b	0.162565	0.165912	0.329858	-0.16715	0.492281
		b-t-b	world	-0.33965	0.157243	0.033491	-0.65213	-0.02716
			s-t-m	-0.16257	0.165912	0.329858	-0.49228	0.167151
	communication among students	world	s-t-m	-0.20784	0.168063	0.21949	-0.54183	0.126147
			b-t-b	-0.00377	0.14413	0.979218	-0.29019	0.282663
		s-t-m	world	0.207844	0.168063	0.21949	-0.12615	0.541834
			b-t-b	0.204078	0.152076	0.183065	-0.09814	0.506298
		b-t-b	world	0.003765	0.14413	0.979218	-0.28266	0.290193
			s-t-m	-0.20408	0.152076	0.183065	-0.5063	0.098141

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	pedagogy related to groupwork	world	s-t-m	0.007279	0.181898	0.968171	-0.35421	0.368763
			b-t-b	0.092291	0.155994	0.555614	-0.21771	0.402297
		s-t-m	world	-0.00728	0.181898	0.968171	-0.36876	0.354205
			b-t-b	0.085012	0.164595	0.606804	-0.24209	0.41211
		b-t-b	world	-0.09229	0.155994	0.555614	-0.4023	0.217715
			s-t-m	-0.08501	0.164595	0.606804	-0.41211	0.242085
	contact instructor when needed by student	world	s-t-m	0.113916	0.158107	0.473128	-0.20029	0.428121
			b-t-b	0.181573	0.135592	0.183982	-0.08789	0.451033
		s-t-m	world	-0.11392	0.158107	0.473128	-0.42812	0.200289
			b-t-b	0.067657	0.143067	0.637454	-0.21666	0.351973
		b-t-b	world	-0.18157	0.135592	0.183982	-0.45103	0.087887
			s-t-m	-0.06766	0.143067	0.637454	-0.35197	0.21666

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Student demand for flexibility							
	demand flexibility in locations of learning	world	s-t-m	0.194372	0.229028	0.398361	-0.26077	0.649518
			b-t-b	0.582555	0.196413	0.003884	0.192226	0.972884
		s-t-m	world	-0.19437	0.229028	0.398361	-0.64952	0.260773
			b-t-b	0.388183	0.207242	0.064376	-0.02367	0.800032
		b-t-b	world	-0.58255	0.196413	0.003884	-0.97288	-0.19223
			s-t-m	-0.38818	0.207242	0.064376	-0.80003	0.023667
	demand flexibility in times of learning	world	s-t-m	0.148841	0.22875	0.516955	-0.30575	0.603434
			b-t-b	0.357584	0.196175	0.071732	-0.03227	0.74744
		s-t-m	world	-0.14884	0.22875	0.516955	-0.60343	0.305752
			b-t-b	0.208743	0.206991	0.315995	-0.20261	0.620093
		b-t-b	world	-0.35758	0.196175	0.071732	-0.74744	0.032272
			s-t-m	-0.20874	0.206991	0.315995	-0.62009	0.202607

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	demand flexibility in pace of learning	world	s-t-m	0.280369	0.210137	0.185575	-0.13723	0.697973
			b-t-b	0.039898	0.180212	0.825298	-0.31824	0.398032
		s-t-m	world	-0.28037	0.210137	0.185575	-0.69797	0.137235
			b-t-b	-0.24047	0.190148	0.209335	-0.61835	0.137408
		b-t-b	world	-0.0399	0.180212	0.825298	-0.39803	0.318236
			s-t-m	0.240471	0.190148	0.209335	-0.13741	0.61835
Institutional policy	**Objective ICT policy**							
	increasing efficiency	world	s-t-m	0.067205	0.180916	0.71118	-0.29233	0.426737
			b-t-b	0.143519	0.155152	0.357485	-0.16481	0.451851
		s-t-m	world	-0.0672	0.180916	0.71118	-0.42674	0.292327
			b-t-b	0.076314	0.163706	0.64225	-0.24902	0.401646
		b-t-b	world	-0.14352	0.155152	0.357485	-0.45185	0.164813
			s-t-m	-0.07631	0.163706	0.64225	-0.40165	0.249018

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	enhancing quality of teaching and learning	world	s-t-m	0.151729	0.177315	0.394485	-0.20065	0.504105
			b-t-b	0.08354	0.152064	0.584138	-0.21865	0.385735
		s-t-m	world	-0.15173	0.177315	0.394485	-0.50411	0.200647
			b-t-b	-0.06819	0.160448	0.671881	-0.38704	0.250667
		b-t-b	world	-0.08354	0.152064	0.584138	-0.38574	0.218655
			s-t-m	0.068189	0.160448	0.671881	-0.25067	0.387045
	enhancing flexibility	world	s-t-m	0.033062	0.178151	0.853198	-0.32098	0.3871
			b-t-b	0.471831	0.152781	0.002693	0.168211	0.775452
		s-t-m	world	-0.03306	0.178151	0.853198	-0.3871	0.320976
			b-t-b	0.438769	0.161205	0.007826	0.118409	0.759129
		b-t-b	world	-0.47183	0.152781	0.002693	-0.77545	-0.16821
			s-t-m	-0.43877	0.161205	0.007826	-0.75913	-0.11841

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	enhancing cost-effectiveness	world	s-t-m	-0.03933	0.242221	0.871389	-0.52069	0.442034
			b-t-b	0.407099	0.207727	0.053186	-0.00571	0.819911
		s-t-m	world	0.039329	0.242221	0.871389	-0.44203	0.520691
			b-t-b	0.446427	0.219179	0.044674	0.010855	0.882
		b-t-b	world	-0.4071	0.207727	0.053186	-0.81991	0.005714
			s-t-m	-0.44643	0.219179	0.044674	-0.882	-0.01085
	generate institutional income	world	s-t-m	0.570166	0.21873	0.010736	0.135487	1.004845
			b-t-b	0.693547	0.187581	0.000378	0.320769	1.066324
		s-t-m	world	-0.57017	0.21873	0.010736	-1.00485	-0.13549
			b-t-b	0.123381	0.197923	0.534649	-0.26995	0.516711
		b-t-b	world	-0.69355	0.187581	0.000378	-1.06632	-0.32077
			s-t-m	-0.12338	0.197923	0.534649	-0.51671	0.26995

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	creating opportunities for lifelong learning	world	s-t-m	0.268124	0.235594	0.258177	-0.20007	0.736318
			b-t-b	0.529123	0.202044	0.010388	0.127603	0.930642
		s-t-m	world	-0.26812	0.235594	0.258177	-0.73632	0.200069
			b-t-b	0.260998	0.213183	0.22411	-0.16266	0.684655
		b-t-b	world	-0.52912	0.202044	0.010388	-0.93064	-0.1276
			s-t-m	-0.261	0.213183	0.22411	-0.68465	0.162658
	creating opportunities for international students	world	s-t-m	0.085079	0.250965	0.735412	-0.41366	0.58382
			b-t-b	0.494986	0.215226	0.023823	0.06727	0.922703
		s-t-m	world	-0.08508	0.250965	0.735412	-0.58382	0.413662
			b-t-b	0.409907	0.227092	0.074491	-0.04139	0.861205
		b-t-b	world	-0.49499	0.215226	0.023823	-0.9227	-0.06727
			s-t-m	-0.40991	0.227092	0.074491	-0.86121	0.041391

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	widening access for the traditional 18-24 years old students	world	s-t-m	0.286724	0.217007	0.189836	-0.14453	0.717979
			b-t-b	0.517101	0.186103	0.006674	0.14726	0.886942
		s-t-m	world	-0.28672	0.217007	0.189836	-0.71798	0.144531
			b-t-b	0.230376	0.196364	0.243876	-0.15986	0.620608
		b-t-b	world	-0.5171	0.186103	0.006674	-0.88694	-0.14726
			s-t-m	-0.23038	0.196364	0.243876	-0.62061	0.159855
	enhancing competitiveness	world	s-t-m	0.185239	0.205178	0.369084	-0.22251	0.592987
			b-t-b	0.376352	0.175959	0.035217	0.02667	0.726033
		s-t-m	world	-0.18524	0.205178	0.369084	-0.59299	0.222509
			b-t-b	0.191112	0.18566	0.306129	-0.17785	0.560073
		b-t-b	world	-0.37635	0.175959	0.035217	-0.72603	-0.02667
			s-t-m	-0.19111	0.18566	0.306129	-0.56007	0.177849

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	enhancing status/reputation	world	s-t-m	0.063691	0.194125	0.743622	-0.32209	0.449473
			b-t-b	0.281421	0.16648	0.094487	-0.04942	0.612265
		s-t-m	world	-0.06369	0.194125	0.743622	-0.44947	0.322092
			b-t-b	0.217731	0.175659	0.218452	-0.13135	0.566815
		b-t-b	world	-0.28142	0.16648	0.094487	-0.61226	0.049423
			s-t-m	-0.21773	0.175659	0.218452	-0.56682	0.131354
	Budget							
	% of annual budget spent of ICT	world	s-t-m	0.116358	0.157633	0.462381	-0.1969	0.429619
			b-t-b	0.424239	0.135184	0.002313	0.155588	0.69289
		s-t-m	world	-0.11636	0.157633	0.462381	-0.42962	0.196904
			b-t-b	0.307881	0.142638	0.033613	0.024419	0.591344
		b-t-b	world	-0.42424	0.135184	0.002313	-0.69289	-0.15559
			s-t-m	-0.30788	0.142638	0.033613	-0.59134	-0.02442

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	HRM policy							
	promotion and tenure	world	s-t-m	0.413794	0.19312	0.034899	0.030009	0.797579
			b-t-b	0.582001	0.165618	0.000699	0.25287	0.911132
		s-t-m	world	-0.41379	0.19312	0.034899	-0.79758	-0.03001
			b-t-b	0.168207	0.174749	0.338404	-0.17907	0.515484
		b-t-b	world	-0.582	0.165618	0.000699	-0.91113	-0.25287
			s-t-m	-0.16821	0.174749	0.338404	-0.51548	0.17907
	regular staff assessments	world	s-t-m	0.263566	0.195573	0.181226	-0.12509	0.652225
			b-t-b	0.537679	0.167722	0.001878	0.204367	0.87099
		s-t-m	world	-0.26357	0.195573	0.181226	-0.65223	0.125093
			b-t-b	0.274113	0.176969	0.124987	-0.07758	0.625801
		b-t-b	world	-0.53768	0.167722	0.001878	-0.87099	-0.20437
			s-t-m	-0.27411	0.176969	0.124987	-0.6258	0.077575

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	external quality exercise	world	s-t-m	0.092135	0.222256	0.679484	-0.34955	0.533821
			b-t-b	0.585379	0.190605	0.002837	0.206592	0.964166
		s-t-m	world	-0.09213	0.222256	0.679484	-0.53382	0.349551
			b-t-b	0.493244	0.201113	0.016158	0.093573	0.892915
		b-t-b	world	-0.58538	0.190605	0.002837	-0.96417	-0.20659
			s-t-m	-0.49324	0.201113	0.016158	-0.89291	-0.09357
	selection and recruitment	world	s-t-m	0.161632	0.263094	0.540568	-0.36121	0.684476
			b-t-b	0.260419	0.225627	0.251544	-0.18797	0.708806
		s-t-m	world	-0.16163	0.263094	0.540568	-0.68448	0.361212
			b-t-b	0.098787	0.238067	0.679186	-0.37432	0.571895
		b-t-b	world	-0.26042	0.225627	0.251544	-0.70881	0.187968
			s-t-m	-0.09879	0.238067	0.679186	-0.57189	0.374322

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Professionalisation of staff is mandatory	World	s-t-m	-0.15776	0.201847	0.436563	-0.55889	0.243371
			b-t-b	0.315761	0.173103	0.071527	-0.02824	0.659766
		s-t-m	world	0.157758	0.201847	0.436563	-0.24337	0.558888
			b-t-b	0.473519	0.182647	0.011155	0.110548	0.836491
		b-t-b	world	-0.31576	0.173103	0.071527	-0.65977	0.028245
			s-t-m	-0.47352	0.182647	0.011155	-0.83649	-0.11055
	financial incentives for individual staff using ICT	world	s-t-m	-0.15509	0.212371	0.467156	-0.57713	0.266951
			b-t-b	0.090169	0.182128	0.621775	-0.27177	0.452109
		s-t-m	world	0.155091	0.212371	0.467156	-0.26695	0.577133
			b-t-b	0.24526	0.192169	0.205218	-0.13664	0.627155
		b-t-b	world	-0.09017	0.182128	0.621775	-0.45211	0.271772
			s-t-m	-0.24526	0.192169	0.205218	-0.62715	0.136636

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	ICT use mandatory	world	s-t-m	0.249253	0.218355	0.256758	-0.18468	0.683188
			b-t-b	0.580016	0.18726	0.00262	0.207876	0.952156
		s-t-m	world	-0.24925	0.218355	0.256758	-0.68319	0.184682
			b-t-b	0.330763	0.197584	0.097674	-0.06189	0.72342
		b-t-b	world	-0.58002	0.18726	0.00262	-0.95216	-0.20788
			s-t-m	-0.33076	0.197584	0.097674	-0.72342	0.061894
Student character-ristics	demand from traditional students	world	s-t-m	0.002701	0.275358	0.992196	-0.54452	0.549918
			b-t-b	0.369612	0.236145	0.121128	-0.09968	0.838902
		s-t-m	world	-0.0027	0.275358	0.992196	-0.54992	0.544516
			b-t-b	0.366911	0.249165	0.144436	-0.12825	0.862074
		b-t-b	world	-0.36961	0.236145	0.121128	-0.8389	0.099677
			s-t-m	-0.36691	0.249165	0.144436	-0.86207	0.128252

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	demand from lifelong learners	world	s-t-m	0.206849	0.272931	0.450547	-0.33554	0.749241
			b-t-b	0.495321	0.234063	0.037153	0.030169	0.960473
		s-t-m	world	-0.20685	0.272931	0.450547	-0.74924	0.335543
			b-t-b	0.288472	0.246968	0.24594	-0.20233	0.779269
		b-t-b	world	-0.49532	0.234063	0.037153	-0.96047	-0.03017
			s-t-m	-0.28847	0.246968	0.24594	-0.77927	0.202325
	demand from international students	world	s-t-m	-0.24505	0.300773	0.417417	-0.84278	0.35267
			b-t-b	-0.01194	0.257941	0.963196	-0.52454	0.500667
		s-t-m	world	0.245054	0.300773	0.417417	-0.35267	0.842778
			b-t-b	0.233118	0.272162	0.394026	-0.30775	0.773983
		b-t-b	world	0.011936	0.257941	0.963196	-0.50067	0.52454
			s-t-m	-0.23312	0.272162	0.394026	-0.77398	0.307748

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
ICT use for strategy	ICT for strategy	world	s-t-m	0.154212	0.116134	0.187651	-0.07658	0.385004
			b-t-b	0.267624	0.099596	0.008617	0.069698	0.465549
		s-t-m	world	-0.15421	0.116134	0.187651	-0.385	0.07658
			b-t-b	0.113411	0.105087	0.28344	-0.09543	0.322249
		b-t-b	world	-0.26762	0.099596	0.008617	-0.46555	-0.0697
			s-t-m	-0.11341	0.105087	0.28344	-0.32225	0.095426
Balance f-t-f/internet	Balance	world	s-t-m	0.088699	0.233767	0.705281	-0.37586	0.553263
			b-t-b	0.175908	0.200477	0.382635	-0.2225	0.574314
		s-t-m	world	-0.0887	0.233767	0.705281	-0.55326	0.375865
			b-t-b	0.087209	0.21153	0.681141	-0.33316	0.507581
		b-t-b	world	-0.17591	0.200477	0.382635	-0.57431	0.222499
			s-t-m	-0.08721	0.21153	0.681141	-0.50758	0.333163

* The mean difference is significant at the .05 level.

LSD for Institutional technology

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Use of technology	e-mail	world	s-t-m	0.137563	0.217018	0.527805	-0.29371	0.56884
			b-t-b	0.087763	0.186113	0.63841	-0.2821	0.457623
		s-t-m	world	-0.13756	0.217018	0.527805	-0.56884	0.293714
			b-t-b	-0.0498	0.196374	0.800399	-0.44005	0.340452
		b-t-b	world	-0.08776	0.186113	0.63841	-0.45762	0.282097
			s-t-m	0.0498	0.196374	0.800399	-0.34045	0.440052
	web resources	world	s-t-m	0.039948	0.195811	0.838815	-0.34919	0.429081
			b-t-b	0.102192	0.167926	0.54439	-0.23153	0.43591
		s-t-m	world	-0.03995	0.195811	0.838815	-0.42908	0.349186
			b-t-b	0.062244	0.177185	0.726208	-0.28987	0.414361
		b-t-b	world	-0.10219	0.167926	0.54439	-0.43591	0.231526
			s-t-m	-0.06224	0.177185	0.726208	-0.41436	0.289873

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	wireless solutions	world	s-t-m	-0.05023	0.193641	0.795932	-0.43505	0.33459
			b-t-b	0.337963	0.166065	0.044847	0.007944	0.667982
		s-t-m	world	0.05023	0.193641	0.795932	-0.33459	0.435051
			b-t-b	0.388193	0.175221	0.02931	0.039979	0.736407
		b-t-b	world	-0.33796	0.166065	0.044847	-0.66798	-0.00794
			s-t-m	-0.38819	0.175221	0.02931	-0.73641	-0.03998
	web-based course management system	world	s-t-m	0.166369	0.255855	0.517227	-0.34209	0.674828
			b-t-b	0.451675	0.21942	0.0425	0.015624	0.887725
		s-t-m	world	-0.16637	0.255855	0.517227	-0.67483	0.34209
			b-t-b	0.285306	0.231517	0.221108	-0.17479	0.745397
		b-t-b	world	-0.45167	0.21942	0.0425	-0.88773	-0.01562
			s-t-m	-0.28531	0.231517	0.221108	-0.7454	0.174786

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	network accessible planning tools	world	s-t-m	0.11145	0.238598	0.641578	-0.36271	0.585613
			b-t-b	0.308152	0.20462	0.135655	-0.09849	0.71479
		s-t-m	world	-0.11145	0.238598	0.641578	-0.58561	0.362712
			b-t-b	0.196701	0.215901	0.364746	-0.23236	0.625759
		b-t-b	world	-0.30815	0.20462	0.135655	-0.71479	0.098486
			s-t-m	-0.1967	0.215901	0.364746	-0.62576	0.232356
	externally available courses via Web	world	s-t-m	0.361255	0.169504	0.035857	0.024402	0.698108
			b-t-b	0.434736	0.145365	0.00361	0.145854	0.723619
		s-t-m	world	-0.36125	0.169504	0.035857	-0.69811	-0.0244
			b-t-b	0.073482	0.15338	0.633067	-0.23133	0.378292
		b-t-b	world	-0.43474	0.145365	0.00361	-0.72362	-0.14585
			s-t-m	-0.07348	0.15338	0.633067	-0.37829	0.231328

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	(video)conferencing tools	world	s-t-m	0.390204	0.19627	0.049909	0.000158	0.78025
			b-t-b	0.58687	0.16832	0.000765	0.25237	0.92137
		s-t-m	world	-0.3902	0.19627	0.049909	-0.78025	-0.00016
			b-t-b	0.196666	0.1776	0.271159	-0.15628	0.549609
		b-t-b	world	-0.58687	0.16832	0.000765	-0.92137	-0.25237
			s-t-m	-0.19667	0.1776	0.271159	-0.54961	0.156277
Infra-structure	infrastructure	world	s-t-m	-0.14032	0.178877	0.434888	-0.4958	0.215162
			b-t-b	0.375176	0.153404	0.016449	0.070318	0.680034
		s-t-m	world	0.140319	0.178877	0.434888	-0.21516	0.4958
			b-t-b	0.515495	0.161862	0.002004	0.193829	0.837161
		b-t-b	world	-0.37518	0.153404	0.016449	-0.68003	-0.07032
			s-t-m	-0.51549	0.161862	0.002004	-0.83716	-0.19383

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Extent ICT is being used	course preparation or organizational purposes	world	s-t-m	-0.0045	0.181351	0.980246	-0.3649	0.355895
			b-t-b	0.047192	0.155526	0.762276	-0.26188	0.356266
		s-t-m	world	0.004503	0.181351	0.980246	-0.35589	0.364901
			b-t-b	0.051695	0.1641	0.753493	-0.27442	0.37781
		b-t-b	world	-0.04719	0.155526	0.762276	-0.35627	0.261883
			s-t-m	-0.05169	0.1641	0.753493	-0.37781	0.27442
	classroom activities	world	s-t-m	0.044169	0.209578	0.833568	-0.37232	0.460661
			b-t-b	0.304498	0.179732	0.093768	-0.05268	0.661678
		s-t-m	world	-0.04417	0.209578	0.833568	-0.46066	0.372322
			b-t-b	0.260329	0.189642	0.173321	-0.11654	0.637202
		b-t-b	world	-0.3045	0.179732	0.093768	-0.66168	0.052682
			s-t-m	-0.26033	0.189642	0.173321	-0.6372	0.116544

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	web environment outside classroom	world	s-t-m	0.195801	0.227938	0.392668	-0.25718	0.64878
			b-t-b	0.660361	0.195478	0.001089	0.27189	1.048833
		s-t-m	world	-0.1958	0.227938	0.392668	-0.64878	0.257177
			b-t-b	0.46456	0.206255	0.026788	0.054671	0.874449
		b-t-b	world	-0.66036	0.195478	0.001089	-1.04883	-0.27189
			s-t-m	-0.46456	0.206255	0.026788	-0.87445	-0.05467
	communication with and among instructor and students	world	s-t-m	0.236254	0.229553	0.30621	-0.21993	0.692443
			b-t-b	0.297889	0.196863	0.133818	-0.09334	0.689113
		s-t-m	world	-0.23625	0.229553	0.30621	-0.69244	0.219934
			b-t-b	0.061635	0.207717	0.767376	-0.35116	0.474428
		b-t-b	world	-0.29789	0.196863	0.133818	-0.68911	0.093335
			s-t-m	-0.06163	0.207717	0.767376	-0.47443	0.351159

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	support group work	world	s-t-m	-0.00984	0.210233	0.962784	-0.42763	0.407957
			b-t-b	0.232164	0.180295	0.20123	-0.12613	0.590462
		s-t-m	world	0.009838	0.210233	0.962784	-0.40796	0.427632
			b-t-b	0.242001	0.190235	0.206683	-0.13605	0.620053
		b-t-b	world	-0.23216	0.180295	0.20123	-0.59046	0.126134
			s-t-m	-0.242	0.190235	0.206683	-0.62005	0.136051
Current teaching practices	lectures	world	s-t-m	-0.23884	0.169234	0.16169	-0.57515	0.097482
			b-t-b	-0.22903	0.145134	0.118133	-0.51746	0.059389
		s-t-m	world	0.238836	0.169234	0.16169	-0.09748	0.575153
			b-t-b	0.009801	0.153136	0.949112	-0.29452	0.314127
		b-t-b	world	0.229035	0.145134	0.118133	-0.05939	0.517458
			s-t-m	-0.0098	0.153136	0.949112	-0.31413	0.294524

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	practice activities	world	s-t-m	-0.1965	0.206411	0.34372	-0.6067	0.213701
			b-t-b	-0.03879	0.177016	0.827057	-0.39057	0.312993
		s-t-m	world	0.196497	0.206411	0.34372	-0.2137	0.606695
			b-t-b	0.157707	0.186776	0.400754	-0.21347	0.528885
		b-t-b	world	0.03879	0.177016	0.827057	-0.31299	0.390572
			s-t-m	-0.15771	0.186776	0.400754	-0.52889	0.213471
	studying via non-Web computer software	world	s-t-m	0.037775	0.247037	0.878819	-0.45316	0.528709
			b-t-b	0.336793	0.211857	0.115485	-0.08423	0.757814
		s-t-m	world	-0.03777	0.247037	0.878819	-0.52871	0.453159
			b-t-b	0.299018	0.223538	0.184453	-0.14522	0.743252
		b-t-b	world	-0.33679	0.211857	0.115485	-0.75781	0.084229
			s-t-m	-0.29902	0.223538	0.184453	-0.74325	0.145216

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	study via web environment	world	s-t-m	0.248865	0.205417	0.228944	-0.15936	0.657088
			b-t-b	0.64902	0.176164	0.000396	0.29893	0.99911
		s-t-m	world	-0.24886	0.205417	0.228944	-0.65709	0.159359
			b-t-b	0.400155	0.185877	0.034071	0.030764	0.769547
		b-t-b	world	-0.64902	0.176164	0.000396	-0.99911	-0.29893
			s-t-m	-0.40016	0.185877	0.034071	-0.76955	-0.03076
	participation in groupwork	world	s-t-m	-0.02387	0.216814	0.912577	-0.45474	0.407
			b-t-b	0.236278	0.185938	0.207172	-0.13323	0.605791
		s-t-m	world	0.023872	0.216814	0.912577	-0.407	0.454744
			b-t-b	0.26015	0.196189	0.188266	-0.12973	0.650035
		b-t-b	world	-0.23628	0.185938	0.207172	-0.60579	0.133235
			s-t-m	-0.26015	0.196189	0.188266	-0.65004	0.129735

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
ICT use for activities	teaching 18-24 years traditional students	world	s-t-m	-0.06648	0.199756	0.740063	-0.46346	0.330491
			b-t-b	0.208583	0.17131	0.22664	-0.13186	0.549025
		s-t-m	world	0.066483	0.199756	0.740063	-0.33049	0.463457
			b-t-b	0.275065	0.180755	0.131654	-0.08415	0.634277
		b-t-b	world	-0.20858	0.17131	0.22664	-0.54902	0.131859
			s-t-m	-0.27507	0.180755	0.131654	-0.63428	0.084146
	teaching lifelong learners	world	s-t-m	0.382264	0.240524	0.11558	-0.09573	0.860255
			b-t-b	0.845994	0.206272	9.14E-05	0.436073	1.255916
		s-t-m	world	-0.38226	0.240524	0.11558	-0.86025	0.095727
			b-t-b	0.46373	0.217644	0.035905	0.031209	0.896252
		b-t-b	world	-0.84599	0.206272	9.14E-05	-1.25592	-0.43607
			s-t-m	-0.46373	0.217644	0.035905	-0.89625	-0.03121

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	teaching international students	world	s-t-m	0.031966	0.256732	0.901195	-0.47823	0.542166
			b-t-b	0.28309	0.220171	0.201895	-0.15445	0.720634
		s-t-m	world	-0.03197	0.256732	0.901195	-0.54217	0.478235
			b-t-b	0.251125	0.23231	0.282655	-0.21054	0.712792
		b-t-b	world	-0.28309	0.220171	0.201895	-0.72063	0.154454
			s-t-m	-0.25112	0.23231	0.282655	-0.71279	0.210543
	innovation in teaching and learning	world	s-t-m	0.339101	0.212009	0.113301	-0.08222	0.760424
			b-t-b	0.550008	0.181817	0.003258	0.188685	0.911331
		s-t-m	world	-0.3391	0.212009	0.113301	-0.76042	0.082221
			b-t-b	0.210906	0.191841	0.274601	-0.17034	0.59215
		b-t-b	world	-0.55001	0.181817	0.003258	-0.91133	-0.18868
			s-t-m	-0.21091	0.191841	0.274601	-0.59215	0.170338

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	internally funded research	world	s-t-m	0.379082	0.296141	0.203884	-0.20944	0.9676
			b-t-b	0.415294	0.253968	0.105576	-0.08942	0.920003
		s-t-m	world	-0.37908	0.296141	0.203884	-0.9676	0.209436
			b-t-b	0.036212	0.267971	0.892816	-0.49632	0.568747
		b-t-b	world	-0.41529	0.253968	0.105576	-0.92	0.089415
			s-t-m	-0.03621	0.267971	0.892816	-0.56875	0.496324
	externally funded research	world	s-t-m	0.476086	0.307589	0.125259	-0.13518	1.087354
			b-t-b	0.573255	0.263786	0.032453	0.049036	1.097474
		s-t-m	world	-0.47609	0.307589	0.125259	-1.08735	0.135181
			b-t-b	0.097169	0.278329	0.727837	-0.45595	0.65029
		b-t-b	world	-0.57326	0.263786	0.032453	-1.09747	-0.04904
			s-t-m	-0.09717	0.278329	0.727837	-0.65029	0.455952

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	interaction with business and industry	world	s-t-m	0.573232	0.269909	0.036493	0.036846	1.109619
			b-t-b	0.726474	0.231472	0.002311	0.266473	1.186475
		s-t-m	world	-0.57323	0.269909	0.036493	-1.10962	-0.03685
			b-t-b	0.153241	0.244233	0.531997	-0.33212	0.638604
		b-t-b	world	-0.72647	0.231472	0.002311	-1.18647	-0.26647
			s-t-m	-0.15324	0.244233	0.531997	-0.6386	0.332121

* The mean difference is significant at the .05 level.

LSD Institutional governance

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Leadership	rector	world	s-t-m	-0.04708	0.291756	0.872162	-0.62689	0.532719
			b-t-b	-0.0323	0.250208	0.897587	-0.52953	0.464938
		s-t-m	world	0.047084	0.291756	0.872162	-0.53272	0.626887
			b-t-b	0.014787	0.264002	0.95546	-0.50986	0.539436
		b-t-b	world	0.032297	0.250208	0.897587	-0.46494	0.529532
			s-t-m	-0.01479	0.264002	0.95546	-0.53944	0.509862
	deans	world	s-t-m	-0.02891	0.261984	0.912394	-0.54954	0.491732
			b-t-b	0.355187	0.224676	0.117491	-0.09131	0.801682
		s-t-m	world	0.028906	0.261984	0.912394	-0.49173	0.549544
			b-t-b	0.384093	0.237063	0.108764	-0.08702	0.855205
		b-t-b	world	-0.35519	0.224676	0.117491	-0.80168	0.091309
			s-t-m	-0.38409	0.237063	0.108764	-0.85521	0.087019

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	head of schools	world	s-t-m	0.236744	0.236985	0.320543	-0.23421	0.707702
			b-t-b	0.385129	0.203237	0.061379	-0.01876	0.789019
		s-t-m	world	-0.23674	0.236985	0.320543	-0.7077	0.234214
			b-t-b	0.148385	0.214442	0.490783	-0.27777	0.574543
		b-t-b	world	-0.38513	0.203237	0.061379	-0.78902	0.018761
			s-t-m	-0.14839	0.214442	0.490783	-0.57454	0.277773
	support centre	world	s-t-m	-0.18873	0.232447	0.419034	-0.65067	0.273214
			b-t-b	0.049748	0.199345	0.803513	-0.34641	0.445904
		s-t-m	world	0.188726	0.232447	0.419034	-0.27321	0.650666
			b-t-b	0.238474	0.210336	0.259967	-0.17952	0.656472
		b-t-b	world	-0.04975	0.199345	0.803513	-0.4459	0.346409
			s-t-m	-0.23847	0.210336	0.259967	-0.65647	0.179524

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	professor or instructor	world	s-t-m	-0.00742	0.222261	0.973444	-0.44912	0.434278
			b-t-b	-0.24284	0.19061	0.20601	-0.62164	0.135956
		s-t-m	world	0.00742	0.222261	0.973444	-0.43428	0.449118
			b-t-b	-0.23542	0.201119	0.244937	-0.6351	0.16426
		b-t-b	world	0.242841	0.19061	0.20601	-0.13596	0.621638
			s-t-m	0.235421	0.201119	0.244937	-0.16426	0.635102

LSD for future institutional profile contingencies

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Use of ICT for future activities	teaching 18-24	world	s-t-m	-0.0731	0.207023	0.724852	-0.48452	0.338314
			b-t-b	0.064144	0.177542	0.718747	-0.28868	0.416971
		s-t-m	world	0.073102	0.207023	0.724852	-0.33831	0.484517
			b-t-b	0.137246	0.18733	0.465724	-0.23503	0.509526
		b-t-b	world	-0.06414	0.177542	0.718747	-0.41697	0.288683
			s-t-m	-0.13725	0.18733	0.465724	-0.50953	0.235034
	providing lifelong learning	world	s-t-m	0.009502	0.266954	0.971686	-0.52101	0.540017
			b-t-b	0.056878	0.228938	0.80437	-0.39809	0.511844
		s-t-m	world	-0.0095	0.266954	0.971686	-0.54002	0.521012
			b-t-b	0.047376	0.24156	0.844964	-0.43267	0.527425
		b-t-b	world	-0.05688	0.228938	0.80437	-0.51184	0.398087
			s-t-m	-0.04738	0.24156	0.844964	-0.52743	0.432673

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	teaching international students	world	s-t-m	-0.16778	0.287455	0.560931	-0.73904	0.403476
			b-t-b	0.000366	0.246519	0.998817	-0.48954	0.490272
		s-t-m	world	0.167781	0.287455	0.560931	-0.40348	0.739037
			b-t-b	0.168147	0.260111	0.519674	-0.34877	0.685063
		b-t-b	world	-0.00037	0.246519	0.998817	-0.49027	0.489539
			s-t-m	-0.16815	0.260111	0.519674	-0.68506	0.348769
	Innovation in teaching and learning	world	s-t-m	-0.00674	0.196164	0.972682	-0.39657	0.383097
			b-t-b	0.178357	0.168228	0.291951	-0.15596	0.512676
		s-t-m	world	0.006737	0.196164	0.972682	-0.3831	0.396571
			b-t-b	0.185094	0.177504	0.299914	-0.16766	0.537845
		b-t-b	world	-0.17836	0.168228	0.291951	-0.51268	0.155961
			s-t-m	-0.18509	0.177504	0.299914	-0.53784	0.167657

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Internally funded research	world	s-t-m	-0.23337	0.340941	0.495466	-0.91092	0.444179
			b-t-b	-0.00906	0.292389	0.975356	-0.59012	0.572003
		s-t-m	world	0.23337	0.340941	0.495466	-0.44418	0.91092
			b-t-b	0.224312	0.308509	0.469104	-0.38878	0.83741
		b-t-b	world	0.009058	0.292389	0.975356	-0.572	0.590119
			s-t-m	-0.22431	0.308509	0.469104	-0.83741	0.388785
	Externally funded research	world	s-t-m	-0.35544	0.354731	0.319094	-1.06039	0.349516
			b-t-b	-0.07897	0.304215	0.795788	-0.68353	0.525593
		s-t-m	world	0.355439	0.354731	0.319094	-0.34952	1.060393
			b-t-b	0.276468	0.320988	0.391411	-0.36143	0.914363
		b-t-b	world	0.078971	0.304215	0.795788	-0.52559	0.683534
			s-t-m	-0.27647	0.320988	0.391411	-0.91436	0.361427

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Interaction business and industry	world	s-t-m	-0.41427	0.305285	0.178249	-1.02097	0.192416
			b-t-b	-0.31805	0.261811	0.227695	-0.83834	0.202248
		s-t-m	world	0.414275	0.305285	0.178249	-0.19242	1.020965
			b-t-b	0.096229	0.276245	0.728411	-0.45275	0.645208
		b-t-b	world	0.318045	0.261811	0.227695	-0.20225	0.838339
			s-t-m	-0.09623	0.276245	0.728411	-0.64521	0.45275
Balance	balance f-t-f en online	world	s-t-m	0.010769	0.186739	0.954145	-0.36034	0.381872
			b-t-b	0.076292	0.160146	0.634975	-0.24196	0.394548
		s-t-m	world	-0.01077	0.186739	0.954145	-0.38187	0.360335
			b-t-b	0.065524	0.168975	0.699122	-0.27028	0.401326
		b-t-b	world	-0.07629	0.160146	0.634975	-0.39455	0.241964
			s-t-m	-0.06552	0.168975	0.699122	-0.40133	0.270279

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Future student demand	demand for wider access 18-24	world	s-t-m	-0.03289	0.261366	0.900155	-0.5523	0.486523
			b-t-b	-0.064	0.224146	0.775898	-0.50945	0.381439
		s-t-m	world	0.032887	0.261366	0.900155	-0.48652	0.552297
			b-t-b	-0.03112	0.236504	0.895625	-0.50112	0.438885
		b-t-b	world	0.064004	0.224146	0.775898	-0.38144	0.509446
			s-t-m	0.031117	0.236504	0.895625	-0.43888	0.501118
	demand for lifelong learning	world	s-t-m	-0.17607	0.232975	0.451819	-0.63906	0.286919
			b-t-b	0.127318	0.199798	0.525627	-0.26974	0.524375
		s-t-m	world	0.176071	0.232975	0.451819	-0.28692	0.63906
			b-t-b	0.303389	0.210814	0.153661	-0.11556	0.722336
		b-t-b	world	-0.12732	0.199798	0.525627	-0.52437	0.269739
			s-t-m	-0.30339	0.210814	0.153661	-0.72234	0.115559

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	demand for international students	world	s-t-m	-0.2141	0.270463	0.430712	-0.75159	0.323384
			b-t-b	-0.20299	0.231947	0.383866	-0.66394	0.257953
		s-t-m	world	0.214103	0.270463	0.430712	-0.32338	0.75159
			b-t-b	0.011111	0.244735	0.963891	-0.47525	0.49747
		b-t-b	world	0.202992	0.231947	0.383866	-0.25795	0.663937
			s-t-m	-0.01111	0.244735	0.963891	-0.49747	0.475248
Future demand for flexibility	demand for flexibility in locations of learning	world	s-t-m	-0.21104	0.229576	0.360466	-0.66728	0.245191
			b-t-b	-0.23128	0.196882	0.243284	-0.62254	0.159985
		s-t-m	world	0.211043	0.229576	0.360466	-0.24519	0.667276
			b-t-b	-0.02023	0.207737	0.922626	-0.43307	0.392599
		b-t-b	world	0.231277	0.196882	0.243284	-0.15998	0.62254
			s-t-m	0.020235	0.207737	0.922626	-0.3926	0.433069

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	demand for flexibility in times of learning events	world	s-t-m	-0.15535	0.228023	0.497464	-0.6085	0.297793
			b-t-b	-0.19481	0.195551	0.321887	-0.58342	0.193809
		s-t-m	world	0.155355	0.228023	0.497464	-0.29779	0.608503
			b-t-b	-0.03945	0.206332	0.848804	-0.44949	0.37059
		b-t-b	world	0.194807	0.195551	0.321887	-0.19381	0.583423
			s-t-m	0.039452	0.206332	0.848804	-0.37059	0.449495
	demand for flexibility in pace of learning	world	s-t-m	-0.16383	0.230503	0.47912	-0.62191	0.294247
			b-t-b	-0.19501	0.197678	0.32659	-0.58785	0.197833
		s-t-m	world	0.16383	0.230503	0.47912	-0.29425	0.621906
			b-t-b	-0.03118	0.208577	0.881507	-0.44568	0.383321
		b-t-b	world	0.19501	0.197678	0.32659	-0.19783	0.587854
			s-t-m	0.031181	0.208577	0.881507	-0.38332	0.445683

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Objective for future ICT related policy	increasing efficiency	world	s-t-m	-0.29141	0.210006	0.16876	-0.70875	0.125936
			b-t-b	-0.12883	0.180099	0.476297	-0.48674	0.229078
		s-t-m	world	0.291406	0.210006	0.16876	-0.12594	0.708747
			b-t-b	0.162575	0.190029	0.394583	-0.21507	0.540217
		b-t-b	world	0.128831	0.180099	0.476297	-0.22908	0.48674
			s-t-m	-0.16257	0.190029	0.394583	-0.54022	0.215067
	enhancing quality of T&L	world	s-t-m	0.028173	0.213534	0.895335	-0.39618	0.452527
			b-t-b	0.030973	0.183125	0.866079	-0.33295	0.394895
		s-t-m	world	-0.02817	0.213534	0.895335	-0.45253	0.396181
			b-t-b	0.0028	0.193221	0.988473	-0.38119	0.386787
		b-t-b	world	-0.03097	0.183125	0.866079	-0.3949	0.33295
			s-t-m	-0.0028	0.193221	0.988473	-0.38679	0.381187

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Enhancing flexibility	world	s-t-m	-0.2695	0.202572	0.186825	-0.67207	0.133068
			b-t-b	-0.26549	0.173724	0.130045	-0.61073	0.079752
		s-t-m	world	0.269501	0.202572	0.186825	-0.13307	0.67207
			b-t-b	0.004012	0.183302	0.982586	-0.36026	0.368287
		b-t-b	world	0.265489	0.173724	0.130045	-0.07975	0.610729
			s-t-m	-0.00401	0.183302	0.982586	-0.36829	0.360262
	Enhancing cost-effectiveness	world	s-t-m	-0.20491	0.251578	0.417549	-0.70487	0.295045
			b-t-b	-0.22262	0.215752	0.304976	-0.65138	0.206141
		s-t-m	world	0.204914	0.251578	0.417549	-0.29504	0.704873
			b-t-b	-0.01771	0.227647	0.93818	-0.47011	0.434694
		b-t-b	world	0.22262	0.215752	0.304976	-0.20614	0.651381
			s-t-m	0.017706	0.227647	0.93818	-0.43469	0.470106

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Generating institutional income	world	s-t-m	-0.10605	0.287852	0.713451	-0.67809	0.465998
			b-t-b	-0.11953	0.24686	0.629442	-0.61011	0.371051
		s-t-m	world	0.106048	0.287852	0.713451	-0.466	0.678094
			b-t-b	-0.01348	0.26047	0.958834	-0.53111	0.504147
		b-t-b	world	0.119531	0.24686	0.629442	-0.37105	0.610114
			s-t-m	0.013483	0.26047	0.958834	-0.50415	0.531113
	Creating opportunities lifelong learning	world	s-t-m	-0.09368	0.271266	0.73067	-0.63276	0.445408
			b-t-b	-0.05402	0.232636	0.816928	-0.51633	0.408298
		s-t-m	world	0.093676	0.271266	0.73067	-0.44541	0.63276
			b-t-b	0.03966	0.245462	0.872012	-0.44814	0.527464
		b-t-b	world	0.054016	0.232636	0.816928	-0.4083	0.516331
			s-t-m	-0.03966	0.245462	0.872012	-0.52746	0.448144

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Creating opportunities international .students	world	s-t-m	-0.45524	0.280099	0.10768	-1.01188	0.101399
			b-t-b	-0.14475	0.240211	0.548322	-0.62212	0.332617
		s-t-m	world	0.455239	0.280099	0.10768	-0.1014	1.011877
			b-t-b	0.310487	0.253455	0.223836	-0.1932	0.814175
		b-t-b	world	0.144752	0.240211	0.548322	-0.33262	0.622121
			s-t-m	-0.31049	0.253455	0.223836	-0.81417	0.193201
	Widening access 18-24 years old students	world	s-t-m	-0.32633	0.256164	0.206055	-0.8354	0.182746
			b-t-b	-0.15604	0.219684	0.479406	-0.59261	0.280538
		s-t-m	world	0.326325	0.256164	0.206055	-0.18275	0.835397
			b-t-b	0.170287	0.231796	0.464511	-0.29036	0.630933
		b-t-b	world	0.156038	0.219684	0.479406	-0.28054	0.592614
			s-t-m	-0.17029	0.231796	0.464511	-0.63093	0.290359

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	Enhancing competitiveness	world	s-t-m	-0.34904	0.243135	0.15467	-0.83222	0.134143
			b-t-b	-0.03191	0.208511	0.878736	-0.44628	0.382466
		s-t-m	world	0.349037	0.243135	0.15467	-0.13414	0.832217
			b-t-b	0.317132	0.220007	0.153003	-0.12009	0.754349
		b-t-b	world	0.031906	0.208511	0.878736	-0.38247	0.446277
			s-t-m	-0.31713	0.220007	0.153003	-0.75435	0.120086
	Enhancing status and reputation	world	s-t-m	-0.26675	0.227868	0.244898	-0.71959	0.186085
			b-t-b	-0.02971	0.195418	0.879493	-0.41807	0.358638
		s-t-m	world	0.266755	0.227868	0.244898	-0.18608	0.719594
			b-t-b	0.237041	0.206192	0.253418	-0.17272	0.646804
		b-t-b	world	0.029714	0.195418	0.879493	-0.35864	0.418066
			s-t-m	-0.23704	0.206192	0.253418	-0.6468	0.172722

External contingencies, measured by perception of HEI

LSD: future

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Influence of competition	National HEI	world	s-t-m	0.089902	0.268801	0.738832	-0.44428	0.624087
			b-t-b	0.250166	0.230522	0.28079	-0.20795	0.708279
		s-t-m	world	-0.0899	0.268801	0.738832	-0.62409	0.444284
			b-t-b	0.160264	0.243231	0.511683	-0.32311	0.643635
		b-t-b	world	-0.25017	0.230522	0.28079	-0.70828	0.207948
			s-t-m	-0.16026	0.243231	0.511683	-0.64364	0.323107
	International HEI	world	s-t-m	-0.10949	0.269631	0.685675	-0.64532	0.426345
			b-t-b	0.014023	0.231233	0.951779	-0.4455	0.473551
		s-t-m	world	0.10949	0.269631	0.685675	-0.42634	0.645324
			b-t-b	0.123513	0.243982	0.613955	-0.36135	0.608376
		b-t-b	world	-0.01402	0.231233	0.951779	-0.47355	0.445504
			s-t-m	-0.12351	0.243982	0.613955	-0.60838	0.36135

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	National business and industry	world	s-t-m	-0.18554	0.250737	0.461273	-0.68383	0.312743
			b-t-b	0.0189	0.215031	0.930161	-0.40843	0.446228
		s-t-m	world	0.185544	0.250737	0.461273	-0.31274	0.683832
			b-t-b	0.204444	0.226886	0.370001	-0.24644	0.655332
		b-t-b	world	-0.0189	0.215031	0.930161	-0.44623	0.408428
			s-t-m	-0.20444	0.226886	0.370001	-0.65533	0.246444
	International business and industry	world	s-t-m	-0.30948	0.232213	0.186063	-0.77095	0.151999
			b-t-b	-0.04179	0.199144	0.834267	-0.43755	0.353967
		s-t-m	world	0.309476	0.232213	0.186063	-0.152	0.770952
			b-t-b	0.267685	0.210124	0.206039	-0.14989	0.685262
		b-t-b	world	0.041791	0.199144	0.834267	-0.35397	0.437549
			s-t-m	-0.26769	0.210124	0.206039	-0.68526	0.149892

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Influence of policy from other actors	European Union	world	s-t-m	-0.0634	0.257377	0.805985	-0.57489	0.448078
			b-t-b	-0.16676	0.220725	0.451947	-0.60541	0.271879
		s-t-m	world	0.063405	0.257377	0.805985	-0.44808	0.574888
			b-t-b	-0.10336	0.232894	0.658273	-0.56619	0.359468
		b-t-b	world	0.166765	0.220725	0.451947	-0.27188	0.605409
			s-t-m	0.10336	0.232894	0.658273	-0.35947	0.566188
	policynatactor	world	s-t-m	-0.09657	0.272757	0.724144	-0.63862	0.445475
			b-t-b	-0.56616	0.233914	0.01756	-1.03102	-0.10131
		s-t-m	world	0.096571	0.272757	0.724144	-0.44548	0.638617
			b-t-b	-0.46959	0.246811	0.060359	-0.96007	0.020895
		b-t-b	world	0.56616	0.233914	0.01756	0.101305	1.031015
			s-t-m	0.469589	0.246811	0.060359	-0.02089	0.960074

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	policynatOCW	world	s-t-m	-0.03237	0.275776	0.90684	-0.58041	0.51568
			b-t-b	-0.29646	0.236503	0.213345	-0.76646	0.173545
		s-t-m	world	0.032366	0.275776	0.90684	-0.51568	0.580412
			b-t-b	-0.26409	0.249542	0.292817	-0.76	0.231823
		b-t-b	world	0.296456	0.236503	0.213345	-0.17354	0.766456
			s-t-m	0.26409	0.249542	0.292817	-0.23182	0.760003
	policysub-national	world	s-t-m	0.059806	0.349591	0.864558	-0.63493	0.754545
			b-t-b	0.248162	0.299807	0.410057	-0.34764	0.843965
		s-t-m	world	-0.05981	0.349591	0.864558	-0.75454	0.634932
			b-t-b	0.188356	0.316336	0.553084	-0.4403	0.817007
		b-t-b	world	-0.24816	0.299807	0.410057	-0.84396	0.347641
			s-t-m	-0.18836	0.316336	0.553084	-0.81701	0.440295

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Influence of cooperation	cooperatenatHEI	world	s-t-m	-0.08336	0.24176	0.731057	-0.56381	0.397086
			b-t-b	-0.40846	0.207332	0.051973	-0.82049	0.003568
		s-t-m	world	0.083362	0.24176	0.731057	-0.39709	0.563811
			b-t-b	-0.3251	0.218763	0.140833	-0.75984	0.109647
		b-t-b	world	0.408461	0.207332	0.051973	-0.00357	0.82049
			s-t-m	0.325098	0.218763	0.140833	-0.10965	0.759844
	cooperateinternHEI	world	s-t-m	-0.36323	0.233583	0.123529	-0.82743	0.100969
			b-t-b	-0.6067	0.200319	0.003223	-1.00479	-0.20861
		s-t-m	world	0.363228	0.233583	0.123529	-0.10097	0.827426
			b-t-b	-0.24347	0.211364	0.252474	-0.66351	0.176567
		b-t-b	world	0.606702	0.200319	0.003223	0.20861	1.004794
			s-t-m	0.243474	0.211364	0.252474	-0.17657	0.663514

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	cooperatenatB&I	world	s-t-m	-0.10831	0.274427	0.694043	-0.65367	0.437059
			b-t-b	-0.38886	0.235347	0.102036	-0.85657	0.078838
		s-t-m	world	0.108308	0.274427	0.694043	-0.43706	0.653674
			b-t-b	-0.28056	0.248322	0.261626	-0.77405	0.212931
		b-t-b	world	0.388865	0.235347	0.102036	-0.07884	0.856567
			s-t-m	0.280557	0.248322	0.261626	-0.21293	0.774046
	cooperateinternB&I	world	s-t-m	-0.06157	0.212827	0.773038	-0.48452	0.36138
			b-t-b	-0.33958	0.182519	0.06615	-0.7023	0.023136
		s-t-m	world	0.061569	0.212827	0.773038	-0.36138	0.484518
			b-t-b	-0.27801	0.192582	0.1524	-0.66073	0.104703
		b-t-b	world	0.339582	0.182519	0.06615	-0.02314	0.7023
			s-t-m	0.278013	0.192582	0.1524	-0.1047	0.660729

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Influence of future competition	nathei	world	s-t-m	-0.16817	0.225886	0.458552	-0.61708	0.280727
			b-t-b	-0.1231	0.193718	0.52677	-0.50808	0.261872
		s-t-m	world	0.168175	0.225886	0.458552	-0.28073	0.617076
			b-t-b	0.045072	0.204399	0.825984	-0.36113	0.451272
		b-t-b	world	0.123102	0.193718	0.52677	-0.26187	0.508077
			s-t-m	-0.04507	0.204399	0.825984	-0.45127	0.361128
	foreignhei	world	s-t-m	-0.22595	0.259451	0.386181	-0.74156	0.28965
			b-t-b	-0.23846	0.222503	0.286777	-0.68064	0.203718
		s-t-m	world	0.225955	0.259451	0.386181	-0.28965	0.741559
			b-t-b	-0.01251	0.234771	0.957638	-0.47906	0.454051
		b-t-b	world	0.238461	0.222503	0.286777	-0.20372	0.680639
			s-t-m	0.012506	0.234771	0.957638	-0.45405	0.479064
	natcommercial	world	s-t-m	-0.18653	0.255649	0.467543	-0.69458	0.321514
			b-t-b	0.131927	0.219242	0.548895	-0.30377	0.567625
		s-t-m	world	0.186534	0.255649	0.467543	-0.32151	0.694581
			b-t-b	0.31846	0.23133	0.172113	-0.14126	0.77818
		b-t-b	world	-0.13193	0.219242	0.548895	-0.56762	0.303771
			s-t-m	-0.31846	0.23133	0.172113	-0.77818	0.141259

	Dependent Variable	(I) strategy	(J) strategy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
	foreigncommercial	world	s-t-m	-0.40725	0.271009	0.136489	-0.94583	0.13132
			b-t-b	0.152411	0.232416	0.513683	-0.30947	0.614288
		s-t-m	world	0.407254	0.271009	0.136489	-0.13132	0.945828
			b-t-b	0.559665	0.245229	0.024888	0.072323	1.047007
		b-t-b	world	-0.15241	0.232416	0.513683	-0.61429	0.309466
			s-t-m	-0.55967	0.245229	0.024888	-1.04701	-0.07232

* The mean difference is significant at the .05 level.