

Information Systems Management and Culture

Experiences from a Chinese perspective

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Nomenclature

AI:	Acceptance and Implementation
AM:	Application Management
BBS:	Bulletin Board Systems
D:	Development
DX:	Difference between two means
E1/E2:	Exploitation
F:	Finding
FM:	Function Management
H:	Hypothesis
ICT:	Information Commutation Technology
IDV:	Individualism–Collectivism Index
IM:	Information Management
IPP:	Information Policy and Planning
IS:	Information Systems
ISM:	Information Systems Management
IT:	Information Technology
LTO:	Long Term Orientation Index
MAS:	Masculinity–Femininity Index
M1/M2:	Minor and Major Maintenance
M–IS:	Model of the Information Systems
M–RS:	Model of the Real Systems
MCM:	Management, Control and Maintain
NS:	Not Significant
OpM:	Operational Management
p?:	Significance
PDI:	Power Distance Index
RS:	Real Systems
StM:	Strategic Management
TaM:	Tactical Management
TM:	Technology Management
TU/e:	Eindhoven University of Technology (in The Netherlands)
UAI:	Uncertainty Avoidance Index
U1/U2:	Utilization
X:	Mean
XJTU:	Xi'an Jiaotong University (in China)

1. Introduction

1.1 The Origin of This Research Interest

As an Information Systems manager, the author worked at Xi'an Jiaotong University (XJTU), China, (<http://www.xjtu.edu.cn>) for many years. Her personal experience can be traced back to 1984 when XJTU was the first university in China to launch a project of management information systems. Since then, various Information Systems (IS) at XJTU have been continually developed and improved. At present, the existing IS are covering almost all the transaction processes of XJTU.

In the year 2000, I had an opportunity to study at the Eindhoven University of Technology (TUE), in The Netherlands (<http://www.tue.nl>). During my study at TUE, I had the opportunity to talk with several managers of the university IS, as well as to look and study more closely at some existing IS at the TUE.

Comparing the several IS between XJTU and TUE in practice, I became convinced that there were tremendous differences. Below I will present some typical examples of the differences.

1.1.1 Information Systems at XJTU

Generally speaking, the existing IS at XJTU were all self-designed and constructed upon the demand of superior management levels. The Chinese expression for this is “the one hand involvement.” This means that the highest senior manager who is responsible for the particular business processing in the organization has taken the initiative to develop his own supporting IS. This is still the dominant slogan and basic principle in the IS community in China, for both IS research and IS development.

In practice, all the existing IS are separately designed, developed and deployed in the several administrative divisions and offices. The output of the IS, mostly printed on paper like general reports with tables, still plays a significant role on campus. Such paper output provides the necessary transfer of messages between the different offices, which is necessary due to the fact that offices and departments are not completely autonomous but depend on each other to a certain degree. Additionally, paper output enables the creation of working archives. These archives will be collected and stored in special departments every certain period.

XJTU has also an electronic campus network linking all offices, the student as well as staff dormitory, inside the university. Most computers in offices at XJTU are physically connected to the campus network. However, the IS mentioned above still work in their original set up and are functioning more or less as information islands. As a matter of fact, there are quite a few database links between the different IS within the different departments. Generally speaking, the IS work inside a particular division for particular administrative business processes. These systems are not intended or accessible outside the “owning” department. Even within a specific

department there are strict authorization rules for those who have access to IS and who do not.

After the Internet was implemented at the XJTU campus, the ISM became involved in new tasks and responsibilities, such as publishing university information on the website, transferring messages by E-mail and communication by Bulletin Board Systems (BBS).

The website technology has provided a new form and a new opportunity for publishing information. The primary information at the official XJTU website includes: university hot news, distinguished academics, an introduction to the university organization, existing national key laboratories, information about educational programs, admission, studying abroad, staff and vacancy information, information about international conferences, including the call for papers, the XJTU journal, information about scientific programs and technology transfer, information about international co-operation, library information, information about the available ICT services, alumni news, and so on.

In general, Email is not prevalent for both collective and individual use. The notifications from the organization to individuals are generally communicated through the medium of paper. Business communications, as well as private communications, are often in a face-to-face mode or by phone, sometimes by FAX.

In addition, the BBS is a very attractive communicating facility at campus. There are many participants discussing themes, covering a lot of messages both at campus, as well as outside the campus. The total number of the actual running chat themes is nearly 200 in the BBS area. Some of the most favorite themes are: the top ten hottest topics, the latest prime topics, news from the XJTU forum science, technology issues, sociology, liberal arts, sports, music, games, news from other universities, on-line chatting and discussions, searching friends, and so on.

Many students, teachers, university staff, as well as managers are quite interested in the chatting themes and topics. It appears to be a very useful communication facility between colleagues, between students and teachers, as well as between staff and managers.

There are two modes of access to the BBS. One is through inputting the registered name and password. Another mode is the anonymous one without any input of personal information. People can enter BBS practically anywhere and anytime globally, as long as the user's computer is connected to the Internet.

Regardless of which model one use to access the BBS, all reading and writing of topics are open to users. In other words, users can access any topic in both access modes. However, the published information on the BBS will be monitored and will be cancelled if that information is not allowed to be published.

1.1.2 Information Systems at the TUE

There are many management IS at the TUE, supporting the many business processes at campus. Classifying them into major categories, one could say that one type of IS has to do with issues regarding educational programs and student affairs, another deals with research themes and issues (the several programs, staff involved, external participants involved, contract agreements, etc), still another handles personnel affairs, and the last deals with financial issues and facilities (lecture halls, laboratories, buildings, etc).

The objective of all the IS at TUE relate to the internal business processes. The IS are either self-developed or standard software purchased from external suppliers. Most information tasks are carried out by TUE personnel or students, but some applications, like salary payments, are completely outsourced. The IS are functioning at university levels, department levels, or sub-department levels.

The majority of IS are user centered. In other words, it is up to the users whether a particular information system is necessary and acceptable. The ease of use is, in that respect, quite an important feature. Next to that, and even more important, is the usefulness of the information system itself for the users. An information system will only be successful if, and only if; the users involved have a direct or indirect benefit from that system. This principle is described by Bemelmans as the “Closed Loop Principle”. A system should be designed in such a way that the people, who are mainly responsible for the input, have a direct benefit of doing that input job in a correct way. The system should function as a closed loop in that respect [Bemelmans, 2000].

The TUE Campus network is linked to all offices at the university, highly facilitating various applications. As a matter of fact, all databases and IS are connected to each other according to the users’ business processes requirements. Modifying those links, such as adding, changing and deleting, has to be done according to the user’s requirements.

Back up facilities are strongly developed at the campus network at the TUE. All the existing IS and relevant databases, as well as the back ups are distributed by the campus network at both departmental and university level. Normally, users make their own initial back up at the department level whenever they like. Afterwards, both department and university level back up will regularly and automatically proceed according to fixed periods.

Email is a very popular communicating facility at the TUE. For example, with email it is quite easy to make an appointment, to exchange messages, to announce an event, to issue an invitation, and so on.

The public folder of the Email includes various information from all faculties, departments, institutes, as well as sub-departments, such as the introductory events for new students and/or staff, all kinds of messages, agenda, public announcements, notifications, meeting minutes, general contacts, project proposals, staff issues, tasks to be done, etc.

The website of the TUE provides general information about TUE, the campus plan, the mission statement, slideshows, agendas, publications, departmental information, study programs, research programs and schools, management & service issues, internationalization, vacancies, library information, information about and for students, employees, prospective students, alumni, companies, general visitors, etc.

In addition, the personal website is very popular at TUE. Every staff member can design his or her own personal website according to his or her own desire regarding content, style and form. Meanwhile, he or she can revise the personal website at anytime.

1.1.3 Some Differences between XJTU and TUE

Comparing the situation of the IS at XJTU and the TUE, we find some interesting differences. These will be discussed in the following section.

- **Different Involvement of Senior Management**

As we described before, at XJTU it is quite normal that the basic initiative to develop an information system is taken by the superior management. Chinese people are familiar with hierarchical relationships and from that perspective, it is quite understandable that IS development is only started on the initiative of the “boss.” Earlier we indicated that attitude as “the one hand involvement.” Said another way, the Chinese approach is a top-down one. Many studies in the IS field concern the question of how to effectively involve the senior and primary managers in the different activities and tasks regarding ISM. In practice, many successfully implemented IS at universities are sufficiently supported by senior and primary managers.

In contrast, the approach in the Netherlands regarding university systems seems to be “bottom up.” The future users of a system have a very important influence on system design and development. In that respect, the **user’s involvement** is significant at the TUE in the Netherlands. For example, users are heavily involved in proposing new IS, and also in designing, evaluating, and upgrading IS, etc.

- **Different Information Systems Architectures**

The IS at XJTU are mainly located in and reserved for specific application units. Generally speaking, they are internally oriented. At the university level, there are hardly any existing links or connections between IS. Databases do not cross the application units so there is no practice in sharing common data. In other words, the architecture of the Chinese IS is distributed but at the same time isolated, not integrated. The several systems are functioning on their own, that is, they behave like information islands.

Although the IS at TUE are also decentralized and distributed in the several application units, they are all connected together according to business process requirements. The links between the existing systems and databases are quite complicated. Seen from an architectural viewpoint, one could characterize the TUE systems as distributed, but at the same time highly integrated. Responsibilities related to the IS, as well as with the databases, are organized according to user requirements.

- **Different Information Sharing Approaches**

At XJTU, the information sharing is mainly dependent on the reporting manner. Whenever information has to be exchanged between different units, this could be provided in both paper mode and electronic mode, according to the required type and form. In practice, each exchange must be approved by management and has to follow certain strict authorization procedures.

Information sharing at TUE is mainly **online** and in electronic mode. As mentioned previously, all the databases and IS are substantially connected with each other, according to the requirements of the daily business processes. If a new requirement comes out because of new or adapted business processes, the IS architecture will be adapted by creating new links and connections.

- **Different Information Communicating Channels**

People at the XJTU and the TUE are using the available information communication channels in different ways. At XJTU, email is not prevalent, as people are still used to being informed face to face, by phone or fax. However, the Bulletin Board System (BBS) appears to be a popular communication channel, providing a complementary bridge to the traditional communication channels at campus.

In contrast to XJTU, at TUE Email is the most commonly used communication channel. Many communications, both at the group and individual level, are done by Email.

From the given examples above, the following questions could be asked:

- Why are the existing IS organized differently in practice between XJTU and TUE?
- Why are the approaches of designing and developing IS different between XJTU and TUE?
- What is the reason that the management emphasis and involvement is different between XJTU and TUE?

In order to answer the questions above, there is a compelling need for researching the domain of ISM.

1.2 Expected Results of the Research

“Information system management is a key component of successful implementation and utilization of Information and communication technology in an organization” [Looijen, 1998]. “It is increasingly becoming an important part of the responsibilities of managers and information workers at all levels of the organization” [Ralph H. Sprague et al., 1993]. Particularly, with the increasing internationalization of trade and consequent integrations of the global economy, ISM is becoming increasingly

obvious. More and more businesses are strongly depending on the reliable functioning of IS. At the same time, applications of IS are continuously infused and diffused world wide, due to the rapid development of information technology. Many new technical products are introduced. New technologies are demanded and also provided. New IS are developed and implemented. The border and the scope of IS are crossing organizations, regions and countries. Consequently, globalization is typical of the application of modern information technology. On the one hand, the development and application of IS are boosted because of globalization. On the other hand, managing those IS properly is getting more and more difficult because of the enormous complexity of modern global IS.

This study is significant for several reasons. First, from a global point of view, studying the differences of ISM between Chinese and Dutch would be meaningful. Insights from the research findings would be helpful in understanding the differences that are important when one has to set up an internationalized ISM. Second, the research findings would be helpful to understand people's behavior from different countries. Third, the results of the research would also contribute to developing relevant management strategies for an internationalized ISM. The results would then be useful to study, design and develop more flexible and compatible IS in a global IS world. And last, but not least, the research could benefit IS producers if they are moving from their own domestic markets towards international markets.

1.3 The Research Scope and Focus

It should be clear from the previous sections that this research could be meaningful, useful and helpful for IS researchers, IS-producers, users, as well as for managers. Comparing the several IS at the XJTU and the TUE and then understanding the differences in ISM are the reason and motivation for this research.

It is necessary to clarify the research scope and the research focus. As described in previous sections, some observable differences in ISM between XJTU and the TUE exist in practice. This might be caused by many factors.

Since countries are different, the IS and its ISM have been embedded in different and situational circumstances. Accordingly, the research scope could include many issues related to country specific factors, such as Politics, Law/Legislation, Economics, Organizational issues, Technology, National Culture, etc.

Although all those country specific factors are of significance for ISM, it is not possible to include all those factors in this research. Therefore, this research will focus on national culture and its influence on ISM. Of course, answering the national cultural impact on ISM would not mean that all other country specific factors have been solved. In that sense, this study has its clear shortcomings. However, the result of this research might be useful and helpful for studying the other country specific factors. The research scope and the research focus are depicted in Figure 1.1.

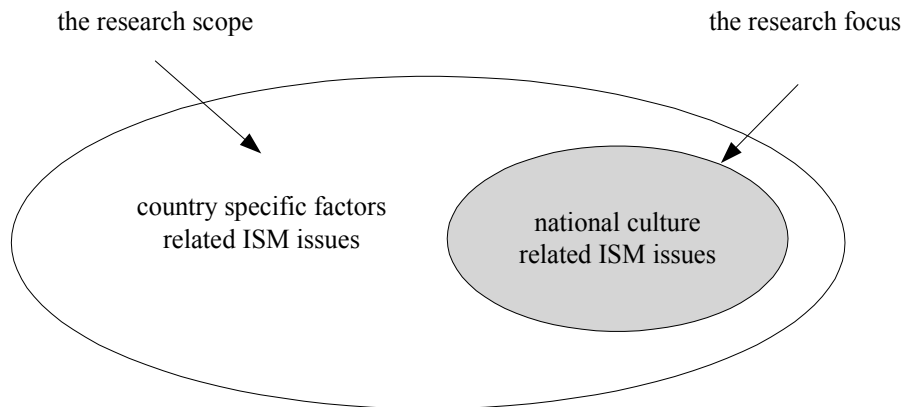


Figure 1.1: The Research Scope and Research Focus

1.4 Research Objective

As stated before, we are interested in finding answers to the following questions:

1. Why are IS in practice organized differently at XJTU and TUE? What generalized conclusions can be drawn from that?
2. Why are there different development approaches in China and The Netherlands? What consequences would this have for ISM?
3. What are explanations that the management emphasis on IS is different between XJTU and TUE? To what adapted strategies should that lead in case one has to develop and deploy IS in general?

The research scope and research focus were clarified in the previous section. In other words, this research will study country specific factors influencing ISM in general, and focus on the national culture factors, in particular. Therefore, one of the objectives of this research is to answer the following research question:

- What is the impact of national cultural differences on ISM?

If national culture plays an important role in the application of IS, it would also profoundly affect the corresponding ISM in practice. Understanding the importance of culture on ISM then becomes particularly relevant because IS cross the borders of countries or regions and thus various users are involved. It is quite a challenge for a (global) ISM to facilitate the reliability, availability, compatibility, flexibility, maintainability, etc of the several IS in use.

Apart from aiming at a direct contribution to understanding and realizing how national culture influences ISM, the second objective of this research is to propose designs for organizing and implementing ISM in the several situational circumstances. Our research ambition is thus not only to clarify the impact of national culture on ISM (explanatory research) but also finding practical solutions for ISM implementations (design oriented research). Therefore, the second objective of this research is answering the following question:

- How can IS be managed properly by taking into account national cultural differences?

We hope that the results of this research will directly contribute to ISM concepts. It will also indirectly contribute to information system design and development according to national cultural influences.

1.5 The Research Approach

The research problems as stated in the previous sections, provide a clue to managing IS properly based on the national cultural influences. In order to study the research questions step by step, the research approach is given in the following Figure 1.2.

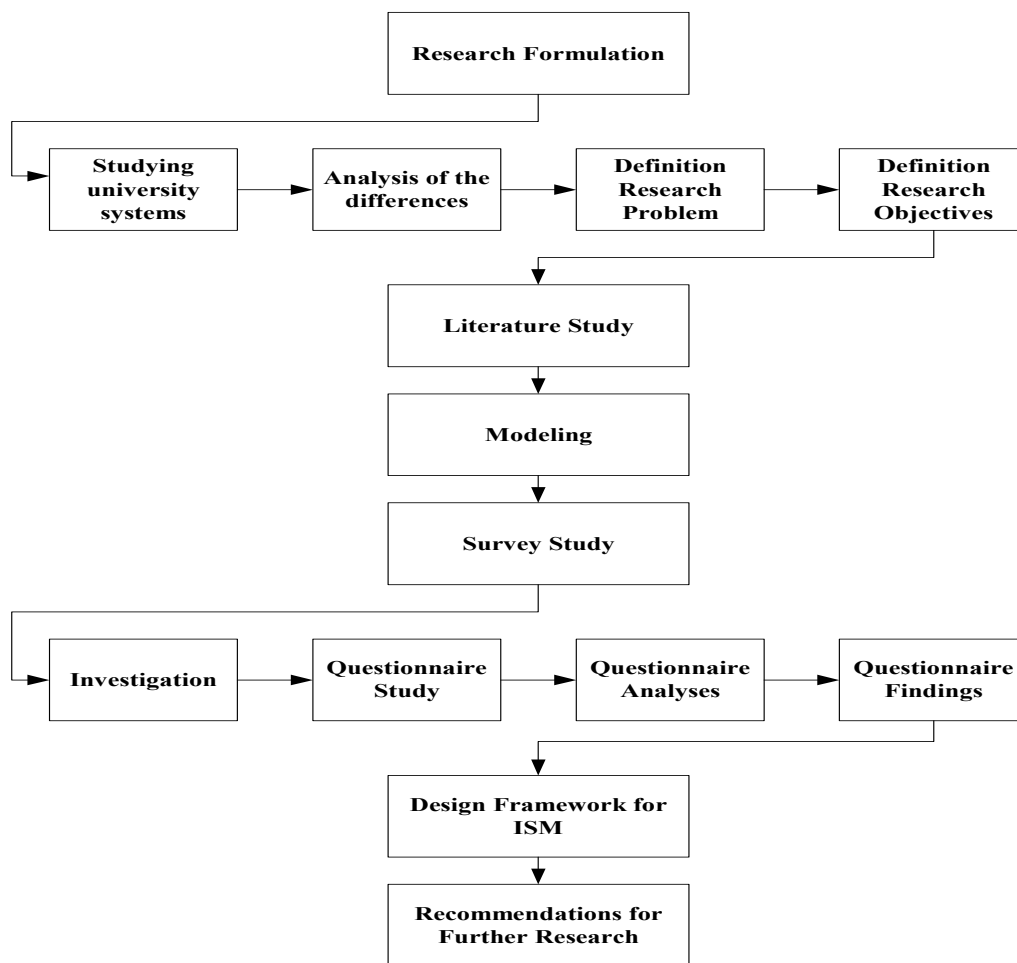


Figure 1.2: Research Approach

1.6 The Thesis Content

This thesis consists of 9 chapters.

Chapter 1 introduces the research domain, the background, the several research problems, the research objectives, as well as the research approach.

Chapter 2 reviews the relevant information system research methodologies. According to the characteristics of this research, we will introduce the several instruments of this research in detail.

Chapter 3 studies and analyzes the country specific factors in general, which influence ISM. In particular, the research issues are presented and analyzed in detail.

Chapter 4 creates an ISM Cube model and analyzes the components of the ISM Cube in general.

Chapter 5 presents the survey study and formulates the hypotheses of the national cultural influences on ISM.

Chapter 6 and 7 present the several statistical results and tests, and analyze the national cultural influence on ISM at universities in China and The Netherlands. The ISM Cube is used in Chapter 6 and Chapter 7, respectively, in different ways. We will explain that in the successive chapters.

Our ambition is also, as stated before, to propose designs for effective and efficient ISM implementations. This is done in chapter 8. In these designs cultural differences are explicitly taken into account.

Finally, Chapter 9 ends this thesis with conclusions and some recommendations for further research.

2. Research Methodology and Strategy

2.1 Introduction

The aim of this chapter is to select the proper research strategy and methods that could be applied to address the research questions and pursue the research objective as described in the previous chapter. Selecting the proper strategy and methods is very important for the reliability and validity of the findings, because “all researches are based on some underlying assumptions about what constitutes ‘valid’ research and which research methods are appropriate” [Myers, 1997]. As a matter of fact, “The academic study of information systems relies very much on the methods used to answer research questions and test research hypotheses, and on the careful application of these methods” [Simon, 1980].

Accordingly, the following sections start with a discussion of some theoretical foundations. The strategy used for this research is outlined subsequently. Furthermore, the several methods used in the research will be presented. Finally, the chapter ends with a chapter summary.

2.2 Theoretical Foundations of the Research

“The research methods related with information system research can be classified in various ways. One of the most common distinctions of these research methods is between qualitative and quantitative” [Myers, 1997]. Qualitative research is described as “the non-numerical examination and interpretation of observations, for the purpose of discovering underlying meanings and patterns of relationships” [Babbie, 1992]. Particularly, qualitative research methods enable researchers to study social and cultural phenomena [Kaplan et al., 1994]. In practice, qualitative research involves the use of qualitative data acquired in interviews, documents, action research, case studies or participative observation to understand and explain social phenomena.

Quantitative research methods were mainly developed in natural sciences to study natural phenomena. Quantitative methods are defined as “the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect” [Babbie, 1992]. Quantitative research is sometimes linked to the notion of science as “objective truth.” Examples of quantitative methods are survey methods, laboratory experiments, and so on.

According to the literature, qualitative research usually begins with an open-ended observation and analysis, most often looking for patterns and processes that could explain the “how and why” questions. Quantitative research usually begins with pre-specified objectives and hypothesis, focused on empirical testing. Recently, “A growing group of researchers have proposed the use of combined research methods, that is, the use of both qualitative and quantitative work” [Meredith, 1998]. In the IS

research community, “The value of combining research methods in information system research has received significant recent attention” [Gable, 1994]. Kaplan states that “Combining these methods introduces both testability and context into the research” [Kaplan and Duchon, 1988]. Accordingly, it is believed that a deeper understanding of the many IS researchable problems can be gained by combining qualitative and quantitative methods.

“However, understanding a problem is only halfway to solving it” [Aken, 2002]. In the domain of ISM it is meaningful to describe, explain and possibly predict observable phenomena on the basis of the evidences provided by empirical research. Nevertheless, for management purposes one needs to go further than only explaining. For applying and using research results one has to look after suitable designs for the observed ISM problems in practice. In other words, empirical research findings should not only lead to valid and reliable knowledge, but should also be used in designing solutions to the several ISM problems.

Summarizing the discussions above, the theoretical foundation of this research will be based on the combination of qualitative and quantitative methods, which will be used to investigate the addressed ISM problems. In addition, our research aims at providing designs for ISM, which also requires a design orientation. To meet foregoing requirements, the strategy of this research will be elaborated in the following section.

2.3 Research Strategy

A research strategy can be defined as the steps, which have to be carried out for studying the chosen phenomena. It outlines the sequence of data acquisition and analysis [Vreed, 1995]. The choice of a strategy is greatly influenced by the nature of the problem to be solved [Wanyembi, 2002].

As mentioned in chapter 1, the focus of this research is to study the national cultural influence on ISM in general, taking the Chinese and Dutch culture, in particular. However, “We have a limited understanding of how and why specific cultural attributes affect the planning and implementation of Information systems (and information technology) enabled business process change efforts” [Davison and Martinson, 2003]. Particularly, “This question is still a very open line of investigation, because other studies do not find a direct relationship between different national cultures and IS management issues” [Aguila et al., 2002]. Accordingly, this research has to face many challenges and has to cope with many open questions.

With respect to the nature of the research problem, it is characterized by the fact that there is neither an appropriate theory available, nor a single method that could be directly employed to study the selected research problem. Consequently, there is a lack of proven references for our research problem. Keeping in mind the research objective, the nature of this research requires a design orientation, which includes exploring and identifying the research questions raised, examining and investigating these questions, as well as describing and explaining the answers found to these questions. Ultimately, the improved knowledge should be not only valid and reliable, but should also be usable in designing solutions to the ISM issues addressed.

Consequently, the proposed research strategy of this study could be briefly summarized as follows:

A first step in the research is necessary to explore and identify what factors are influencing ISM.

A second step should answer the question whether differences in cultural patterns are leading to significant differences in ISM approaches.

Finally as a third step, the research should deliver designs for proper ISM implementations in practice, taken into account the insights acquired in the previous two steps of the research process.

The foregoing concludes our choice for a particular research strategy, containing three major steps in studying and analyzing the problem stated.

2.4 Research Methods

Research methods are expected to be the means, with which the phenomenon is studied, data is collected and analyzed. Next we need methods to validate the acquired insights and to transform this knowledge into operational ISM concepts. It would be easy if from the research strategy, the preferred research methods would be indicated automatically. However, the selection of particular methods depends, among other things, on the amount of the already existing knowledge, on the nature of the object of research, on the aspects of the research object that the researcher wants to focus on, and on the resources available to the researcher [Benbasat et al., 1987; Orlikowski et al., 1991].

Based on the discussions about the research nature and research objective, the considerations of the research methods are composed of *studying instruments*, *designing instruments* and *data collecting instruments*. In the following subsections, the chosen instruments will be briefly described and explained.

2.4.1 Studying Instruments

As mentioned in the previous section, our research will be based on the combination of qualitative and quantitative methods. In particular, we use a combination of case study and survey methods, as recommended in literature studies. In the IS research community the following statement can be found regarding this subject: “The case study (qualitative) and survey (quantitative) methods have seen extensive application in information systems” [Gable, 1994]. According to literature, survey studies and case studies have been seen as mutual complementary methods. It is said that each is incomplete without the other [Attewell et al., 1991; Kraemer, 1991; Gutek, 1991]. “Without the survey data, the observer could only make reasonable guesses about his area of ignorance in the effort to reduce bias” [Jick, 1983]. Accordingly, survey could contribute to greater confidence in the generalized results. Nevertheless, “The

researcher should have a very good idea of the answer before starting a survey. Thus, traditional survey research usually serves as a methodology of verification rather than discovery” [Gable, 1994]. In this regard, case study, as a supplementary approach, could seek to discover and identify the research problems being investigated in advance. Therefore, the study instruments, which we will employ in this research, will be a combination of *case study* and *survey*.

Case Studies

“Case study is the most common qualitative method used in information systems” [Orlikowski et al., 1991; Alavi and Carlson, 1992]. Case study is an ideal methodology when a holistic, in-depth investigation is needed [Feagin et al., 1991]. Yin defines a case study as follows:

A case study is an empirical inquiry that

- *Investigates a contemporary phenomenon within its real-life context, especially when*
- *The boundaries between phenomenon and context are not clearly evident [Yin, 1994]*

There are three specific types of case studies: *Exploratory*, *Explanatory*, and *Descriptive* [Yin, 1993].

Exploratory case studies are considered as a prelude to some social research. In exploratory case studies, fieldwork and data collection may be undertaken prior to definition of the research questions and hypotheses. In other words, the framework of the study has to be created underway. Pilot projects are in this respect very useful in determining the final protocols that will be used. In addition, surveys can be adapted or added based on the outcome of the pilot study.

Explanatory case studies are suitable for doing causal studies. In very complex and multivariate cases, the analysis can make use of pattern-matching techniques since the “pattern-matching was described as a useful technique for linking data to the propositions” [Campbell, 1975].

Descriptive case studies require that the investigator start with a descriptive theory. What is implied in this type of study is the formation of cause-effect relationship.

According to Yin’s definition, case study research excels at bringing us to an understanding of a complex issue or object, and can extend experience or add strength to what is already known through previous research. It is appreciated that there are three strengths of case study research in IS:

- (1) The researcher can study IS in a natural setting, learn about the state of the art, and generate theories from practice;
- (2) The method allows the researcher to understand the nature and complexity of the process taking place; and

- (3) Valuable insights can be gained into new topics emerging in the rapidly changing information systems field [Benbasat et al., 1987].

Particularly, “case studies are appropriate where the objective is to study contemporary events, and where it is not necessary to control behavioral events or variables” [Yin, 1994].

The Survey Method

A survey is a means of “gathering information about the characteristics, actions, or opinions of a large group of people, referred to as a population” [Tanur, 1982]. Survey analysis may be primarily concerned either with relationships between variables, or with projecting findings descriptively to a predefined population [Glock, 1967].

In contrast to case study, survey research involves examination of a phenomenon in a wide variety of natural settings. The researcher has to define very clearly independent and dependent variables and a specific model of the expected relationships, which are tested against observations of the phenomenon. It is said that survey research is most appropriate when:

- a. The studying questions are of the type “what is happening?” and “how and why is it happening?” Particularly, survey research is well suited for answering questions about “how many or how much”.
- b. Control of the independent and dependent variables is not possible or not desirable.
- c. The phenomena of interest have to be studied in their natural setting.
- d. The phenomena of interest occur in current time or occurred in the recent past [Pinsonneault et al., 1993].

Survey research can be used for *exploratory*, *descriptive*, or *explanatory* purposes.

The exploratory survey focuses on determining what concepts have to be measured and how to measure them best. It could also be used to discover and raise new possibilities and dimensions of the population of interest. According to literature, “The purpose of an exploratory survey is to elicit a wide variety of responses from individuals with varying viewpoints in a loosely structured manner as the basis for design of a more careful survey” [Ball, and Harries, 1982].

The descriptive survey research is to find out what situations, events, attitudes, or opinions are occurring in a population. It aims at a description of the distribution of some phenomena in a population or among subgroups of a population. The researcher’s concern is to construct a distribution or to make comparisons between distributions. It is often used to ascertain facts, not to test theory [Pinsonneault et al., 1993].

The explanatory survey is to test theory and causal relations. It aims at asking about relationships between variables and studies how and why the variables ought to be related from theoretically grounded expectations. It not only assumes that relationships of cause and effect exist between the variables, but also directionality exists as well. The research questions may not only address the existence of a causal relationship but may also orient toward asking why the relationship exists.

Our choice for a combination of case study and survey method

Based on the discussions above, we conclude that it is meaningful and helpful to combine the case study (exploratory) approach and the survey (descriptive) approach in this research. On the one hand, the exploratory case study, as an instrument, is suitable for exploring the research problems and issues. It provides the opportunity to look for the penetrating research questions and to capture the richness of the research problems for ISM. Furthermore, the problems and issues identified in the exploratory case study could point to important variables for further investigation. Especially, survey questions can be subsequently organized or added according to the research problems and issues identified from prior case studies.

On the other hand, the descriptive survey suits the objective of the research as the detailed study part, because it investigates and examines the distributions of some phenomena in a population or among subgroups of a population. Since this research is concerned with the differences of ISM between Chinese culture and Dutch culture, the findings could contribute to the confidence of the explored research questions and issues from prior case studies.

2.4.2 Designing Instruments

In order to investigate the identified ISM issues in detail, the research needs an approach for examining them. Furthermore, the research should go further than only explaining, but also provide solutions for ISM problems taken into account the cultural impact. Both situations require that we employ additional research instruments, which should be design orientated. One of the most promising methods in this respect is (business and information process) modeling.

According to IS literature, “Modeling is the most important connection that links information system management and information technology” [Chen et al., 2002]. Some researchers have concluded, “Modeling is an essential element of information systems work” [Beynon-Davies, 2002]. Consequently, the modeling will be employed as the designing instrument in this research, which will follow the framework: the way of thinking, the way of modeling and the way of working [Sol, 1990]. Particularly, we will focus on the way of modeling.

“The way of modeling describes the different types of models that are constructed during the modeling study” [Vreede, 1995]. There is a distinction between conceptual and descriptive models. Conceptual models define and mark the boundaries of the issues within the problem area to be focused upon. Descriptive models allow the analysis, description and diagnosis of the issues, leading to a deeper understanding of the situation under investigation, to determine what must be done and to offer possible solutions to the problems under consideration” [Checkland, 1981, 1990]. Accordingly,

both conceptual models and descriptive models suit our research requirements, and therefore both will be employed in this research.

2.4.3 Data Collecting Instruments

For the purpose of conducting this research, collecting valid data is of prime importance. Data collecting should not only be planned carefully, but also be organized properly. The scope of the data collecting is divided into two main parts: one part is Chinese, and the other part is Dutch, since this research particularly focuses on the national cultural influence on ISM in China and The Netherlands. Consequently, the locations where data was collected were China and The Netherlands. The collected data include both primary data and secondary data.

Primary Data Collecting Instruments

In this research, various instruments are used for collecting primary data, namely interviews, site visits, reflection on past experience, and surveys based on questionnaires.

- **Interview**

Interviews are important means of gaining case study information. Interviews can be used for three purposes: as an exploratory device to help identify variables and relations, as the main instrument of the research, or as a supplement to other methods [Kerlinger, 1986]. Interview instruments mainly include communication in a *face-to-face mode*, *by telephone* and *by email*. All these instruments are frequently used at the beginning stage of the research. In this research, we used several interviews, both in a formal and in an informal setting. They mainly served as a supplement to the survey. Many times the form of the interviews was open-ended. People who were involved in such interviews were mainly Dutch. Some of them were educators and research specialists in the ISM research field or in the culture research field; some of them were researcher's colleagues or friends. Their ideas, standpoints and attitudes were not only useful and helpful to conceive the research background, but also to construct the research problems and issues for further study.

- **Site Visiting**

Site visiting proceeded at the TUE at an early stage of this research. I visited some organizations and departments related to ISM and Information Technology and Communication (ICT). Meanwhile, some existing information systems were also studied. During this period, many formal qualitative data were collected, including the management strategy, the operation of the specialized ICT organization, the several information systems, as well as the relevant technical facilities at TUE.

- **Historical Retrospect**

As a contrast sample, a brief historical retrospect was summarized according to the past experiences of the researcher, related to the ISM and ICT at XJTU (Xi'an Jiaotong University) in China. The comparison was focused on issues such as the ICT organization, the decision-making, as well as the IS design, the application of IS, and last but not least the maintenance and updating activities.

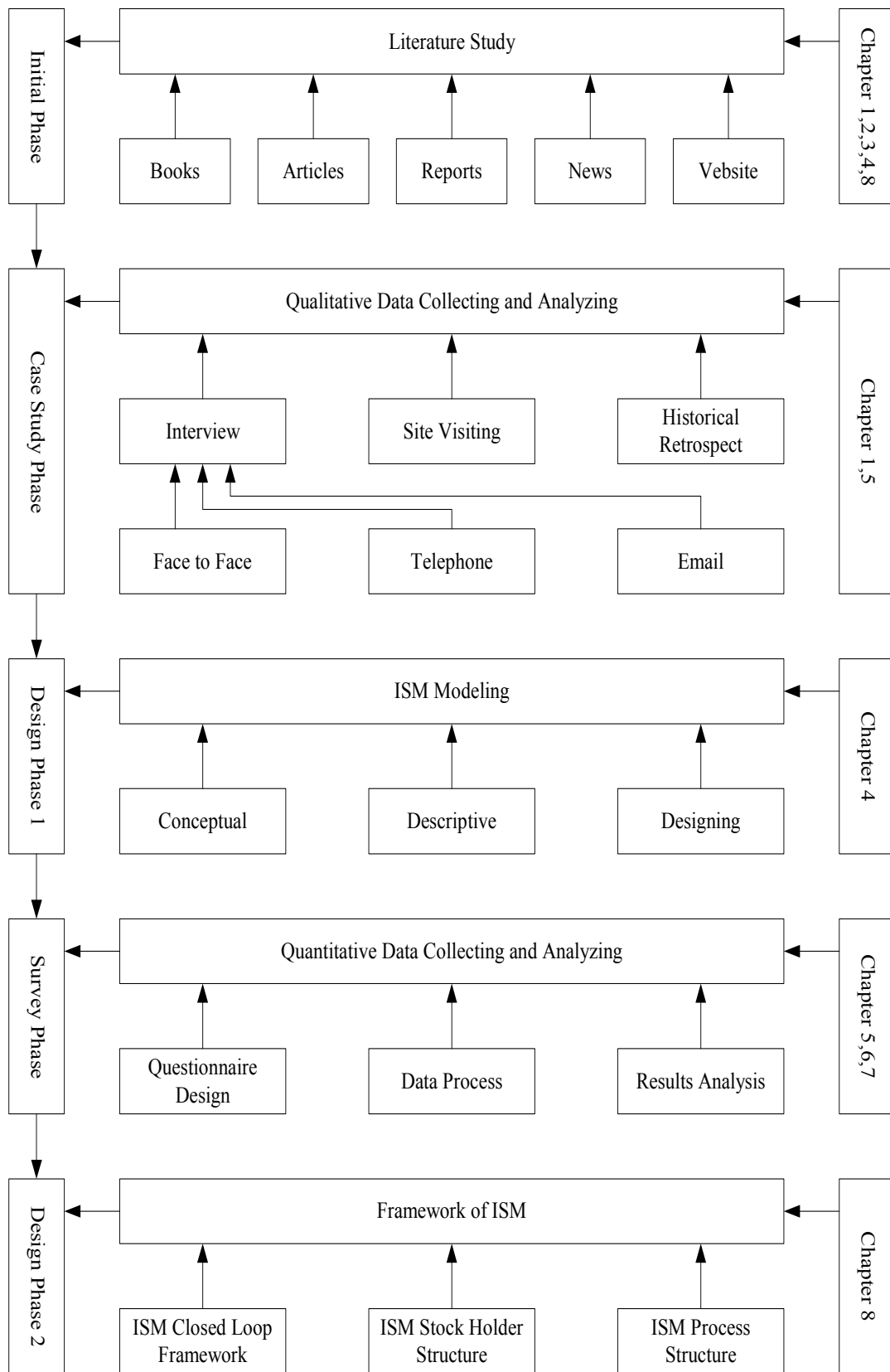


Figure 2.1: Research Instruments Used in Different Phases

The work during this period was planned as setting up of the case study for this research. All qualitative data gained above were elaborated. The general analysis provided a deeper understanding of the research problems. Meanwhile, they were also used as a basis for the questions in the questionnaire that was designed later in the course of this research.

- **Survey questionnaire**

A formal survey questionnaire was specially designed for this research, based on qualitative data analysis from the prior case study. It was intended to collect quantitative data. The survey data were all collected in a complete anonymous way, because it was expected that the collected answer would be more accurate in doing so.

Although the qualitative (case study) and the quantitative (survey) research stages were organized separately, the results of both stages were presented and analyzed simultaneously.

Secondary Data Collecting Instruments

Apart from the primary data, secondary data is also another important part of the references for this research, since it is very useful and very often saves research time. There are many secondary data available for our research issue, such as *literature, books, articles, working reports, newspapers, news reports* and *websites* etc. Although none of them could be directly used to study the entire research problem, they are very useful and valuable as references for understanding the cultural differences as well as some aspects of our research problem. Particularly, such instruments are significant for providing hints and clues to the researcher in order to continue from the initial stage of research.

Summing up the discussions above, the general outlines of the research instruments used in this research are presented in the Figure 2.1, which is divided into different phases and appears in the corresponding chapters as well.

2.5 Chapter Summary

The methodology and strategy used in this research were described and explained in this chapter. The theoretical foundations were briefly reviewed, on which the rational choices of the case study and survey were based. A brief description of the modeling, which is employed in this research as the designing instrument, was also given. The details of the methods and strategy used in this research will appear in the following corresponding chapters.

3. ISM and Influential Factors

3.1 Introduction

In this chapter we will investigate the issues regarding ISM in a global perspective. Section 3.2 identifies the complexity of ISM, taking into account the actual situation and future outlook where IS will become more and more global considering the business trends like international cooperation and worldwide alliances. Section 3.3 presents a systematic overview of existing literature regarding ISM and discusses the various subjects belonging to ISM as identified in theory and practice. Section 3.4 focuses on several interrelationships between ISM and characteristics of the IS and IS environment. As such, it presents a contingency approach where dependent on the situational factors one has to decide on a proper ISM concept. Finally, the chapter ends with a chapter summary.

3.2 Trends of ISM

The development of IS has contributed greatly to the feasibility of and opportunities for globalisation. Some citations can underline this trend. “As evidence of a world that is becoming increasingly integrated, the terms ‘global’ or ‘globalization’ occur in many management disciplines from managerial economics to marketing to management information system” [Ford et al., 2003]. Various researchers concur: “Globalisation is particularly relevant for information systems practitioners and researchers because IS have played the important role in organizations’ responses to globalisation” [King et al., 1999]. Though national differences may affect IS development, implementation, structure and use, many international and multinational companies need to transfer or develop IS in a number of different countries [Abdul-Gader, 1997; Day et al., 1995; Dustbar and Hofstede, 1999; Ferratt and Vlahos, 1998; Martinsons, 1991]. From a global point of view, the international environments of ISM are becoming more prevailing and inevitable.

Considering the globalization of applications and of the design of IS, ISM can be classified into four types:

- native-designed vs. foreign-applied (type I);
- foreign-designed vs. foreign-applied (type II);
- native-designed vs. native applied (type III) and
- foreign-designed vs. native applied (type IV).

These four types of ISM are represented in the several quadrants of Figure 3.1 and will be described in more detail below.

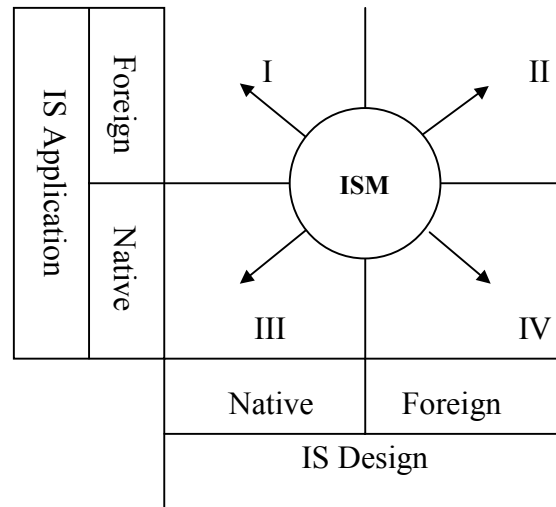


Figure 3.1: The Global Environments of ISM

Quadrant I

The IS in this quadrant are native designed but the application of these systems are functioning in foreign environments. This implies also that ISM in this quadrant has to be international per se. One of the important management issues is to harmonize the application of the different IS in the several countries with the native designed perspective. This quadrant represents the typical situation of international organizations, such as a headquarter office in one country with branch offices abroad. Other examples are international financial reporting systems from the several local companies to headquarters or the “distant learning” educational systems.

Quadrant II

The global environment of ISM in this quadrant shows a very special situation. The IS are designed in country A, the applications are situated in country B, and the users are from other countries. This is a very special ISM situation, commonly happening in the case of outsourcing the design as well as the factual application of the IS. The management issue here is not only to guarantee the fit with the local situation, but also to take into consideration the users’ national backgrounds. Later on we will call this aspect of ISM the information management part. Practical examples of this case are international training business and international education exchange.

Quadrant III

This quadrant has a purely native environment. ISM means in this case the management of both native products and native applications. This quadrant was valid for the very beginning of automation and lasted for many decades. In the global environment of today, this case is obviously getting less and less important.

Quadrant IV

Quadrant IV represents an environment of ISM, in which the management issue is to apply locally foreign designed IS products. This also refers to outsourced management of the development of IS products. Typical examples are standard

Enterprise Resources Planning (ERP) systems from worldwide operating software companies, standard workflow systems from specialized software houses, hospital IS, etc.

Figure 3.1 clearly presents the trend toward the globalization and internationalization of ISM (e.g., in quadrant I, quadrant II and quadrant IV). Consequently, it is meaningful to clarify the issues of an internationalized ISM.

3.3 Issues of Internationalized ISM

The following citations demonstrate some of the trends in ISM, indicating also what kind of managerial issues are becoming increasingly important. “Reports of key information systems management issues have continually appeared” [Palvaia et al., 2002] and “Information systems management has been the job of technicians, but it is increasingly becoming an important part of the responsibilities of managers and information workers at all levels of the organization” [Sprague et al., 1993]. Furthermore, “Information systems management is concerned with the management of information handling applications in the organization” [Beynon-Davies, 2002]. From the global point of view, “The management of IS (IT) refers to managing the design, development, and implementation of IS and technologies in a cross-cultural environment” [Weisinger et al., 2003].

In the IS literature, various authors have described ISM issues from different perspectives. Particularly, many studies on ISM key issues have emphasized the international perspective. For example, Deans et al. organized a survey with the result that important ISM issues depend on political, legal, economic, cultural and technological factors in the several foreign countries studied [Deans et al., 1991]. It was suggested that critical issues of ISM should reflect political, economic and cultural impacts of the regional environments, certainly in cases where ISM transcends national boundaries [Burn et al., 1993]. Issues in ISM should include the differences between regions such as national culture, economic status and structure, political/legal environment, and the technological status [Watson et al., 1997].

From the IS management research practice, some models were provided to emphasize ISM issues from a broader regional or global perspective. For example, Deans elaborates on his model: “The model identifies a means by which multinational MIS managers can begin to understand the major forces in the technological, social/cultural, legal/political and economic dimensions of the foreign environments in which they do business” [Deans and Ricks, 1991]. Palvia et al. have developed an organized and well-structured framework for global IS/IT issues and the factors that might influence them, which include the level of the economic development of a country, the political/regulatory structure, several cultural issues, global organizational strategies, global business and IS/IT strategy, and type of firm [Palvia et al., 2002].

Also Looijen, one of the most famous writers on ISM, suggests in his paradigm that several external influences for ISM should be distinguished like managerial, informational, economic and technical influences [Looijen, 1998]. Hemmen further modifies those external influences into “managerial, contractual, economic and

technical influences” [Hemmen, 1997]. Wanyembi distinguishes “managerial influence, cultural influence, economic influence, technological influence and donor influence” [Wanyembi, 2002]. Hendriks creates a distinction between factors (influences) regarding “supply and sales markets, labor markets, technological environments, legislation and social attitudes, and the socio-economic situation” [Hendriks, 2003].

Summarizing the IS literature above: “A number of factors have been suggested to cause national differences, including a country’s infrastructure, the political and economic situation, the physical environment and the cultural dynamics” [Ford et al., 2003]. Despite the variety of studies related to the global IS/IT area, there has been little effort of clarifying these influencing factors. The following discussion will concentrate on the factors most frequently mentioned in literature, which could be generally summarized as: the political environment, the legislation/regulation, organizational structure and culture, technological environment, and last but not least, national culture.

3.3.1 The Political Environment

Palvia states in his study: “The political and governance philosophy (socialism, capitalism, communism, democracy and dictatorship) affects therefore the conditions in which IS (IT) is managed and developed” [Palvia et al., 2002]. Chepaities [1996] suggests, “The problems caused by the impact of a political system that includes control and pressure by the authorities, are poor public data stores and a lack of competitive market experience”. Therefore, the political environments in different countries deserve more attention for ISM, because “The political environment can affect different IS (IT) related areas, e.g. the governmental technology initiatives, enactment and enforcement of standards, technology investments and technology deployment as well” [Palvia et al., 2002].

For example, the Chinese government behaves rather differently from the governments in Western countries. A typical point, for example, is that the Chinese government not only proposes and develops IS projects directly, but also supports the projects with huge financial investments. Some examples will be presented in the following.

Since the launching of the so-called “open door policy” in 1978, the Chinese government viewed the application of IT as essential for maintaining economic growth. Hereafter, a lot of huge IS and IT projects were initiated. For example, in 1984 the State Council formally announced the development of a Nation-Wide Economic Information Network. This system linked all the IS of the central government with those of the provincial and the city governments.

At the Seventh Five-year Plan (1985-1990), there were 12 large-scale IS domains mentioned as priority areas. These domains were post/telecommunications, banking, taxation, security, meteorology, railways, power supply, civil aviation, technology intelligence, aeronautics, and military applications. In 1992, the Ministry of Electronics established ‘three golden projects, which are the Gold-bridge, the Gold-card, and the Gold-custom projects. The Gold-bridge project was the nationwide

economic information network. The Gold-card project was the national network for credit cards. The Gold-custom project referred to the information network by which companies can do business transactions through EDI and email.

Encouraged by the central government's huge IS efforts, local governments also established their own IS policies. It is said that during 1980s, Chinese government invested over \$10 billion Renminbi (\$100 Renminbi equals roughly US\$18 at that time).

3.3.2 Legislation

Legislation stands for the formal legal provisions such as Law, as well as for all kinds of regulations, rules and limitations issued by government or other institutional bodies. Legislation certainly will influence ISM in the sense that it determines what is legal versus illegal, what is allowed and what is not. As legislation differs per country, so will the influence on ISM. Some quotes can demonstrate these effects. "In some countries, certain types of telecommunications equipment may be banned.... In order to protect their data and information processing industries, some countries may require that hardware and software be purchased locally" [Deans et al., 1991]. Once Indonesia had such a regulation prescribing that "All equipment must be purchased by a local distributor, if the local distributor does not sell a particular product, it cannot be used in the country" [Ives et al., 1993].

In addition, transport restrictions of data flows, privacy regulations intellectual property rights for software, and restrictions regarding information publishing might also be different in different countries. For example, in 1991, France temporarily stopped Fiat from transferring its French personnel records to Italy because Fiat did not meet the French regulation regarding privacy protection [Cespedes et al., 1993].

As a sovereign nation, China has also strengthened its information management. Garfield reported the following: "In February 1996, China instituted new regulations that required any network offering Internet service be subject to close supervision by the Ministry of Post and Telecommunications or one of three other designated government agencies. The regulations are intended to endure 'healthier development of the exchange of international computer information.' Customers of the network in China 'are also forbidden to produce, retrieve duplicate or spread information that may hinder public order'" [Garfield et al., 1998]. In the international press it was commented as follows: "China is not closing the door to all information. It's just requiring that all information coming in has to follow Chinese laws" [Associated Press, 1996].

In summary, the following quote may clarify what the impact is of legislation on ISM in an international perspective: "There is an urgent need to understand local laws and policies, which relate to trade secrets, copyright, data protection, and privacy" [Wan et al., 1997].

3.3.3 Economic Status

As stated before, the economic status will also impact the development and use of IS in the several countries. As far as economic status is concerned, one could distinguish different levels of development. “The level of economic development of a country has been identified as having four levels, under-developed, developing, newly industrialized, and advanced” [Palvia et al., 2002]. One of the influences of the economic status of a particular country is the financial budget available for investments in ICT and for the operational expenses for the running IS.

The big differences among the statuses of the several countries will influence every step in the IS planning cycle ranging from strategic planning, the design, the implementation and application, the maintenance, the updating and upgrading of a system until the substitution of an information system. For example, setting up IS requires certain (sometimes very large) amounts of budget for software, hardware and the relevant facilities. Afterwards one has to cope with the operational expenses for the continuous training of the employees, for maintaining the systems running, for updating the software and the equipments, etc. These are not one-off investments but concern daily expenses. Along with the running of the IS, the expenses will go up sharply after some years due to the so-called legacy problem. Systems deteriorate and cause serious problems as far as the continuity of the information provisioning is concerned. Updating those legacy systems is only possible by upgrading or replacing those systems on the expense of huge amounts of money. However, that money is very often not available in the developing and under-developed countries, a reason why systems are running out of time and use, leading to huge capital destruction.

“Economic differences have been associated with IS in terms of the digital divide” [Cronin, 2002]. “Countries at similar stages of economic development typically have similar technological infrastructures and systems. While countries with highly developed economies have extensive technological infrastructures and systems, such investment is more limited in countries whose economies are less developed” [Ford et al., 2003]. One specific study examines the relationship between the national information infrastructures and the economic status in the least developed countries. The empirical study confirms a clear correlation between levels of national information infrastructure and socio/economic development [Meso et al., 2000].

The economic status of a country influences ISM differently, not only regarding management issues, but also regarding research issues. The following quotes illustrate that “The level of economic development of each country cannot be ignored since it involves different levels of IS (IT) development and therefore different levels of research concerns” [Aguila et al., 2002]. “Firms in more advanced countries have more strategic issues to be concerned about, while firms in less developed countries have to manage more basic and operational issues” [Palvia et al., 2002].

3.3.4 Organization

Organizational variables can also impinge upon ISM from several perspectives. Typical influential factors of organizations can be classified into the following factors:

the type of the organization, the size of the organization, the complexity of the organization, and the structure of the organization.

Many researchers use “the type of firm”, “the type of organization” or “the industrial sector” as one perspective to study the organizational impact on IS and ISM. There are considerable differences in IS management in the manufacturing, service and non-profit organizations [Niederman et al., 1991]. One of the early surveys found that the financial, the utility, and the governmental organizations more often employed sophisticated IS as compared with wholesale and retail organizations [Lehman, 1985]. It was suggested, “Service and manufacturing firms seem to manage in a different manner some IS issues” [Deans et al., 1991]. Therefore, “The level of development, the composition and the objective of the IS/IT portfolio can differ depending on the type of organization” [Aguila et al., 2002].

In addition, the size of the organization also influences IS and ISM. It was reported that “larger organization more often employed sophisticated information systems”, and “the larger organization, the larger the MIS department” [Lehman, 1985].

The complexity of an organization is another perspective to study the organizational impact on IS and ISM. The complexity of an organization appears to be strongly related to the complexity of the corresponding IS. So does the ISM. There is no doubt that the more complicated the organization, the more complicated the IS, and the more complicated the associated ISM.

The last organizational factor concerns the organizational structure. “An organization’s structure may influence the design of Information Systems as well as the success of these IS” [Beynon-Davies, 2002]. Particularly, the centralization vs. the decentralization of the organization will influence the IS and ISM fundamentally. It appears that “MIS tends to be more centralized in the centralized organizations” [Ein-Dor et al., 1982]. Top managers in centralized organizations are the directing people. They require more information and expect to be informed more quickly and accurately to make their decisions in a centralized organization [Lado et al., 1998]. In contrast, in decentralized organizations the lower and middle level managers are much more important to keep the business going. They should be informed properly about the organization’s overall situation in order to optimize their work in the decentralized organization [Argyres, 1999; Lawler, 1998].

Apart from the aspect of centralization versus decentralization, the organizational structure (architecture) can also be related with the vertical differentiation, which results in a hierarchical or flat structure. Naturally, this also has a considerable impact on the informational structures and on ISM. The degree of vertical differentiation differs per economic branch and business type. Even in the same business, it will differ from one organization to another. Furthermore, it differs certainly for the different countries. For example, the People’s Republic of China (PRC) has a hybrid situation regarding organizational structures. Some organizations have a similar set up as modern western companies. Others still have a strong hierarchical, vertical supervising structure. An example of the latter is the state council, which leads various ministries and governmental committees. These on their turn are supervising special units like industry, medical care, education, etc. An extra complicating factor is that those units are at the same time supervised by provinces. In China, the term

‘departmental structure’ or the vertical relationship is called *tiaotiao* (条条) management. The term ‘regional structure’ relationship is called as *kuaikuai* (块块) management.

Since the PRC is a country under the leadership of the communist party, the internal organizational architecture of the whole organization is also very complex. Especially in the governmental organizations and in the state enterprises, there are two supervising bodies at the same time: the one is the administrative head supervising each management level below; the other is the head of the party committee that supervises at the same time the same management level.

In addition to the differences of external and internal organizational structures (architecture), reorganizing the businesses do affect the IS from many aspects. Consider: merging versus splitting up, and downsizing versus enlarging the organizational units. All these things will directly influence the IS and ISM. Furthermore, changing senior management or stakeholders of an organization also influences the IS and ISM in certain ways. The systems that belong to the category of Executive Information Systems (EIS) will especially be influenced by changes in management or supervising boards.

3.3.5 Technological Environment

The technological environment also influences both IS and ISM from many aspects. Technologies related to IS and ISM can be categorized as: hardware technology, software technology, database technology, network technology and communication technology.

The technical incompatibilities in hardware, software, and data standards often make it difficult to transfer or share software and information between organizations and certainly countries. One example is the international difference in the formats of numbers and dates. The date 11/1/2002 means the November 1st, 2002 in the United States of America, but it means January 11th, 2002 in Europe. In China, and in Japan, November 1st, 2002 should be written as 2002/11/1, and January 11th, 2002 should be written as 2002/1/11. Such simple discrepancies can cause many, many changes on hundreds of software programs when a software company installs a standard package abroad.

Hardware produced in one country very often needs special adapters in order to be used in another country. Moreover, the voltage of the facilities, equipments, and devices is also discrepant from U.S.A. to most other countries. Such technical incompatibilities of the hardware facilities is quite a significant influential factor on IS and ISM from a technological point of view.

Technical incompatibility could also influence the IS maintenance and updating because of the rapidly continuing progress of IT. Particularly, the legacy systems need to be updated, which might bring out some considerable problems about the compatibility from the existing systems to the future systems.

In addition, “Technical infrastructures are manifested in differences in how various IS are implemented and used within different countries (e.g., the preponderance of wireless technology in South Korea, versus a heavier reliance on fiber-optic technologies in North America)” [Ford et al., 2003].

3.3.6 National Cultures

National cultures determine that people have different norms, thinking, attitudes, and behavior from different national cultural backgrounds. “The importance of cultural issues is becoming increasingly evident in many applied disciplines” [Davison et al., 2003]. “Culture is deeply rooted in ourselves. It is a way of thinking that determines our behaviors, decisions, actions and knowledge” [Demeester, 1999]. “It is generally agreed that national culture at the societal level plays a major role in determining work-related values and attitudes, as well as the behaviours and practices that prevail in a particular business context” [Davison et al., 2003]. “Their encounter through technology exchange triggers conflicts that are expressed in objective terms” [Demeester, 1999].

“The management of cultural context refers to managing IS (IT) workers and workplaces in such a way that social processes that reflect the interactions among groups of people with differing worldviews are taken into account” [Weisinger et al., 2003]. From the international point of view, “The management of IS (IT) refers to managing the design, development, and implementation of IS and technology in a cross-cultural environment” [Weisinger et al. 2003].

According to the literature, “researchers in both management and information systems have developed a healthy interest in cultural issues. This trend has been supported by the growing number of studies that address cultural issues in these domains, as evidenced by an informal survey of articles” [Davison et al., 2003]. Figure 3.2 is sourced from a recent IEEE journal and presents the articles indexed in ABI Inform Global and Emerald.

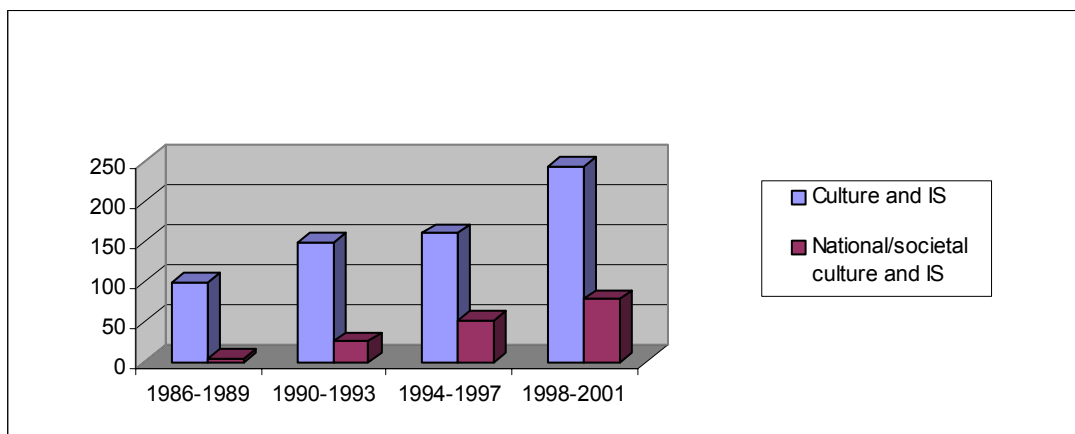


Figure 3.2: The Articles Indexed in ABI Inform Global and Emerald.

Many publications have contributed to analyse the influences of culture on group support systems [Rutkowski et al., 2001], [Davison et al., 1998], the impact of national culture on information processes [Steinwachs, 1999], the influences of

culture on IS applications [Shore, 1994], the role of national culture in IS analysis and design [shore, 1995]; [Harvey, 1997], the effect of national culture on IS [Ein-dor et al., 1993], the national culture and SDLC (System Design Life Cycle) [Carayannis, et al., 2001], the influence of national culture on information infrastructures [Garfield et al., 1998], the influence of culture on communication technology acceptance [Kwon et al., 1998], and the cultural differences affecting the IS implementation success [Robey et al., 1989].

Some researchers have compared IS/IT application in two (or three) national or societal cultures. For example, “The use of fax and email in the United States and Japan were examined, which attributed the differences to cultural factors” [Straub et al., 1997]. “End-user computing is profoundly different in the U.S.A. as compared to Japan” [Nelson et al., 1992]. “Several frameworks of culture were used in order to explain why the nature of management information systems within Chinese businesses differs fundamentally from that found in U.S.” [Martinsons et al., 1997]. “The universality of Western-based theories related to decision support systems has been refuted by studies in China” [Zhang et al., 1989]; [Martinsons et al., 1997].

In the coming chapters we will further highlight the influence of national culture on ISM.

3.4 The Characteristics of Global ISM Issues

Summing up the discussions in the previous sections, there are at least six factors identified with a considerable impact on ISM; e.g. the political factor, the legislation factor, the economic factor, the organizational factor, the technical factor and the national cultural factor. These factors can be considered the external influential factors on ISM.

In order to explain the relationships among the identified external influential factors on ISM, we present a model to portray the **relationships** between ISM and those factors. See Figure 3.3.

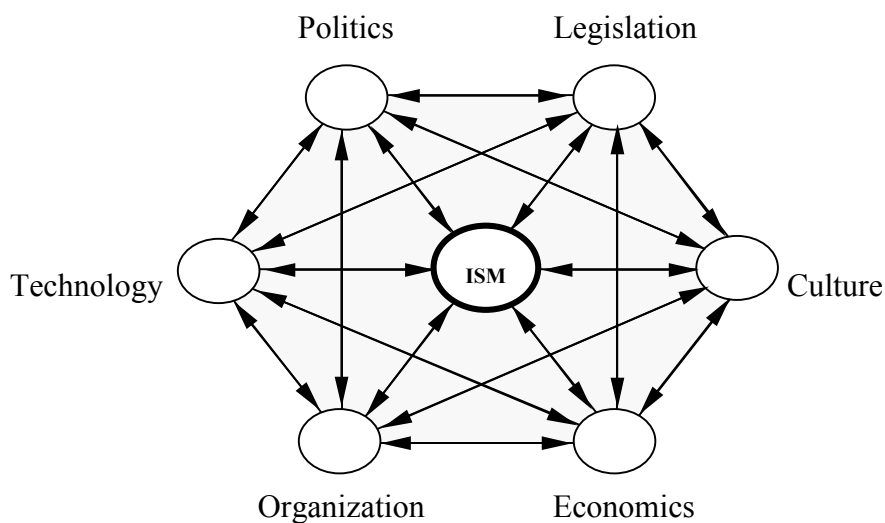


Figure 3.3: The Relationships between ISM and the External Influential Factors

Figure 3.3 describes a multiple relationship between ISM and the six external influential factors. All of the factors influence, and are influenced by others in many ways. About the relationships, the following could be said:

- (1) The relationships among the factors are very complicated. Firstly, the influences among these factors can be of a direct nature. Every factor is directly influenced by the other five factors. At the same time, the concerning factor also influences all the other five factors directly.

Secondly, the influence among these six factors can be indirect. It means that the factor A is influenced by the factor B indirectly because of the single C factor or a combination of the factors C, D and E.

Thirdly, the influence among the six factors can be both positive and negative. If a factor influences other factors positively, that factor can be considered as a contribution. On the contrary, if a factor influences other factors negatively, then that factor could be considered as a constraint.

- (2) The influences between ISM and the six external influential factors are also very complicated. Firstly, ISM can be influenced by any single one of the six factors directly. At the same time, ISM can also be influenced by any combination of the six factors directly.

Secondly, ISM can be influenced by these six factors indirectly. It means that the A factor influences ISM because of the single B factor or any combination of the other factors.

Thirdly, these six factors can influence ISM both positively and negatively. If the influences of these factors on ISM are positive, they are contributing to ISM. On the contrary, if the influences of these six factors on ISM are negative, they are constraints to ISM.

- (3) ISM also influences these six external influential factors directly and indirectly. If it is direct influence, it means that ISM influences the external factors without other interferences. If it is an indirect influence, it means that ISM influences a particular external factor because of one of the other factors.

ISM can influence all six external influential factors both positively and negatively. Positive influences are contributions of ISM to the external factors. Negative influences are constraints of ISM to the external factors.

- (4) Every external influential factor has some sub factors, as discussed in previous sections. In fact, the relationships among those sub factors, and between the factor and its sub factors are even more complicated than sketched before.

Summing up the discussions above, the relationships among the six external influential factors are very complicated. The relationships between these external influential factors and ISM are also very complicated. Furthermore, it is not clear how those external influential factors intervene with each other yet. Consequently, it would be extremely difficult to explore how these external influential factors could intervene with each other internationally. Therefore, it is necessary to focus on one of the six external influential factors. The research findings and solutions could be helpful to deal with other external influential factors on ISM internationally.

As a matter of fact, those six external factors influence ISM differently. “National culture has been illustrated to influence IS above and beyond political, economic, and physical factors” [Ford et al., 2003]. Culture may usefully be compared to an iceberg: we can observe directly only the small part that lies above the water’s surface. More difficult to understand, and only partly because it can’t be observed directly, are the reasons for and meaning of that behaviour [Davison et al., 2003]. Moreover, “The culture is subtler and less visible, because it has unstated assumptions, values, and norms that define ‘acceptable’ management practices in the IS (IT) workplace” [Weisinger et al., 2003].

It is now generally accepted that IS/IT management practices are far from universal. “Cross-cultural differences pose an emerging challenge to the global information management community” [Martinsons et al., 1997]. IS designed in one country and being used in other countries may not accommodate the system requirements in the same way because “National cultures are important in the acceptance of information systems” [Carayannis et al., 2001]. “With the increasing internationalisation of trade and consequent integration of the global economy, it is becoming increasingly difficult and dangerous to ignore cultural issues” [Martinsons, 1991].

“Despite the growing interest in cultural issues from IS and technology management scholars, the research outputs tend to be fragmented and ephemeral” [Davison et al., 2003]. As the matter of fact, “We have a limited understanding of how and why specific cultural attributes affect the planning and implementation of IT-enabled business process change efforts” [Davison et al., 2003]. “This question is still a very open line of investigation, because other studies do not find a direct relationship between different national cultures and IS management issues” [Aguila et al., 2002]. From the global point of view, “We need to go beyond the what and the where to understand the how and the why, such as: why are western models of e-commerce not directly transferable in China? Which characteristics of the Chinese environment are important yet not included in mainstream Western theories? How might prescriptions derived in the West be informed by non-Western cultural contexts? ” [Davison et al., 2003]

Based on the discussion of the globalisation and the internationalised ISM above, the research background and the research issues are clarified in detail, which could be depicted in Figure 3.4.

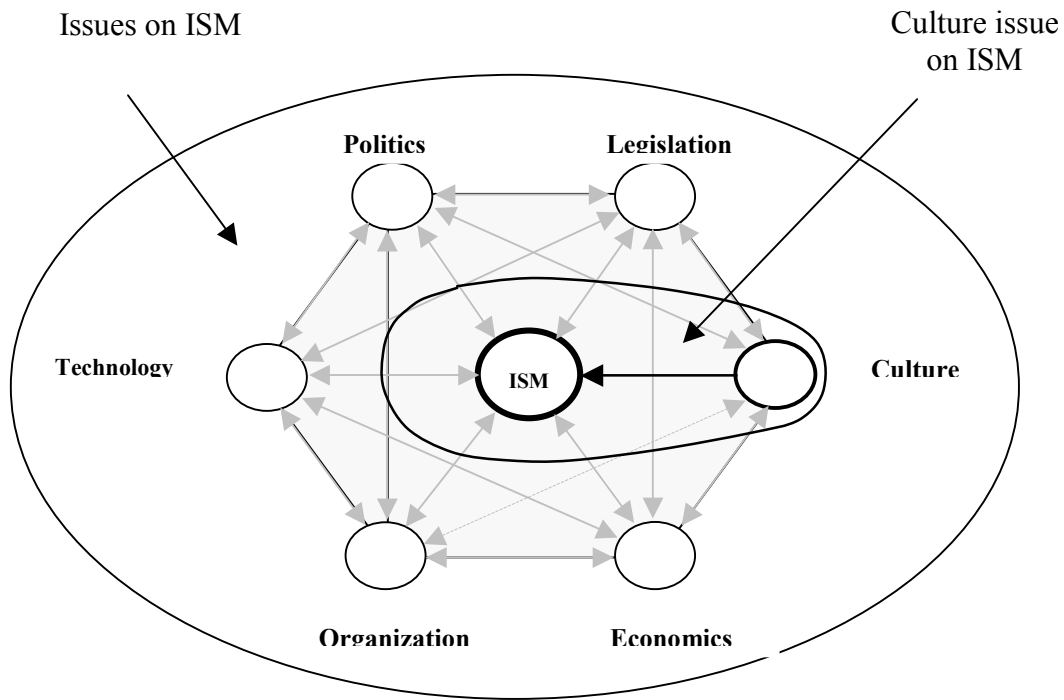


Figure 3.4: The Research Background and Research Issues

3.5 Chapter Summary

There are six external influential factors on ISM identified in this chapter. The relationships among these external influential factors, and the relationship between these external influential factors and ISM are discussed briefly. Based on the arguments of characteristics about these external influential factors, the research scope and research focus were further clarified and defined.

4. Concepts of ISM, Culture and ISM Cube

4.1 Introduction

In this chapter we will explain first what the term ISM means and what literature says about that concept. Thereafter we will construct an ISM Cube based on the existing models. The main objective of the ISM Cube is to come up with a comprehensive approach for a globalization ISM concept. Particularly, the cube provides a means to embed the national cultural influence on ISM, identified in the previous chapter as a very significant factor for ISM.

The approach applied for the development of the ISM Cube in this chapter follows the framework of Sol, who states that three things can be distinguished, namely “the way of thinking, the way of modeling and the way of working” [Sol, 1990]. In this chapter, the main focus is on the way of modeling. “Models are an essential part of information systems” [Alter, 1992]. However, “The way of modeling contains the different types of models that are constructed during the modeling cycle, such as the conceptual models” [Vreede, 1995], because conceptual models define and mark the boundaries of the issues within the problem area to be focused upon. Furthermore, conceptual models can be descriptive or prescriptive, depending on whether they will be used to describe an object, idea, or event, or prescribe an object, idea or event [Wanyembi, 2002].

Descriptive models allow the analysis, description and diagnosis of the issues, which are useful for a deeper understanding of the situation under investigation [Checkland, 1981]. Based on that understanding, one could think about what has to be done for further improvements, how the system under consideration could be altered and adapted to improve the performance. As soon as one is moving toward concrete changes of the system, the model is no longer a descriptive model but becomes a prescriptive, a normative (design) model.

Apart from the notions of the modeling cited above, another distinction can also be made between the so-called explanatory science and design science. Explanatory sciences can be seen as a quest for truth, mostly description-oriented. They aim at a shared understanding. Opposed to the explanatory sciences, the design sciences are more solution-focused and in that sense more pragmatic.

Summing up the perspectives of the modeling arguments above, the ISM Cube will be designed in the following way:

- First, in order to mark and define the items of ISM, some conceptual models are employed.
- To analyze the relevant items of ISM, some descriptive modeling is applied for a detailed explanation.
- Next, the ISM Cube is created as a framework of reference.
- Finally, we sketch from a design orientation how and why ISM, in a particular culture, could be implemented in a proper way.

This chapter is organized as follows: the ISM concept and the tasks of the ISM will be specified in detail according to several models described in literature. In section 4.3 we will clarify the actors involved in ISM, based on the framework of Zachman [1987]. Then, national culture will be introduced in section 4.4 according to the study of Hofstede [1980]. Subsequently, the ISM Cube is constructed in section 4.5 as a comprehensive approach for ISM, followed by an elaborate discussion of that cube. The chapter concludes with a summary.

4.2 The ISM Concept

In order to implement ISM in a proper way, the concept of ISM and the different tasks of ISM should first be clarified. We cited the following definition of Maarten Looijen:

“ISM entails the management, control and maintenance (MCM) of implemented information systems in accordance with the requirements and preconditions imposed by utilization, the situational factors and the characteristics of the information system components (hardware, software databases, procedures and people). ISM offers services in the most effective and efficient way and influences the goals of the organization in a positive way” [Looijen, 1998].

The extensive study of ISM in all its dimensions like the several models such as the MCM paradigm, state model, extended state model, and the triple model, was the core of research in the department of information systems and software engineering, at the Delft University of Technology in the Netherlands” [Wanyembi, 2002].

The models developed by Looijen are referring to several aspects of ISM, which includes the strategic, tactical and operational management, organizational units management, and ISM during the life cycle of IS as well. “This approach for the management of information systems has been used in practice for many years and has proven to be successful” [Verleun et al., 2001].

4.2.1 Modeling the ISM Concept

A conceptual model, very often used in literature is the so-called management paradigm model. In this model the real world is described as three subsystems: the subsystem to be controlled, the managerial subsystem and the informational subsystem (see Figure 4.1). The system to be controlled can vary; dependent on what a researcher is defining as his area of interest. So the system could be a department within a firm or a specific part of it; it could be the whole firm; it could be a combination of firms (think about strategic alliances), etc. Each system to be controlled will be supervised/managed by a controlling subsystem. That control can only be done based on proper information about the subsystem to be controlled and based on external information. So there is always a third subsystem, namely the information subsystem, consisting of several IS depending on the scope and kind of the other subsystems.

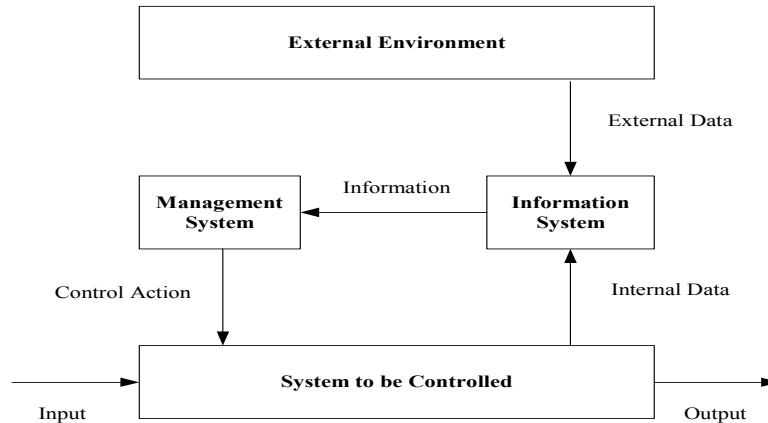
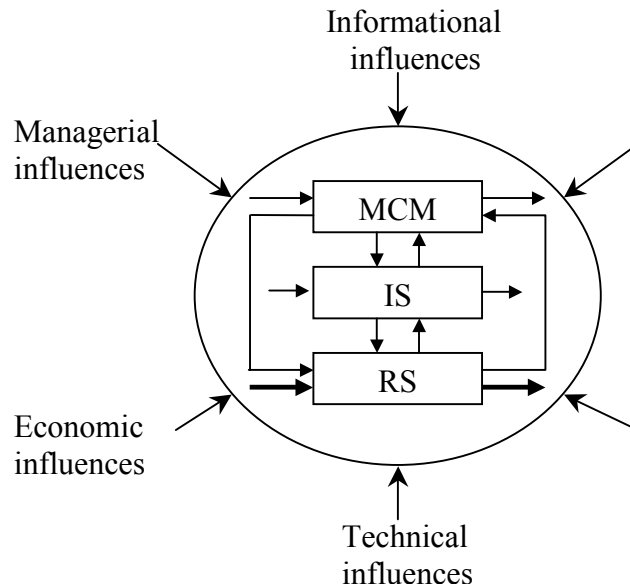


Figure 4.1: The Management Paradigm Model MCM

A very particular situation of the management paradigm model is the situation in which the subsystem to be controlled is an information system. The subsystem in this case is not a real subsystem, like a machine or a department, etc., but is an IS. It is the IS itself that needs to be managed in this case.

Looijen introduces for this purpose a variant of the management paradigm model, which is also called the MCM paradigm model (see Figure 4.2). The MCM paradigm consists of three basic entities: the real system (RS), the set of IS and the management, control, and maintenance of those IS (abbreviated as MCM).

As can be seen from Figure 4.2, there are also several outside affects like managerial, informational, economic and technical influences. All these influences come from outside the system under study, so from the environment.



- Key:
- Relationship between entities
 - Streams or energy/concrete materials and products
 - Influence

Figure 4.2: The MCM Paradigm Model

The entity RS represents the real business processes within an organization. The term “organization” should be interpreted in this case in a very general and broad sense. So an organization can stand for a “real” firm but can also stand for a part of it or for an alliance of firms operating in a supply chain, etc.

The entity IS stands for all IS used within that organization, including components, such as hardware, the relevant basic and application software, the datasets, the procedures, etc.

To support all informational processes needed and wanted, the entity IS should be managed, controlled and maintained (MCM) by taking into account the requirements and preconditions of the RS. Control in this description has a more limited meaning than in the American literature where control embraces management in all its dimensions. Here control means literally controlling and checking afterwards whether all things which need to be done, are done in the prescribed way.

The MCM model was originally developed for all kinds of ICT services to be handled by a specialized ISM departmental center. That means that the managerial issues are mainly technology driven and are dealing with the technicalities of IT and IS.

In this research, the MCM model will be adapted to study the internationalized ISM issues for, among others, the top organizational level (e.g., the entire enterprise level or entire university level). The consequence is that we are interested in what top management should do regarding ISM. It will be clear that top management is not in charge for the technicalities but has to deal much more with strategic and tactical aspects of ICT within the organization and between organizations. Accordingly, to the internationalized ISM, it is necessary to have some modifications, substitutions as well as supplemented specifications for the MCM model from more perspectives. In figure 4.3 we present an adapted MCM model in order to fit in with the aim and the scope of this research.

First of all, we added the national culture as an extra external influence. Then we modified the items IS and RS into M-IS and M-RS. The entity M-IS represents the whole set of IS. IS here stands for specially designed and computerized systems for supporting the business processing. The IS could be connected to the business processes at many levels, in many unities both inside and outside the organization. In other words, the systems might be located anywhere. In addition, the systems can be the existing running systems, as well as the systems under development or being upgraded. Additionally, those systems also contain the outsourced systems, as well as the implemented systems from other business partners. Accordingly, M-IS stands for an internationalized IS environment.

The entity M-RS indicates the Model of the Real System, which includes the organization models, the various business models, the processing models, as well as the requirements models. These models could be generalized for the entire organization as well as for any part or any level of the entire organization. Meanwhile, the models could also be intra-organizational, as well as inter-organizational. Consequently, the entity M-RS describes in principle an internationalized business environment.

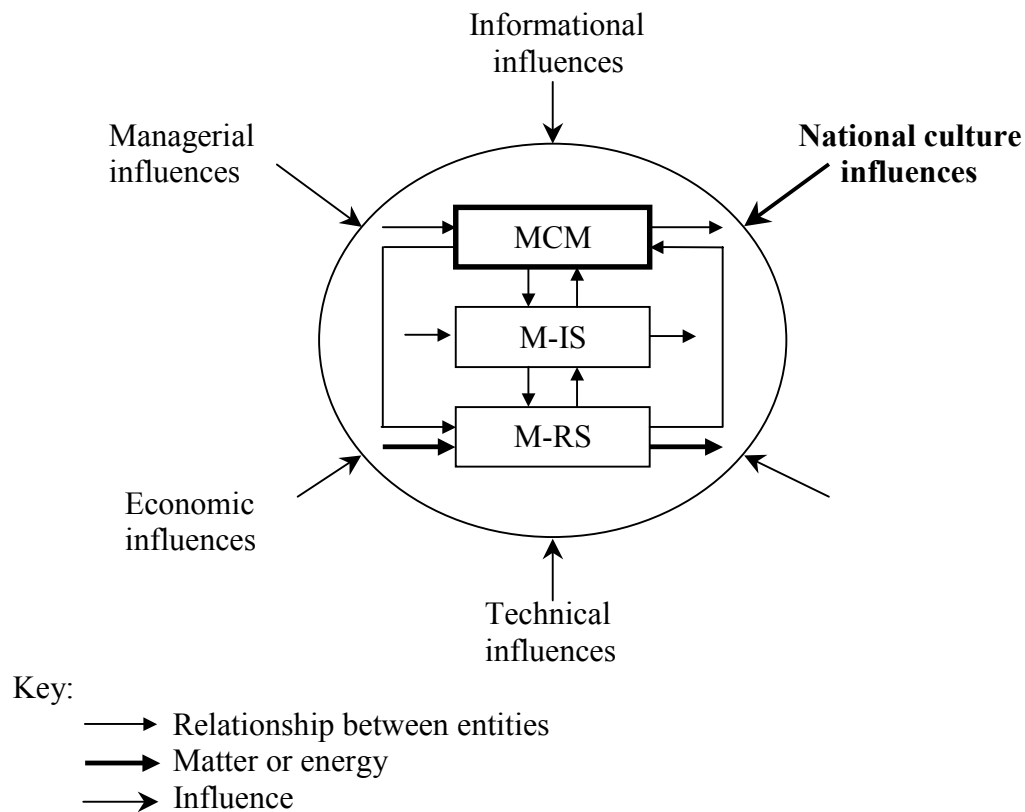


Figure 4.3: The MCM Paradigm of the Internationalized ISM

For an internationalized IS setting, many capabilities are highly demanded from ISM, such as guaranteeing availability, reliability, continuity, controllability, interoperability, compatibility, flexibility and maintainability of the IS. Consequently, the entity of M-IS should be carefully managed, controlled and maintained by the entity of MCM. That entity now has a wider meaning than originally in the model of Maarten Looijen. To the MCM entity not only belong the more or less specialized, technical oriented people, but every person of an organization that partly belongs to the MCM entity, in so far as he or she has to cope with information tasks.

4.2.2 Modeling ISM over the Life Cycle of IS

IS are not stable and constant over time, but are changing according to the changes in the business processes, the users involved, etc. Therefore, the entity MCM mentioned previously, should not be considered as a static entity, but rather be interpreted as a dynamic operating entity. ISM does therefore mean that management has the task to align the IS with the continuously changing business processes.

The Extended State Model, presented also by Looijen, can be used to represent that dynamic dimension, mentioned before and to describe ISM from the perspective of the life cycles of IS, as well as the different states of the IS. Figure 4.4 shows the Extended State Model, including the following states:

- Information Policy and Planning (IPP),
- Development (D),
- Acceptance and Implementation (AI),
- Utilization (U1, U2),
- Exploitation (E1, E2),
- Minor (M1) and Major maintenance (M2).

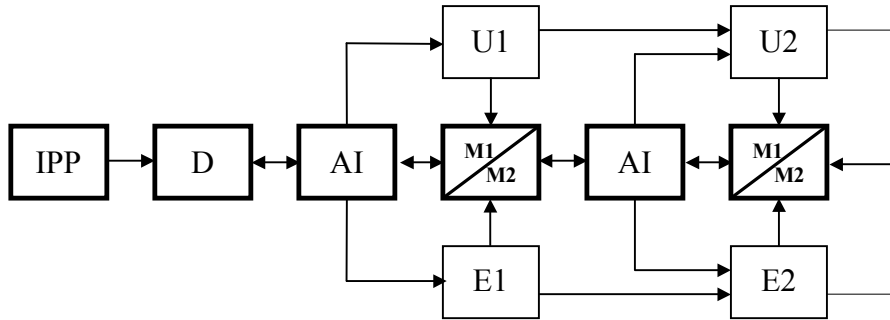


Figure 4.4: The Extended State Model

The several ISM tasks related to some states can be modeled as follows:

- During the IPP state ISM has to settle the primary goals, constraints and prerequisites of the IS, related with the development, implementation, utilization, control and maintenance of the IS for the entire organization. The IS mentioned here could be completely new or could be older systems to be changed/modified.
- In the state D, ISM mainly represents the management of IS projects. In this stage, ISM is involved in every step during the design and construction (or purchasing) of a particular IS.
- ISM in the state AI is related to all procedures and protocols of testing and accepting the IS that have been developed or maintained.
- ISM in the state U is involved in the management of the IS utilization. In this stage, the ISM takes care of evaluating and examining the (economic) performances of the several IS and for the cost accounting and cost charging affairs.
- ISM in the state E is related with the exploitation of the running of IS. In this stage, ISM is responsible for a proper operation and exploitation of IS.
- The state M (M1/M2) stands for (small to large) maintenance. ISM in this stage has to cope with all maintenance issues such as accepting requests for changes, dealing with priorities, actual maintenance, version management, testing and new acceptance of the adapted system, etc. A very special case is the case in which the formulated strategy (state IPP) or a system under

development has to be adapted and modified. Here maintenance is not regarding an already running system but is regarding planning issues.

The stages AI, U1, E1, and M1/M2 can be repeated as many times as desired, depending on the implementation circumstances. Circumstances could be that adapting systems is only allowed after certain time intervals or is allowed as soon as business requirements change. It is a matter of “law and order” how an organization wants to deal with these repeating activities.

The extended state model above describes the various states of IS and the corresponding ISM tasks. In this research, we emphasize especially the states IPP, D, AI, M1/M2, because these states are extremely relevant in an internationalized setting of ISM.

4.2.3 Modeling the Content of ISM

In order to model the content of ISM, the Triple Management Model of Maarten Looijen will be adopted. That model is based on Mintzberg's work with organizational structures. The Triple Management Model is also services oriented at the ISM departmental level, as was also the case with the original MCM model described in the previous subsections.

The Triple Management Model includes three subdomains of ISM: namely, function management (FM), application management (AM) and technology management (TM). Not included in the model is what has been called in literature information management (IM). One of the elements of information management is content management, that is to say, the obligations to guarantee the consistency and justness of the data in the several data files. IM is defined as “all the activities to be carried out in order to supply everyone in a company with the information necessary to perform the functions assigned to them. In this connection information management is an organizational concept” [Looijen, 1998].

Because ISM in this research is considered not from the viewpoint of a specialized department but from a general management perspective, IM should be taken into account as one of the subdomains of ISM. Therefore, we modify the original Triple Management Model into a Quaternion Management Model with four subdomains of ISM. In the Figure 4.5 the Quaternion Management Model is depicted for clarifying the content of ISM.

The Quaternion Management Model makes a distinction of ISM in three levels of management: namely, strategic, tactical and operational management, and in four domains namely FM, AM, TM and IM. The three management levels of ISM are all involved in the four domains of ISM. In other words, each domain has three management levels. Naturally, each level is characterized by special tasks at that level. We will briefly explain the model below.

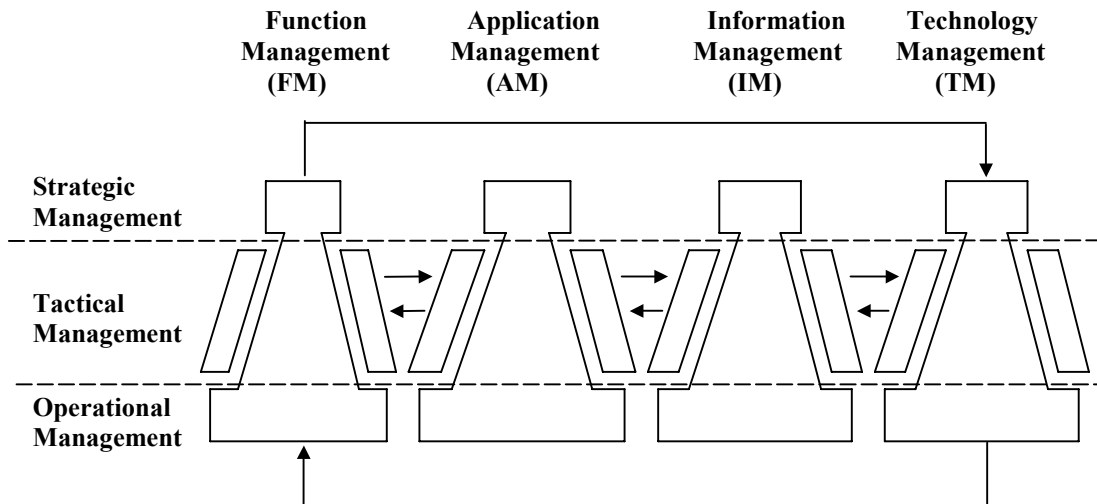


Figure 4.5: The Quaternion Management Model

StM: Strategic Management

The strategic management is responsible for the general and overall policy-determination regarding ICT, in general, and IS, in particular. It covers the formulation of strategic goals, constraints, basic principles and starting points, policy plans, and strategies to obtain the necessary resources, such as technical facilities, (specialized) staff and financial resources.

TaM: Tactical Management

Tactical management is responsible for realizing the strategy and for implementing the several plans. It is coordination oriented toward the operational management level. As a matter of fact, tactical management is in charge for leading and steering the operational management level including the control of that level. Therefore, it often deals with the allocations or reallocations of the facilities, as well as the resources for the operational level.

OpM: Operational Management

Operational management is responsible for the actual implementation of all ISM tasks on the operational level. It is strongly oriented to the daily operations of the implemented IS. Therefore, this level includes everyday practice. It is concerned with the utilization, such as efficiency performance, the cost consciousness of users, etc.

FM: Function Management

Function management is responsible for the management, control and maintenance of the functionality of the IS. Consequently, it has to cope with two sides of the same coin. One is to deal with the requirements stemming from the several business processes in the organization and to translate these into IS functionality. (In literature sometimes this is called requirements engineering.)

The other one concerns the utilization of the functionalities of the IS in general. It includes the administration, such as management instructions, rules and regulations, as well as the task of delivering adequate instruction manuals, helping the controllability, and interoperability of IS.

AM: Application Management

Application management is responsible for the management, control and maintenance of the various application software (packages), that are developed based on the earlier described functionalities of the IS. The application software could be outsourced or internally designed as well as introduced by and embedded in business partners. The AM is involved in updating and modifying software, which includes many tasks such as adaptation, addition, correction, and improvement. All these tasks will facilitate the availability, reliability, continuity, controllability, interoperability, compatibility, flexibility and maintainability of the implemented IS.

TM: Technology Management

Technology management covers all issues regarding the technology of the IS platform, the communication facilities, the hardware and basic (system) software, as well as all kinds of ICT facilities and infrastructures. Technology management is mainly services oriented, supporting the application and utilization of the implemented IS for all units of the entire organization.

IM: Information Management

Information management is involved in the management, control and maintenance of all information resources, as well as the information itself of the business processes in the organization. Information resources could be databases, data warehouses, repositories, information banks, etc., with internal or external data. Therefore, the information resource management covers issues such as information acquisition, information extraction, information censoring, information update, information dissemination, information access, and information evaluation. The target of information resource management is to keep the information resources available, reliable, controllable, and maintainable, as well as integrated and consistent.

The management of the information itself of the several business processes or coming from outside (external data) has to do with all tasks related to the integrity of the data concerned. In this regard, the aim of IM is to guarantee the integrity, compatibility, continuity, interoperability and reliability of the business processes information itself. In literature this subdomain is very often called content management.

Summing up the discussions above, four domains of ISM have been clarified. The relationships among these four domains have only been mentioned briefly. In practice, one has to specify precisely what interrelations exist and how to cope with these interrelations. The whole ISM concept is and should be a cooperative model in which all four domains at all three distinguished levels (strategic, tactical and operational level) should function in a coordinated and proper way. That is easy to say but very hard to do in practice, certainly if one has to deal with a global and internationalized ISM concept.

4.3 Modeling ISM Actors

Various authors have defined IS. For the purpose of identifying the several actors of an IS we present some definitions below.

“An information system is all the hardware with the relevant basic software and application software, datasets, procedures and *persons involved* in the control/support of real systems or business processes” [Looijen, 1998].

“An information system is a system of communication between *people*. Information systems are systems involved in the gathering, processing, distribution and use of information. Information systems support *human activity systems*.” [Beynon-Davies, 2002].

According to [Turban et al., 1999], the basic components of IS are hardware, software database network procedures and *people*.

It can be noticed that all definitions of IS cited above contain a significant component, namely *people*. In this research we will call people who are involved in ISM the actors of ISM. In the following subsection, several actors of ISM are introduced, based on an existing theory – the Framework of Zachman’s information system architecture.

The Zachman framework was first described in a paper “A Framework for Information System Architecture working from the business perspective down to the technological (implementation) perspective” [Toussaint et al., 1997]. That framework offered a concept to cope with complex information projects. The concept was originally identified from analogous structures, found in much older disciplines like Architecture/Construction and Engineering. These disciplines classify and organize the design of artifacts into the process of design and into the physical artifacts to be developed.

An important aspect of the Zachman’s framework is “a set of design artifacts, or descriptive representations, that are relevant for describing an object such that it can be produced to requirements (quality) as well as maintained over the period of its useful life (change)” [Zachman, 2002, 2003]. In this regard, Zachman’s Framework also provides a framework for IS analysis and development, as well as a structure of the role differentiation in ISM.

The framework consists of five types of actors (planner, owner, designer, builder and subcontractor) and six dimensions (what, how, where, who, when, and why). They together form a matrix of 30 cells with five rows and six columns. Table 4.1 shows Zachman’s framework.

Actors	Dimensions					
	What	How	Where	Who	When	Why
Planner						
Owner						
Designer						
Builder						
Subcontractor						

Table 4.1: The Zachman’s Framework for Information System Architecture

The significance of Zachman's framework is the structure for the *role differentiation and participation* of the several actors in project management of IS development. Each actor has his own perspective on "the same world" (namely the development of IS) and will therefore answer the several dimensions of Why, What, etc. differently. If system engineers do not take into account these differences in involvement, and thus in perspectives toward the new systems to be developed, then the development certainly will become a failure. The different roles will be briefly explained below.

Planners

Planners deal with the first sketch of an IS depicting in gross terms the scope, size, shape, and basic purpose of the final structure of an IS. Planners are concerned about the overall setup of the system, what it will cost, and how it should perform. Especially the Why, and What questions are in this perspective relevant, not so much the technical How, When and By Whom.

Owners

Owners as future users of a system will deal later on with the daily routines of the IS and of the business. Owners are especially concerned about the usability aspects of an IS. They emphasize the IS fit to the general business needs. They are particularly interested in the What, When and Why questions indicated in the matrix of Table 4.1.

Designers

Designers deal with the translation of the rudimentary sketches and drawings of a new IS into the detailed specifications. They take charge of the modeling of the IS, related with the business requirements. The modeling work includes several types of modeling like business, process and IS modeling. The designers transfer the business entities, processes and data elements into several design models of the IS. Designers have also to consider the design constraints. Prime questions for this category are the How, When and By Whom questions, next to the detailed specification of the What question.

Builders

Builders have to construct the system taking into account the several construction constraints and the state of the art in methods and technologies in the physical domain. They are responsible for the technology model, which transfers the IS model into concrete implementations in terms of software, I/O devices, and hardware technologies. Prime questions for this actor group are (the technical) What and How question, next to Where and When.

Subcontractors

Subcontractors are working on parts or subsections of a system to be developed. Mostly they will get detailed specifications on the basis of which they have to do their job. They have to program individual modules without the need of being concerned about the overall context or structure of the system. Prime questions here are comparable with the questions of the builders, discussed before.

As said before, Zachman's framework was developed for getting a clearer idea of who is involved in the design process of a new IS and from what perspective. Transferring that idea to the domain of ISM makes some adaptations necessary. One of the adaptations could be that we would add several categories of people involved in

ISM such as business managers, maintenance specialists, security specialists etc. That would make the overall structure more and more complex with differentiations, which are not any longer operational. Also looking to the empirical study that we would like to perform later on in our study, we limited the category of actors in the framework of ISM to four categories, namely Managers, Users, Designers/Builders and Maintainers. We will briefly explain these roles below.

Managers

Managers are mainly responsible for the ongoing business in an organization and the accompanying decision-making. No matter for which part of the organization a manager is responsible for, he or she will be more or less involved in one or several decision-making procedures regarding IS. That involvement can be on the strategic, the tactical or the operational management level. Then, the involvement can differ as far as the kind of management issues are concerned. For example, managers might be involved in the definition and settlement of the several ISM procedures which have to be followed during the planning, the design, the implementation as well as the updating of an IS. Some of those procedures will address issues like how to handle the demands for new systems development, how to create fair decision routines for setting priorities, how to act with risk analysis, etc.

The foregoing may demonstrate that managers in one way or another play a very important role in ISM, a reason to distinguish them as a separate category.

Designers/Builders

Designers/Builders are responsible for the realization of the functionalities of an IS according to the requirements of the business in the organization. In practice, they play very important roles in the analysis, the design and the construction of the IS. Their contributions are directly related to the accomplished IS whether those systems can be implemented successfully or not. Consequently, Designers/Builders should also be considered as important actors in the domain of ISM.

Users

Users are closely related with every stage of the IS life cycle from the very beginning till the end, such as IS planning, business analysis, design, testing, using as well as the updating stages of the IS. Particularly, they are using IS from day to day to support the business processes of the organization. Users should be considered as primary ISM actors and are mainly in charge for the well functioning of IS and for the integrity of the information. Without users, no IS and thus no ISM!

Maintainers

Looking to the dynamic characteristic of organizational goals and processes, IS should be changing and maintained in order to align with the organizational dynamics. In practice, the maintainers' work is not only related to the several application packages, but also with the ICT infrastructures and technical facilities. In this regard, the maintainers are responsible for facilitating the availability, reliability, continuity, controllability, interoperability, and compatibility of ICT. Therefore, maintainers should be considered as significant actors in the domain of ISM.

Summing up the arguments above, four categories of actors are identified, namely Managers, Designers/Builders, Users and Maintainers that are significantly related to

ISM. As a matter of fact, people who are involved in ISM can be classified into many more categories of actors. In that sense there is in fact no limitation. Still we stick to the limited four categories, purely from a pragmatic viewpoint. Looking to the empirical study that we would like to execute, it is impossible to deal with a manifold of categories. Therefore, we limit the ISM actors to four dominant groups.

One remarks at the end. The division in four clear distinctive categories may suggest that a particular person belongs to one and only one category. That will seldom be the case in practice. A particular person mostly has several tasks and responsibilities in which all identified actor roles regarding ISM are recognizable. A particular person could have as a major role the management role but will also be a user at the same time of a specific IS, and/or designer of a new (management) system, for example, a personalized EIS. Still we believe that it is possible to group somebody in one of the four distinct categories of ISM actors, looking to the major responsibility and to the main characteristics of his/her position.

4.4 National Cultural Differences

We discussed in the previous sections the ISM concept in terms of ISM tasks and ISM actors. Managers acted as the decision makers about IS, system designers as the constructors of IS, users as utilizing the implemented IS, and maintainers as being in charge of upgrading the several systems. All ISM activities mentioned above are strongly dependent on the ISM actors. In an internationalized IS environment these actors will come from different countries, and their national cultural backgrounds might be very different. Do national cultural differences impact the behaviors of the ISM actors? To answer this question, we will first discuss the national cultural differences in this section.

National culture has been defined in many ways. Hofstede defined culture as the collective “programming of the mind” [Hofstede, 1980] that distinguishes one group from another. Parsons and Shils defined culture as the shared characteristic of a high-level social system [Parsons et al., 1951]. Erez and Earley stated that national culture is the shared values of a particular group of people [Erez et al., 1993]. National culture reflects the core values and beliefs of individuals formed during childhood and reinforced throughout life [Lachman, 1983; Triandis, 1995].

According to [Hawryszkiewicz, 1994], “Culture has been referred to as shared values, expectations and norms found within countries, regions, social groups, business firms and even departments and work groups within a firm.” Consequently, “Culture values shape people’s beliefs and attitudes and guide their behaviors” [Rokeach, 1973]. Furthermore, “A value system is seen as a relatively permanent perceptual framework that influences an individual’s behavior” [England, 1978].

As shown in the various definitions and citations of national culture above, national culture is a collective phenomenon. On the one hand, it is always a group of people who share the same values, beliefs as well as norms, because they have the same national cultural background. On the other hand, specific cultural manifestations have a strong power to unite the members of a culture, make them feel part of it and influence their behaviors. In addition, the shared values lead people from the same

national culture to react similarly to certain situations and to judge certain behaviors in the same way. They might exclude others in some ways because of different cultural backgrounds and different values.

According to the discussions above, the individual's thinking, attitude, and behavior are important in considering tasks and jobs to be done in organizations, thus also the case for ISM. As "the collective programming of the mind which distinguishes the members of the human group from another" [Hofstede, 1980], "the cultural distinctions at the national or societal level may be expected to exert a significant influence on the management of IT and IS." "Given this current situation, and our belief that culture does matter when it comes to managing IT and IS, it deserves more attention from both technology management scholars and practitioners" [Davison et al., 2003].

ISM theory and practice that take into account only ISM tasks and ISM actors, neglecting the cultural impact, will not necessarily lead to a successful outcome of the implemented IS. Many research results present the evidence of the very important impact of culture on IS. "Unsatisfactory results with IT (IS) are due most commonly to a poor fit with the prevailing culture and/or a failure to build a culture to support change" [Martinsons, 1991]. Consequently, we believe very strongly that national culture should be embedded in ISM. By taking that into account, national culture would become the third dimension of ISM, next to ISM tasks and ISM actors. Later in this chapter we will present these three dimensions in a so-called ISM cube. Before doing so, first some explanations about culture.

It is important to note that national cultures here are described and defined as the forms of shared norms, values and beliefs of the people on the national level. We are referring not to individual characteristics and differences. This research studies and discusses the distinctions related with national cultures, as we will see later on.

4.4.1 The National Cultural Model

Geert Hofstede created an empirical model to compare the (cultural) values of similar people (employees and managers) in different subsidiaries of the IBM Corporation in more than 64 countries. His basic theory was that our mind will be continuously "programmed" during our life, starting in our childhood, going on during learning time, followed by working life and life within a society coping with governmental bodies. Norms and values and the belonging attitudes and behavior are expressed most clearly in the relationships between successively parents-child, teacher-student, employer- employee and government-citizen. Related to this theory and in accordance with it, Hofstede organized large surveys in 1968 and 1972, and totally produced 116,000 questionnaires in 20 different languages. Each survey included over 100 questions relating to values. Based on this research, Hofstede constructed four distinct national culture dimensions in 1980 and revised them to five later on. These dimensions measured via indexes are successively *Power Distance Index (PDI)*, *Uncertainty Avoidance Index (UAI)*, *Individualism Index (IDV)*, *Masculinity Index (MAS)*, and *Long-term Orientation Index (LTO)*

A major citation analysis proved that Hofstede's work was identified as having one of the most significant impacts of all research, in the field of international business studies [Chandy et al., 1994]. Particularly, Hofstede's work appears to be flourishing in some disciplines, such as psychology, sociology and international business management [Ford et al., 2003]. Table 4.2 sources the results of the citations search about Hofstede's work from a very recent IEEE journal.

Year(s)	Total Hofstede Citations (SSCI)	Total IS Articles in SSCI	Total IS Articles Found
1980-1993	632	0	0
1994	117	4	8
1995	145	6	9
1996	172	8	9
1997	201	8	8
1998	183	7	11
1999	238	9	12
Total:	1679	42	57

Table 4.2: The Results of Citations Search about Hofstede's Work

According to literature, "Hofstede's proposed dimensions of national culture are very commonly used. These dimensions allow national-level analysis and are standardized to allow multiple country comparisons" [Ford et al., 2003]. Many studies have confirmed the validity of these dimensions [Ronen and Shenkar, 1985; Shackleton and Ali, 1990] and employed them to account for empirical observations [Early, 1993; Straub, 1994; Tan et al, 1998]. Furthermore, "Hofstede's dimensions are often employed by researchers when 'international' or 'national culture' issues are discussed within IS [Ford et al., 2003].

This research also employs Hofstede's model, because it has been shown as a reliable and useful tool to identify and explain the cultural differences in numerous studies across many disciplines. In the following we will explain briefly Hofstede's five dimensions mentioned.

The Dimension of Power Distance (PDI)

"Power is the ability to, in accordance with the objectives of a person or group, consciously limit the behavioral options of other persons or groups. However, Power is not something that can be perceived"; "there can only be evidence of authority if the relevant power is accepted by those who are subordinate"[Haaf et al., 2002].

To measure the acceptance of power, Mulder defined that concept in measurable terms [Mulder, 1977] which was adopted by Hofstede. He defined power acceptance as "The extent to which the less powerful persons in a society accept inequality in power and consider it as normal" [Hofstede, 1980]. In fact, inequality exists anywhere in the world, but the degree to which it is tolerated varies from one culture to another. Power acceptance is happening in the four relationships mentioned before: parents-child, teacher-student etc.

In order to compare the differences of the power distance, a **Power Distance Index (PDI)** was developed as an overall score to measure people's willingness in different

countries to consider power inequality as acceptable. It deals with the need for dependence versus interdependence in a society. The PDI scores can be used to indicate and explain the differences of accepting inequality in the different countries.

The Dimension of Uncertainty Avoidance (UAI)

The willingness to cope with uncertainty indicates “The extent to which people within a culture are made nervous by situations which they perceive as unstructured, unclear, or unpredictable, situations which they therefore try to avoid by maintaining strict codes of behavior and a belief in absolute truth” [Hofstede, 1980]. This dimension is related to how people deal with conflict and aggression, release energy, use formal rules and with the tolerance they have for ambiguity [Gudykunst et al., 1988].

Hofstede used an **Uncertainty Avoidance Index (UAI)** as an overall score, resulting from the several answers of the respondents to “uncertainty questions” in Hofstede’s surveys. The UAI is usable to measure and explain the extent of different national cultures to avoid uncertainty.

The Dimension of Individualism–Collectivism (IDV)

The relationship between the individual and the collectivity in a human society is not only a matter of ways of living together; but it is intimately linked with societal norms (in the sense of value systems of major groups of the population). Therefore, it affects people’s thinking as the self-concept.

According to Hofstede’s research, individualism vs. collectivism refers to the relationship between the interests of the individual and the interests of the group. In other words, it describes how far an individual is willing to reduce his/her ambitions/plans/actions in the light of the collectivity. It indicates whether the individual or the collectivity prevails in a given society. Because it has many implications for values and behaviors, it is reflected in the way people live together. Hofstede developed an index called **Individualism Index (IDV)** on the same manner as he did for the other dimensions.

The Dimension of Masculinity–Femininity (MAS)

The fourth dimension of national culture is called Masculinity and Femininity. Masculinity pertains to societies in which social gender roles are clearly distinct (i.e., men are supposed to be assertive, tough, and focused on material success whereas women are supposed to be more modest, tender, and concerned with the quality of life). Femininity pertains to societies in which gender roles overlap (i.e., both men and women are supposed to be modest, tender, and concerned with the quality of life).

In Hofstede’s view, the two characteristics are mainly rooted in the social roles and, in particular, in the social roles attributed to men, naturally also associated with the biological fact of the existence of two genders. The cultures labeled as ‘masculine’ strive for a maximal distinction between how men and women are expected to behave and to fulfill their roles. Hofstede’s index for **Masculinity–Femininity** is noted as **MAS** to compare the different national cultures.

The Dimension of Long Term Orientation (LTO)

Hofstede later on defined a fifth national culture dimension as the **Long–Term Orientation Index (LTO)**. He also employs an overall score for this dimension to

identify and explain the differences in cultural patterns, observed in different countries. The long-term versus short-term orientation refers to the extent to which a culture “programs” its members to accept delayed gratification of their material, social, and emotional needs. Long term orientation means that people are willing to delay their needs on the short term for the benefit of future gratifications.

4.4.2 The Characteristics of the National Cultural Differences

The Differences between Large PDI and Small PDI

Generally speaking, the following statement is valid: “Cultural variability along this dimension affects the way interpersonal relationships form and develop when differences in “power” are perceived” [Gudykunst, et al, 1988]. In large power distance countries there is considerable dependence of subordinates on bosses. Subordinates respond by either *preferring* such dependence (in the form of an autocratic or paternalistic boss), or rejecting it entirely, which in psychology is known as *counter-dependence*. In these cases, the emotional distance between subordinates and their bosses is large: subordinates are unlikely to approach and contradict their bosses directly. On the working place, the superiors are supposed to make decisions without consultation with the subordinates, and the subordinates prefer this in practice.

In small power distance countries, there is limited dependence of subordinates on bosses. On the contrary, both boss and subordinate have a preference for consultation. In the Dutch culture, there is even a specific expression for this attitude that is namely as “poldermodel.” The consultation therefore, describes the relationship of *interdependence* between boss and subordinate. The emotional distance between them is relatively small: subordinates will quite readily approach and contradict their bosses. In other words, there exists a participative and egalitarian relationship between superiors and subordinates.

The Differences between Strong UAI and Weak UAI

Societies adapt to uncertainty in different ways. These ways differ not only between traditional societies, but also among modern societies. Ways of coping with uncertainty belong to the cultural heritages of societies, and they are transferred and reinforced through the basic units, such as the family, the school, the work organization, or the state. They are reflected in collectively held values of the members of a particular society. “Their roots are non rational, and they may lead to collective behavior in one society that may seem aberrant and incomprehensible to members of other societies” [Hofstede, 2001].

Uncertainty avoidance leads to a reduction of ambiguity. In countries with strong uncertainty avoidance, people likely try to shun ambiguous situations. In such cultures, people are used to look for a clear structure and for clear rules of behaviour in their organizations, institutions, and relationships, which makes events clearly interpretable and predictable.

In countries with weaker uncertainty avoidance, there is less of a prevailing sense of urgency, and therefore a more public acceptance of uncertain situations. Not only

familiar, but also unfamiliar risks are accepted more easily such as those involved in a change of a job or in engaging in activities for which there are no clear rules.

In strong uncertainty avoiding societies there are many formal and informal laws, rules and regulations, related with employers and employees. In countries with very weak uncertainty avoidance, there rather seems to be an emotional horror of formal rules. Rules are only established in case of an absolute necessity [Hofstede, 2001]. In case unpredicted situations occur, one decides what Minzberg calls “mutual understanding” [Mintzberg, 1979].

The Differences between Individualism and Collectivism

In individualistic cultures, social identity is based on the individual contribution. Basic social values emphasize personal initiative and achievement. Autonomy, variety, pleasure, and personal financial security are superior to group loyalty. As a result, “In highly individualistic countries, there is greater employment mobility since individuals are expected to look after their own interests” [Hofstede, 1980].

In the collectivistic cultures, people are born into extended families or clans that protect them in exchange for loyalty. Social identity is based on group membership. There is greater emphasis on belonging to a group vis-à-vis personal initiative. Thus, individual initiative is not highly valued. “Deviating in opinion or behavior is typically not accepted or even punished. In collectivistic cultures, group decisions are considered to be superior to individual decisions” [Hofstede, 1980].

In most collectivist cultures, harmony with one’s social environment becomes a key virtue, which extends from family to working place. Directly confronting another person is considered as rude and undesirable. The expression ‘no’ is seldom used, because saying no is a confrontation. ‘You may be right’ or ‘we will think about it’ are typical examples of polite ways of turning down a request. In the same vein, the word ‘yes’ should not necessarily be seen as an approval.

In individualist cultures, on the other hand, expressing one’s mind is a virtue. Telling the truth about how one feels is characteristic for a sincere and honest person. Confrontation can be salutary; a clash of opinions is believed to lead to a higher truth. The effect of communications on other people should be taken into account, but it does not, as a rule, justify changing the facts. Adult individuals should have learned to accept direct feedback constructively.

Individualistic cultures emphasize the individual’s goals, while collectivistic cultures stress that group goals have precedence over individual goals. Collectivistic cultures emphasize goals, needs, and views of the group over those of the individual; the social norms of the group count rather than the individual pleasure; shared group beliefs are superior to unique individual beliefs; cooperation with group members is valued rather than maximizing individual outcomes [Gudykunst et al., 1988].

In collectivist cultures, the communication has a high context in which little has to be said or written because most of the information is either in the physical environment or within the person, while very little is in the coded, explicit part of the message. Individualist cultures have a typical low context communication in which the mass of

information is vested in the explicit code. “Lots of things that in collectivist cultures are self-evident must be said explicitly in the individualist cultures” [Hofstede, 1991].

The Differences between Masculine Culture and Feminine Culture

In masculine societies, organizations stress job content and payments related to working. In practice, these are often reflected in the regulations of the organization, which always relate to performances. On the other hand, in feminine societies, quite a few organizations are likely to reward people in this way. As a matter of fact, the organizations in a feminine culture stress more the physical conditions [Hofstede, 2001].

Masculine and feminine cultures create different management types. The masculine manager is assertive, decisive, and ‘aggressive’. In masculine societies, this word ‘aggressive’ definitely expresses a positive implication. The masculine manager normally is a lonely decision-maker who is looking for facts and figures, rather than a group discussion leader. On the other side, the manager in a feminine culture is less visible, intuitive rather than decisive, and accustomed to seek consensus as well as shared agreements. Both characteristics of these national cultures are resourceful and intelligent in their own societies.

The Differences between Low-LTO Culture and High-LTO Culture

In a low-LTO culture, people have more concern for the past and especially the present. They believe that what people have held in the past and in the present is more important than in his/her future. Moreover, they prefer to have at the present more than what they will have in the future. It is important to have an immediate gratification, as well as enjoying leisure time.

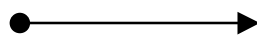
In the high-LTO culture, people are more concerned about the future. Children learn thrift, tenacity and humility in the pursuit of whatever goals, not to expect immediate gratification of their desires. As for the adults, the most important thing is to have a good foresight, which supports their behavior in business, social contacts, as well as a stress for keeping one’s commitments.

4.5 Modeling the ISM Cube

In the previous sections, three dimensions of ISM were identified, based on relevant research literature. All these dimensions were elucidated briefly and were related to ISM. In this section, the distinct dimensions will be modeled in an ISM Cube that will be used as a framework for our further study.

4.5.1 ISM Dimensions and the ISM Cube

We first introduce a scaled line with an arrow like



to express a dimension of ISM. Here the origin indicates the scale from 0 to N and the arrow indicates the scale increasing one by one. Each scaled line stands for a specific ISM dimension.

Taken into account the three dimensions earlier discussed, we have the following ISM dimensions:

National culture	0 ,..., 5	● →	X
Tasks of ISM	0 ,..., 4	● →	Y
Groups of the Actors	0 ,..., 4	● →	Z

The three dimensions above are used to distinguish the several aspects of an internationalized ISM, such as the national cultural aspect of ISM, the tasks of ISM and the actors of ISM.

We specify the national culture dimension as the X-axis, which can be represented by the set {PDI, UAI, IDV, MAS, LTO}, where PDI is the Power Distance Index, UAI is the Uncertainty Avoidance Index, IDV is the Individualism Index, MAS is the Masculinity Index and LTO is the Long Term Orientation Index.

We name the ISM task dimension as the Y-axis, scaled by the set {FM, AM, IM, TM}, where FM is Function Management, AM stands for Application Management, IM for Information Management and TM for Technology Management.

Considering the actors managers, designers/builders, users and maintainers, the Z-axis can be denoted by the set {M, D, U, Mt}, where M stands for Managers, D for Designers/Builders, U for Users and Mt for Maintainers. Hence, a 3-dimension coordinate system is formed with its axes as:

- X: PDI, UAI, IDV, MAS and LTO;**
- Y: FM, AM, IM and TM;**
- Z: M, D, U, and Mt.**

The coordinate system is named as the ISM Cube, shown in Figure 4.6.

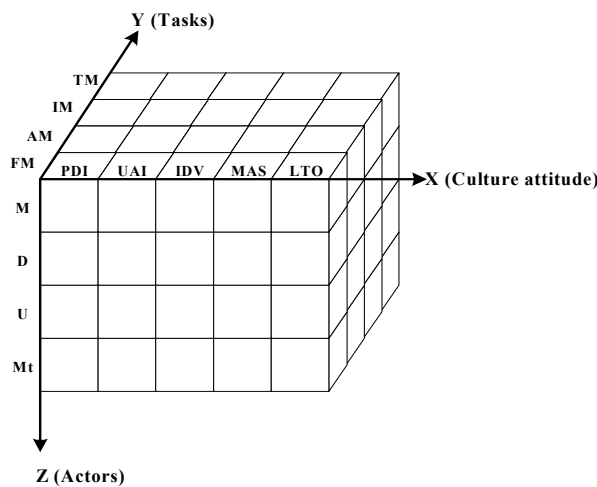


Figure 4.6: The ISM Cube

The ISM Cube is a schematic outline structure, which defines the three distinct dimensions and their relationships. Meanwhile, the ISM Cube provides a way of

viewing ISM from the different dimensions, also showing how those dimensions are probably interrelated.

4.5.2 The Distinct Components of the ISM Cube

A component of the ISM cube is an intersection or combination along the three dimensions in the ISM Cube. In Figure 4.7, for example, 80 different components in the ISM Cube can be distinguished based on the possible occurrences of three dimensions (X with 5 occurrences, Y with 4 and Z with 4). We use the indication $C(x, y, z)$ to express the ISM Cube component with the coordinates $x, y,$ and z . For example: $C(x=3, y=1, z=2)$ indicates the component of the ISM Cube as shown in Figure 4.7.

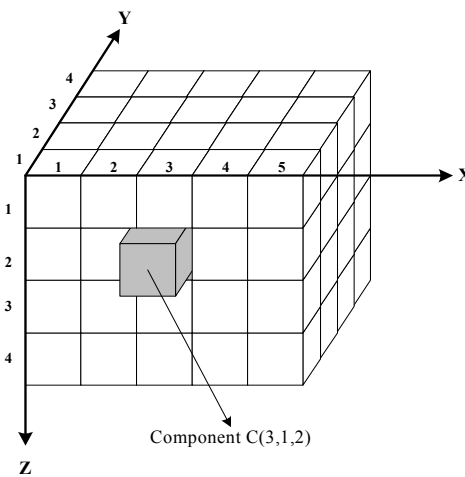


Figure 4.7: The Component of the ISM Cube

In the ISM Cube, Every component presents a particular relationship along the specified dimensions (e.g. national culture, ISM task and ISM actors), which is depicted in Figure 4.8.

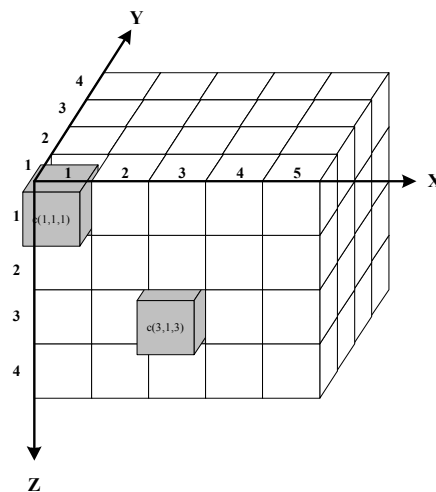


Figure 4.8: The Signification of the Components in the ISM Cube

The significance of each component of the ISM Cube is the following: each component represents a certain attitude of a certain ISM actor attitude regarding a certain ISM task. That attitude is driven by the national cultural background of that actor. In other words, **it indicates that the national cultural influences the ISM Actors' behavior (or attitude) on the ISM Task.**

For example, the component C(1,1,1) is related with three items PDI, FM and M respectively. PDI represents the Power Distance Index indicating the national cultural influence on ISM. FM means the task Function Management of ISM. M stands for Managers who are one of the types of actors in ISM. Therefore, the component C(1,1,1), labeled as PDI–FM–M, indicates that the attitude of managers regarding function management is influenced by the national culture variable “power distance.”

For the significant of all components in the ISM cube, we specify them in the Annex that belongs to this chapter.

The primary objective of the ISM Cube is to provide a means to contrast the differences for an internationalized ISM in the most effective manner. Based on the contrast, the differences in ISM between the different national cultural backgrounds can be described and analyzed. Understanding those differences could be an important step toward improving an internationalized ISM.

Generally speaking, the ISM Cube is intended for the use at any managerial level, such as the strategic, tactical and operational level. It can also be used in the different states of the earlier presented Extended State Model (e.g. in the states IPP; D; AI; M1/M2).

There is no specific order for the dimensions in the ISM Cube. In other words, each component of the ISM Cube is in principle a valid one without taken into account preceding or following components. Whether a component has a significant meaning depends on the cultural impact on actor and task. It is possible that for certain actors and for certain tasks there exists no difference, independent of the country where an actor is coming from. The significance of the cultural impact is in this case nearby zero and thus not relevant in shaping and organizing ISM.

4.6 Chapter Summary

In this chapter we developed the ISM Cube for facilitating ISM in an internationalized environment. The ISM Cube is based on the existing models, such as the Looijen's MCM models, Zachman's framework for the several participants in system development and design, and Hofstede's study on national culture profiles. The ISM Cube represents different dimensions of ISM, namely the several tasks of ISM, the several actors in the domain ISM and the national cultural influences on the ISM. We clarified them in this chapter. Consequently, the ISM Cube consists of three dimensions: the national culture dimension, the task dimension, and the actor dimension.

We will use the ISM cube in the following chapters in our empirical study related to differences in ISM between China and The Netherlands. As a vehicle of explanation, we restrict ourselves to an application domain with which we are familiar, namely university systems like educational and student systems, administrative and management systems for university research and personnel systems.

Annex at chapter 4: specification of the ISM cube components.

Component	Label	Meaning
C(1,1,1)	PDI-FM-M	Relationship between Power Distance (Culture) – Function Management (Task) – Manager (Actor)
C(1,2,1)	PDI-AM-M	Relationship between Power Distance (Culture) – Application Management (Task) – Manager (Actor)
C(1,3,1)	PDI-IM-M	Relationship between Power Distance (Culture) – Information Management (Task) – Manager (Actor)
C(1,4,1)	PDI-TM-M	Relationship between Power Distance (Culture) – Technology Management (Task) – Manager (Actor)
C(2,1,1)	UAI-FM-M	Relationship between Uncertainty Avoidance (Culture) – Function Management (Task) – Manager (Actor)
C(2,2,1)	UAI-AM-M	Relationship between Uncertainty Avoidance (Culture) – Application Management (Task) – Manager (Actor)
C(2,3,1)	UAI-IM-M	Relationship between Uncertainty Avoidance (Culture) – Information Management (Task) – Manager (Actor)
C(2,4,1)	UAI-TM-M	Relationship between Uncertainty Avoidance (Culture) – Technology Management (Task) – Manager (Actor)
C(3,1,1)	IDV-FM-M	Relationship between Individualism (Culture) – Function Management (Task) – Manager (Actor)
C(3,2,1)	IDV-AM-M	Relationship between Individualism (Culture) – Application Management (Task) – Manager (Actor)
C(3,3,1)	IDV-IM-M	Relationship between Individualism (Culture) – Information Management (Task) – Manager (Actor)
C(3,4,1)	IDV-TM-M	Relationship between Individualism (Culture) – Technology Management (Task) – Manager (Actor)
C(4,1,1)	MAS-FM-M	Relationship between Masculinity (Culture) – Function Management (Task) – Manager (Actor)
C(4,2,1)	MAS-AM-M	Relationship between Masculinity (Culture) – Application Management (Task) – Manager (Actor)
C(4,3,1)	MAS-IM-M	Relationship between Masculinity (Culture) – Information Management (Task) – Manager (Actor)
C(4,4,1)	MAS-TM-M	Relationship between Masculinity (Culture) – Technology Management (Task) – Manager (Actor)
C(5,1,1)	LTO-FM-M	Relationship between Long Term Orientation (Culture) – Function Management (Task) – Manager (Actor)
C(5,2,1)	LTO-AM-M	Relationship between Long Term Orientation (Culture) – Application Management (Task) – Manager (Actor)
C(5,3,1)	LTO-IM-M	Relationship between Long Term Orientation (Culture) – Information Management (Task) – Manager (Actor)
C(5,4,1)	LTO-TM-M	Relationship between Long Term Orientation (Culture) – Technology Management (Task) – Manager (Actor)

C(1,1,2)	PDI-FM-D	Relationship between Power Distance (Culture) – Function Management (Task) – Designer (Actor)
C(1,2,2)	PDI-AM-D	Relationship between Power Distance (Culture) – Application Management (Task) – Designer (Actor)
C(1,3,2)	PDI-IM-D	Relationship between Power Distance (Culture) – Information Management (Task) – Designer (Actor)
C(1,4,2)	PDI-TM-D	Relationship between Power Distance (Culture) – Technology Management (Task) – Designer (Actor)
C(2,1,2)	UAI-FM-D	Relationship between Uncertainty Avoidance (Culture) – Function Management (Task) – Designer (Actor)
C(2,2,2)	UAI-AM-D	Relationship between Uncertainty Avoidance (Culture) – Application Management (Task) – Designer (Actor)
C(2,3,2)	UAI-IM-D	Relationship between Uncertainty Avoidance (Culture) – Information Management (Task) – Designer (Actor)
C(2,4,2)	UAI-TM-D	Relationship between Uncertainty Avoidance (Culture) – Technology Management (Task) – Designer (Actor)
C(3,1,2)	IDV-FM-D	Relationship between Individualism (Culture) – Function Management (Task) – Designer (Actor)
C(3,2,2)	IDV-AM-D	Relationship between Individualism (Culture) – Application Management (Task) – Designer (Actor)
C(3,3,2)	IDV-IM-D	Relationship between Individualism (Culture) – Information Management (Task) – Designer (Actor)
C(3,4,2)	IDV-TM-D	Relationship between Individualism (Culture) – Technology Management (Task) – Designer (Actor)
C(4,1,2)	MAS-FM-D	Relationship between Masculinity (Culture) – Function Management (Task) – Designer (Actor)
C(4,2,2)	MAS-AM-D	Relationship between Masculinity (Culture) – Application Management (Task) – Designer (Actor)
C(4,3,2)	MAS-IM-D	Relationship between Masculinity (Culture) – Information Management (Task) – Designer (Actor)
C(4,4,2)	MAS-TM-D	Relationship between Masculinity (Culture) – Technology Management (Task) – Designer (Actor)
C(5,1,2)	LTO-FM-D	Relationship between Long Term Orientation (Culture) – Function Management (Task) – Designer (Actor)
C(5,2,2)	LTO-AM-D	Relationship between Long Term Orientation (Culture) – Application Management (Task) – Designer (Actor)
C(5,3,2)	LTO-IM-D	Relationship between Long Term Orientation (Culture) – Information Management (Task) – Designer (Actor)
C(5,4,2)	LTO-TM-D	Relationship between Long Term Orientation (Culture) – Technology Management (Task) – Designer (Actor)
C(1,1,3)	PDI-FM-U	Relationship between Power Distance (Culture) – Function Management (Task) – User (Actor)
C(1,2,3)	PDI-AM-U	Relationship between Power Distance (Culture) – Application Management (Task) – User (Actor)

C(1,3,3)	PDI-IM-U	Relationship between Power Distance (Culture) – Information Management (Task) – User (Actor)
C(1,4,3)	PDI-TM-U	Relationship between Power Distance (Culture) – Technology Management (Task) – User (Actor)
C(2,1,3)	UAI-FM-U	Relationship between Uncertainty Avoidance (Culture) – Function Management (Task) – User (Actor)
C(2,2,3)	UAI-AM-U	Relationship between Uncertainty Avoidance (Culture) – Application Management (Task) – User (Actor)
C(2,3,3)	UAI-IM-U	Relationship between Uncertainty Avoidance (Culture) – Information Management (Task) – User (Actor)
C(2,4,3)	UAI-TM-U	Relationship between Uncertainty Avoidance (Culture) – Technology Management (Task) – User (Actor)
C(3,1,3)	IDV-FM-U	Relationship between Individualism (Culture) – Function Management (Task) – User (Actor)
C(3,2,3)	IDV-AM-U	Relationship between Individualism (Culture) – Application Management (Task) – User (Actor)
C(3,3,3)	IDV-IM-U	Relationship between Individualism (Culture) – Information Management (Task) – User (Actor)
C(3,4,3)	IDV-TM-U	Relationship between Individualism (Culture) – Technology Management (Task) – User (Actor)
C(4,1,3)	MAS-FM-U	Relationship between Masculinity (Culture) – Function Management (Task) – User (Actor)
C(4,2,3)	MAS-AM-U	Relationship between Masculinity (Culture) – Application Management (Task) – User (Actor)
C(4,3,3)	MAS-IM-U	Relationship between Masculinity (Culture) – Information Management (Task) – User (Actor)
C(4,4,3)	MAS-TM-U	Relationship between Masculinity (Culture) – Technology Management (Task) – User (Actor)
C(5,1,3)	LTO-FM-U	Relationship between Long Term Orientation (Culture) – Function Management (Task) – User (Actor)
C(5,2,3)	LTO-AM-U	Relationship between Long Term Orientation (Culture) – Application Management (Task) – User (Actor)
C(5,3,3)	LTO-IM-U	Relationship between Long Term Orientation (Culture) – Information Management (Task) – User (Actor)
C(5,4,3)	LTO-TM-U	Relationship between Long Term Orientation (Culture) – Technology Management (Task) – User (Actor)
C(1,1,4)	PDI-FM-Mt	Relationship between Power Distance (Culture) – Function Management (Task) – Maintainer (Actor)
C(1,2,4)	PDI-AM-Mt	Relationship between Power Distance (Culture) – Application Management (Task) – Maintainer (Actor)
C(1,3,4)	PDI-IM-Mt	Relationship between Power Distance (Culture) – Information Management (Task) – Maintainer (Actor)
C(1,4,4)	PDI-TM-Mt	Relationship between Power Distance (Culture) – Technology Management (Task) – Maintainer (Actor)

C(2,1,4)	UAI-FM-Mt	Relationship between Uncertainty Avoidance (Culture) – Function Management (Task) – Maintainer (Actor)
C(2,2,4)	UAI-AM-Mt	Relationship between Uncertainty Avoidance (Culture) – Application Management (Task) – Maintainer (Actor)
C(2,3,4)	UAI-IM-Mt	Relationship between Uncertainty Avoidance (Culture) – Information Management (Task) – Maintainer (Actor)
C(2,4,4)	UAI-TM-Mt	Relationship between Uncertainty Avoidance (Culture) – Technology Management (Task) – Maintainer (Actor)
C(3,1,4)	IDV-FM-Mt	Relationship between Individualism (Culture) – Function Management (Task) – Maintainer (Actor)
C(3,2,4)	IDV-AM-Mt	Relationship between Individualism (Culture) – Application Management (Task) – Maintainer (Actor)
C(3,3,4)	IDV-IM-Mt	Relationship between Individualism (Culture) – Information Management (Task) – Maintainer (Actor)
C(3,4,4)	IDV-TM-Mt	Relationship between Individualism (Culture) – Technology Management (Task) – Maintainer (Actor)
C(4,1,4)	MAS-FM-Mt	Relationship between Masculinity (Culture) – Function Management (Task) – Maintainer (Actor)
C(4,2,4)	MAS-AM-Mt	Relationship between Masculinity (Culture) – Application Management (Task) – Maintainer (Actor)
C(4,3,4)	MAS-IM-Mt	Relationship between Masculinity (Culture) – Information Management (Task) – Maintainer (Actor)
C(4,4,4)	MAS-TM-Mt	Relationship between Masculinity (Culture) – Technology Management (Task) – Maintainer (Actor)
C(5,1,4)	LTO-FM-Mt	Relationship between Long Term Orientation (Culture) – Function Management (Task) – Maintainer (Actor)
C(5,2,4)	LTO-AM-Mt	Relationship between Long Term Orientation (Culture) – Application Management (Task) – Maintainer (Actor)
C(5,3,4)	LTO-IM-Mt	Relationship between Long Term Orientation (Culture) – Information Management (Task) – Maintainer (Actor)
C(5,4,4)	LTO-TM-Mt	Relationship between Long Term Orientation (Culture) – Technology Management (Task) – Maintainer (Actor)

5. The Investigation of National Cultural Differences on ISM

5.1 Introduction

One of the objectives of this research is to answer the research question: What is the impact of national cultural differences on ISM? Keeping this objective in mind, we will focus in this chapter on the national cultural differences on ISM in general, and on differences between China and The Netherlands in particular. As an example for studying the ISM, we choose university systems in this research.

Since our study focuses on the cultural differences between the Chinese and Dutch, the Z-axis of the ISM Cube will be denoted by the set {Chinese, Dutch}. Figure 5.1 below presents schematically the cross-cultural application of the ISM Cube, which will be used in this chapter.

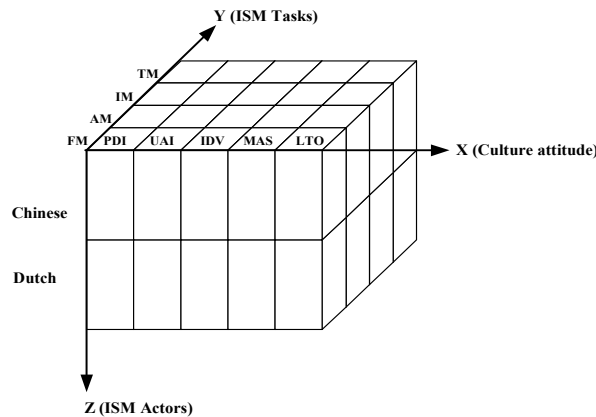


Figure 5.1: The Cross-Cultural Application of the ISM Cube

This chapter contains the following: In section 5.2 we will describe the national cultural differences between the Chinese and Dutch according to the literature study. In section 5.3 we provide examples of cultural differences in daily life and briefly discuss them according to personal observations. Based on the cultural differences described, several hypotheses regarding the impact on ISM are formulated in section 5.4. In section 5.5, we describe the survey, specially designed for this research. Finally, this chapter ends with a summary.

5.2 National Cultural Differences Between Chinese and Dutch in Theory

As described in the previous chapter, Hofstede conducted a cross-cultural research project in which he studied the influence of national cultural differences on work environments and identified five dependent dimensions of culture. Hofstede successfully collected data from many countries and areas. However, the People's Republic of China (P.R.C) wasn't included in his first survey. When he set up the

second survey, some data from the P.R.C was added, but only limited to the fifth national cultural dimension LTO (Long Term Orientation). Consequently, with the exception of LTO, there are no national culture scores directly related to the Mainland China for PDI, UAI, IDV and MAS.

In many cultural studies related to P.R.C, researchers consider the culture scores of Taiwan representative for China. We will do so as well in this research. In Table 5.1, both scores of the Chinese (Taiwanese) and the Dutch culture from Hofstede's research are listed.

	Chinese	Dutch
PDI	58	38
UAI	69	53
IDV	17	80
MAS	45	14
LTO	118	44

Table 5.1: The Scores of Five Culture Dimensions for China and Netherlands

The scores on the five dimensions for Chinese and Dutch reflect some fundamental differences between the Chinese and the Dutch national cultures. The Chinese have significantly higher scores than the Dutch with respect to PDI, UAI, MAS and LTO. The Dutch have a significantly higher score than the Chinese regarding IDV. The foregoing strongly suggests that the Chinese might differ essentially in their beliefs, attitudes and behaviours from the Dutch.

5.3 Some Examples of National Cultural Differences between the Chinese and Dutch in Daily Life

5.3.1 Chinese National Cultural Characteristics

Chinese history began in 2697 BC, more than 5000 years ago. The influence of the Chinese culture had a strong impact not only on Mainland China, but also on Taiwan, Hong Kong, Japan, Korea, Singapore, as well as some other Far East areas and countries. Generally speaking, Chinese culture is based on Confucianism, Taoism and Buddhism. As such, Chinese national culture has some essential beliefs.

Order

Chinese culture believes that order is the most important issue everywhere. The origin of this belief can be traced back to **Wu lun** which includes five principles, earlier defined by Confucius. Wu lun describes five basic relationships between people, such as Ruler-Subject, Father-Son, Older-Young, Husband-Wife, and Senior-Junior. These relationships are mutual. "Their complementary obligations can be summarized as follows: The Subject (Son, Youngster, Wife, Junior) owes the Ruler (Father, Older, Husband, Senior) respect, while the first owes the second protection and consideration" [Fang, 2000]. These are the basic practical ethics that have been rooted in Chinese culture for many thousands of years. This key tenet created a stable

hierarchical social order in the long history of China. This means that Chinese accept unequal relationships between people from generation to generation. For example, in the working place, employees prefer managers to make the decisions and do not prefer to share these responsibilities. This is a clear concept for Chinese, named as “Ge si qi zhi (各司其职)” or “bu zai qi wei, bu mou qi shi (不在其位，不谋其事)”, which means that everyone should concentrate on his own work according to his/her post. This attitude is closely related to the power distance aspect of Hofstede and can be characterized as a **Large Power Distance Culture**.

Balance

Balance, also called **Middle Way Policy**, was created by Taoism. It emphasizes that all things in the world, concrete as well as abstract, should be kept in balance. Its well-known symbol of a symmetric divided circle is very interesting and represents this meaning in a visualized way. Later on, this symbol was used in the Korean national flag. The idea of balance is deeply embedded in Chinese culture. Even today, this can still be seen in many Chinese constructions, such as cities, farmlands and buildings. This can even be seen in Chinese handwriting, representing the balance that Chinese people keep in their minds during their whole life.

Accordingly, imbalance is not acceptable because it is not stable and brings chaos and risks to the world. This results in a Chinese attitude to do what can be predicted and controlled. This phenomenon is related with Hofstede’s uncertainty avoidance. The Chinese culture can be labeled as a **Strong Uncertainty Avoidance Culture**.

Harmony

Chinese culture believes that harmony is a very important and beautiful virtue. This mainly comes from Buddhism. Within a family or an organization, harmony must be preserved because it reflects ‘one’s face’, dignity, self-respect and prestige. The real virtue is to treat others as one would like to be treated. The noted instruction “和为贵” is another Chinese principle, which can be written as “和” and often seen everywhere. Harmony is taught both at home and at school when people are still very young. In Chinese daily life, harmony is not only the case for the family life, but also for public behavior. Chinese people prefer to create a harmonious atmosphere, and to live and work in that atmosphere.

Thus, to keep harmony, individuals have to give up their own ambitions if these are in conflict with the ambitions of their family (or the organization). Chinese people believe that strongly differing ambitions of many individuals will destroy harmony. That belief conduces the collectivism culture of the Chinese society which can be labeled as a **Collectivism Culture**.

Summing up the basic background of the Chinese culture mentioned above, all three Chinese beliefs support each other. Order keeps balance, and balance results in harmony, while harmony maintains order. These three basic principles also support the Hofstede’s five national culture dimensions. We already described the impact on power distance, uncertainty avoidance and collectivism. Below we briefly explain the relationship with LTO and with MAS.

The Three Beliefs and LTO

In order to keep things under control, Chinese people prefer that things be predictable. They often try to discover strong relationships between past, present and future. Particularly, Chinese people think that future is more important than present. There is a very famed Chinese proverb “ren wu yuan lü, bi you jin you (人无远虑，必有近忧)”. It tells people that if someone is unable to reason from the future perspective, he/she will always have trouble in every present moment. Consequently, Chinese culture is future oriented, which could be related to Hofstede’s **Long Term Orientation** labeled as a **High LTO Culture**.

The Three Beliefs and MAS

Everyone is supposed to behave in the right way according to his own position and post. For example, in the working environment, managers are not only supposed to be qualified for their posts, but also to be responsible, assertive, and decisive. Meanwhile, Chinese subordinates are used to accepting the manager’s mandates. This willingness could be related with Hofstede’s **Masculinity** dimension and labeled as a **High MAS Culture**.

5.3.2 Dutch National Cultural Characteristics

Dutch culture has some characteristics that are quite different from other countries in the world. According to literature study and some personal observations, we will present some typical traits of Dutch culture.

Equal Rights

The idea that people are equal is deeply rooted in Dutch history. In Dutch society, everyone is equal from a moral point of view. It is widely accepted that people should be treated equally, no matter what the status of people is in their society, high or low. Based on this deeply rooted culture, some phenomena are quite typical in the Netherlands. We will give only two small examples from personal experience.

In the Netherlands, students that have graduated from high schools have equal opportunity to apply for the universities where they want to study. There are no special (national) admission exams for universities in the Netherlands. This is a very different situation from many other countries in the world.

Job evaluation is another example. Job evaluation at universities is done regularly each year. The evaluation is bi-directional. The status of the employee’s contract, temporary or permanent, does not matter. The individual receives an evaluation from his/her supervisors. At the same time, he or she can also provide his own evaluation to the supervisors.

The examples observed and mentioned above may demonstrate that Dutch people feel equal and would like to be treated equally. This has also been reported in literature. Oudenhoven studied the relationship between national culture and managerial conflicts within five European countries [Oudenhoven, 1998]. He investigated how middle managers were dealing with conflicts arising between their colleagues, and between themselves and their superiors. The respondents indicated on a 7-point scale the extent of their conflict appreciation, whether it was a small or a large conflict

(1=very small; 7=very large). Figure 5.2 presents one of the results, indicating the appreciation of conflict in Denmark, United Kingdom, The Netherlands, Spain and Belgium.

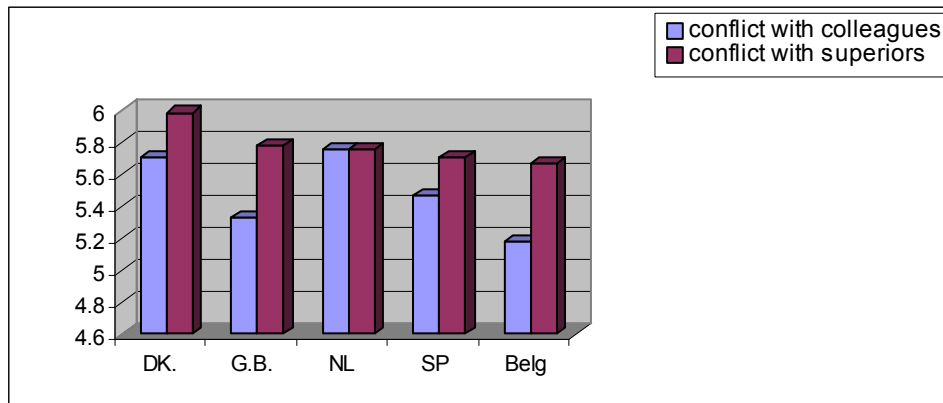


Figure 5.2: Conflict Seriousness in Lateral and Hierarchical Conflict

Figure 5.2 clearly indicates that the Netherlands is the only country, in which the appreciation of managerial conflict is the same, both with superiors and colleagues. This result strongly suggests that Dutch people not only feel equal in their work place, but also behave as though they are equal.

In daily life, it is difficult to experience the status of a person by observing the clothing worn or other external characteristics. Based on the equal right feeling, the directness and critical attitude of the Dutch are quite understandable. The Dutch do often voice their opinions in clear terms. They do not mind expressing their feelings, ideas, and views with their critics, because they feel equal and expect to be treated equally. In this respect, the Dutch culture is a **Small Power Distance Culture**.

Individualism

The individual's choice is respected very much in the Netherlands. Some legislation examples demonstrate the individual traits of the Dutch culture.

The first example concerns euthanasia which is legislated in The Netherlands under some strict supervisory structures. When the sick are unable to be cured, they might make the choice of euthanasia through regulated procedures. This personal choice is well understood and respected by family, relatives and medical doctors.

A second example concerns the drug policy. Within certain limitations and regulations, people are allowed to use soft drugs. Coffee shops can legally sell these drugs. Furthermore, it is even legal, on a limited basis, to culture some plants for a person's own use.

The last example is with respect to marriages. "Netherlands is the first country in the world to have legal marriages between people of the same gender" [NRC, 2001]. It is not only widely accepted by society, but also legislated. This is a typical example of respecting the individual's personal choice.

All examples mentioned above are related with individualism. Thus, the Dutch culture can be characterized as **an individual behaviors culture**.

Consensus

Consensus is another trait of the Dutch culture. Philippe d'Iribarne's wrote: "In the Netherlands, one of the management principles is the need for consensus among all parties, neither predetermined by a contractual relationship nor by class distinctions, but based on an open-ended exchange of views and a balancing of interests" [Hofstede, 1993].

A typical example is the Dutch government. The Dutch will always have a coalition cabinet due to the fact that the so-called Second Chamber (the formal representation of the Dutch population) is organized according to the votes that the several political parties have won during the election. On the national level, all policies and strategies are the result of consensus. Because any single party is always a minority, each party has to deal with another party for achieving a majority. This system guarantees that parties in the cabinet always have to negotiate and cooperate as a coalition.

What is happening on the national level is also occurring at the enterprise level where there is a coalition culture. Stockholders, managers, representatives of trade union, etc. are always working on the basis of consensus. In practice, the Dutch are normally consulted by the decision maker before making a final decision. As a matter of fact, the Dutch are very proud of this particular cultural aspect, as the following statement from a famous daily newspaper illustrates: "Our country relies on consultation, on the involvement in decision-making of as many people as possible" [NRC, 2001].

This attitude of looking to achieve consensus makes the Dutch culture a **Small Power Distance** but also a **Weak Uncertainty Avoidance culture**.

Femininity

Femininity is also a typical trait of Dutch culture. At the work place, "the Dutch attached more importance to freedom to adopt their own approach to the job, being consulted by their boss in his or her decisions, training opportunities, contributing to the success of their organization fully using their skills and abilities, and helping others" [Hofstede, 1993].

According to an European Graduate Survey (1995), the findings showed that: "Dutch business students ranked 'ability to handle conflicts and crises' and 'ability to listen and understand other views' much higher than did the other 12 nations." In addition, one of the findings from another survey study revealed that the Dutch do empathize both with their colleagues and managers more than other cultures [Oudenhoven, 1998]. Moreover, "In terms of management theories, both motivation and leadership in Holland are different from what they are in the United States. The leadership in Holland presupposes modesty, as opposed to assertiveness in the United States. No U.S. leadership theory has room for that" [Hofstede, 1993]. The prior empirical studies underline that the Dutch culture is a **Femininity Culture**.

5.4 The Impact of National Cultural Differences on ISM between Chinese and Dutch

As mentioned previously, one of the aims of this research is to show the impact of national cultural differences on ISM in general, and between the Chinese and Dutch in particular. Thus, we will formulate a set of hypotheses according to the studies and discussions in the previous sections.

In order to proceed step-by-step, the ISM Cube that was created in the previous chapter will be employed as an approach to conduct the hypotheses regarding the national cultural influences on ISM. The several hypotheses will be presented slice by slice along the national cultural items PDI, UAI, IDV, MAS and LTO (see figure 5.3).

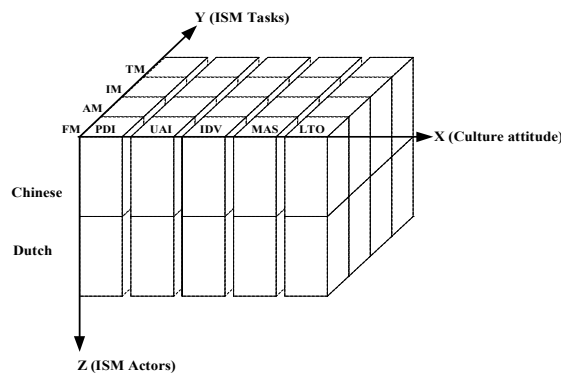


Figure 5.3: The Impact of National Cultural Attitudes on ISM

5.4.1 ISM Tasks–PDI

One of the national cultural traits from Hofstede’s research is PDI, which indicates to what extent inequality among people is accepted as normal in different countries. In a high PDI culture, people behave according to their own working posts and status. The higher positions that people have, the more responsibilities they will have and the more expectations they receive from their subordinates. In a low PDI culture, there is almost no difference in the working post or status. People are treated as individuals and are expected to contribute as much as possible to organizational goals, assuming that these are in line with personal interest and ambitions.

In Figure 5.4, the national culture dimension PDI is expected to influence ISM tasks. Many ISM tasks are related to responsibilities, obligations, permits, limitations, preconditions, etc. The question “who is entitled for doing what?” is in that respect important for ISM. Particularly, that question should be clarified for the different national cultures.

Since the Chinese culture is a high PDI culture, opposite to the Dutch culture, the following hypothesis could be formulated in general:

H1: The extent of accepting authority in ISM is more prevalent in the Chinese culture than in the Dutch culture.

This hypothesis can be applied for the several levels of decision-making and for the several states of ISM during the life cycle. As discussed in the previous chapters, ISM can be separated into three different levels, the strategic, tactical and operational level. In addition, ISM is involved in many states of the IS life cycle, such as the states IPP, D, AI, M1/M2, U1, U2, E1, and E2.

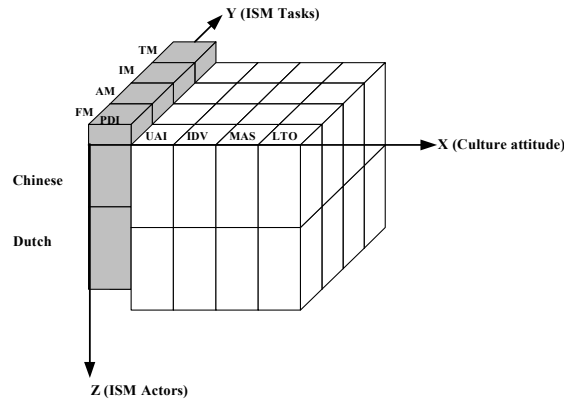


Figure 5.4: The Impact of National Cultural Attitudes PDI on ISM

5.4.2 ISM Tasks–UAI

National cultures are different regarding uncertainty avoidance. In a strong uncertainty avoidance culture people tend to shun ambiguous situations. Conversely, in a weak uncertainty avoidance culture, people are expected to accept ambiguous situations as familiar.

Uncertainties might also exist in ISM. These uncertainties are related to the planning, design, implementation and maintenance of IS. In other words, ISM tasks will encounter many situations with uncertainties in complicated (international) circumstances. Literature shows that people with different national cultural backgrounds react differently to uncertainties. Therefore, the ISM actors are expected to react differently to ISM uncertainties. The highlighted slice of the ISM Cube therefore moved one step from the left to right in the Figure 5.5.

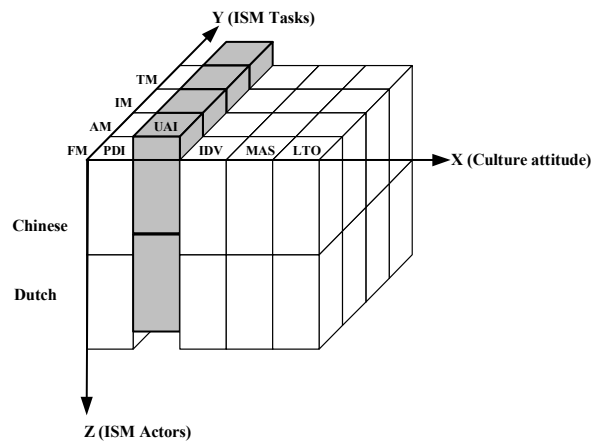


Figure 5.5: The Impact of National Cultural Attitudes UAI on ISM

According to literature, the Chinese are labeled as a strong, while the Dutch are labeled as a weak uncertainty avoidance culture. From this point of view, the following hypothesis is formulated:

H2: The extent of avoiding uncertainty in ISM is more prevalent in the Chinese culture than in the Dutch culture.

5.4.3 ISM Tasks–IDV

As noted previously from the Hofstede’s theory, national cultures are distinguished into individual and collectivistic cultures. In an individual culture personal choices are respected and tolerated in society. People are encouraged to show their own identities and to have their own personal interests at their work place. In collectivistic cultures, people strive for a harmonious environment, both at home and at the work place. The individual initiative is not highly valued. The interests and the shared values of the group are considered to be superior to the individual.

ISM has also to deal with individualizations, and thus, one may expect an impact of cultural differences on ISM. The national cultural influence of individualism on ISM can be depicted in Fig 5.6. The slice of the ISM Cube is highlighted on the IDV slice.

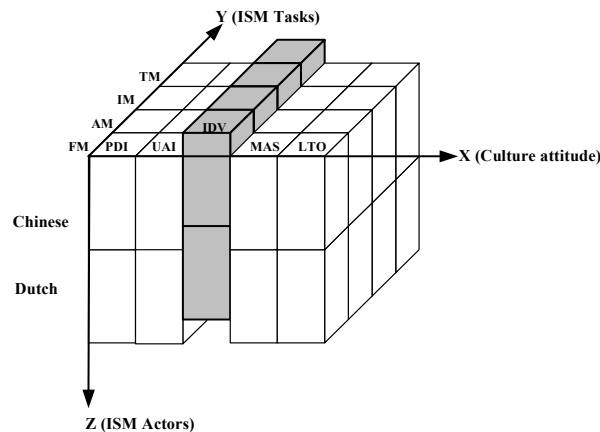


Figure 5.6: The Impact of the National Cultural Attitudes IDV on ISM

Since Chinese culture is collectivistic and the Dutch individualistic, it could be expected that differences exist between the Chinese and Dutch regarding ISM. Consequently, the following hypothesis can be formulated:

H3: The extent of individualization of ISM is more prevalent in the Dutch culture than in the Chinese culture.

5.4.4 ISM Tasks–MAS

National cultures can be divided into high and low MAS. In a masculine society, people are used to strictness and rational decision-making. Therefore, a high MAS culture emphasizes the rational outcome of a decision. In a feminine society, people

are used to mildness and moderation. Consequently, a low MAS culture emphasizes an individual's emotion. It pays more attention to the satisfaction of individuals.

Differences between high MAS and low MAS culture might also influence ISM, because the ISM actors are expected to react differently to the several ISM tasks. The impact of the national culture attitudes MAS on ISM is depicted in Figure 5.7. The highlighted slice MAS, indicates the relationships between the national cultural attitude MAS and ISM tasks.

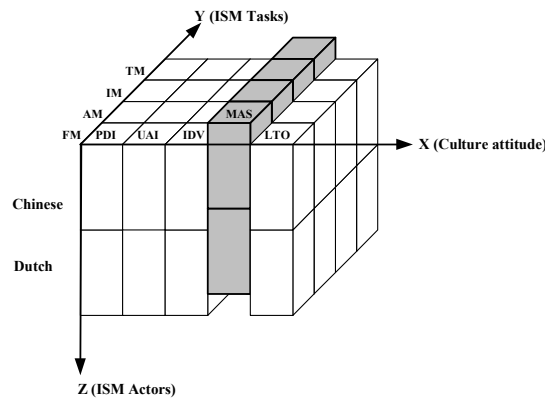


Figure 5.7: The Impact of the National Cultural Attitudes MAS on ISM

The Chinese culture is characterized as a high MAS culture (Masculinity culture), opposed to the Dutch culture. Accordingly, the following hypothesis of MAS differences on ISM can be assumed:

H4: The extent of masculinity of ISM is more prevalent in the Chinese culture than in the Dutch culture.

5.4.5 ISM Tasks–LTO

National cultural differences will also influence ISM because of the LTO dimension (Long Tem Orientation). In a high LTO culture, people do care about the present as well as the future situation. Acting is valued, taking into account the future consequences. The future is more important than the present, because people deeply believe that a well-planned future will insure a good situation for the present.

In a low LTO culture, people pay more attention to the present. In other words, the present situation is judged as more important. From a psychological perspective, it is quite reasonable to pay more attention to the present than to the future, expressed by the famous proverb in western societies: “Who then lives, then struggles.”

National cultural differences of high and low LTO will influence ISM from many aspects, such as the planning, designing, maintaining, as well as the updating of IS. It might also influence the selection of IT products and facilities, as well as the technical infrastructures. The impact of the attitudes LTO between the national cultures is highlighted in the ISM Cube, shown in Figure 5.8.

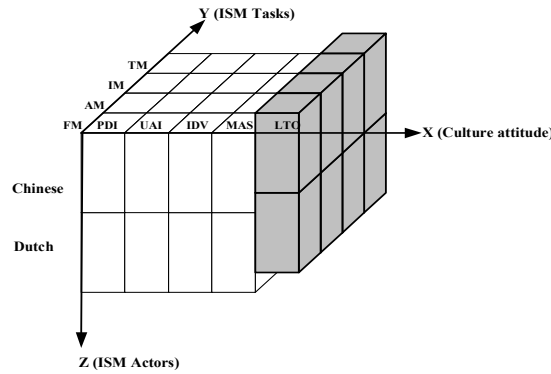


Figure 5.8: The Impact of the National Cultural Attitudes LTO on ISM.

Thus, the following hypothesis can be presumed:

H5: The Long term orientation on ISM is more prevalent in the Chinese culture than in the Dutch culture.

Comparing the cultural differences between Chinese and Dutch, it has become clear that certain attitudes in one culture will be more prevalent than in the other. The mark ‘+’ and ‘-’ will be used to denote these attitudes, respectively. The character ‘+’ indicates that a certain attitude is more prevalent in a particular national culture than in the other one. By contrast, the character ‘-’ expresses that the attitude is less prevalent in a national culture than in the other one. The hypotheses formulated above can be summarized as follows (see Table 5.2):

Impact cultural aspect on ISM	Cultural characterization		Hypothesis: The supposed prevalent attitude on ISM	
	Chinese	Dutch	Chinese	Dutch
H1: ISM – PDI	Large	Small	+	-
H2: ISM – UAI	Strong	Weak	+	-
H3: ISM – IDV	Low	High	-	+
H4: ISM – MAS	High	Low	+	-
H5: ISM – LTO	High	Low	+	-

Table 5.2: Overview of the Several Hypotheses

5.5 Introduction to the Survey Study

In order to study the cross-cultural differences on ISM in practice, we used ISM at Chinese and Dutch universities as a practical case. Reasons for that have already been provided in chapter 1, along with the researcher’s experience in the domain of university ISM, that is, working as an ISM manager at the Xi’an Jiaotong University in China. In addition, the university processes and informational structures are almost

the same all over the world. Universities all have similar educational programs and accompanying administrative and managerial systems. The same applies to research and personnel systems. The fact that the university setting is quite comparable in various countries is an advantage when studying the impact of cultural differences on ISM. If this setting were different, another uncertain influence would be introduced, namely the impact of the different prime and secondary processes within organizations on ISM.

In our research, we have chosen the several IS at campus as reference systems in our survey. Examples are: education centered management systems including students affairs, courses management systems; research centered management systems, including project administration, publications overview systems; personnel centered management systems, including all staff affairs, as well as ICT facilities management systems.

People who were involved in answering questionnaires were matched into several groups, according to their professions. We were doing so because we are interested in the several actors involved in ISM. We made the following division: teachers and researchers, students, university managers and ICT maintainers. The reason for splitting up several target groups was to discover the different opinions from the different actors on ISM.

Based on the foregoing, a questionnaire was designed with the aim of verifying the five basic hypotheses that were presented in the previous sections of this chapter. In that questionnaire several questions were concerned with the three main university information systems, indicated previously as the Student Information system, abbreviated as SIS; the Research Project Information System, abbreviated as RPIS; and the Human Resources Information System, abbreviated with HRIS. These systems were very common for the different actors at the various universities and the relevant questions appeared to be easily understood by the concerning people.

All questions were closely related to ISM within a university, in general. However, the different national cultural traits were hidden in most questions in order to analyze the impact of culture on ISM. The questionnaire used in this research is described in the appendices A (the English version) and B (the Chinese version) at the end of this thesis.

The questionnaire was originally stated in English. We used this questionnaire for the Dutch without translation since the Dutch are quite familiar with the language English. In China the questionnaire was translated into a Chinese version, because the Chinese involved in answering the questionnaire could not communicate very well in English. Thus the questionnaire had two versions, the English and Chinese.

There are two types of questions in the questionnaire inviting the respondents for their answers. The first type is a single choice question, leading to single Yes/No answers. The second type is a multiple-choice question. Answers in this case range from: strongly disagree, disagree, indifferent, agree and strongly agree.

Before the formal questionnaire was put into practice, a draft questionnaire was designed based on the author's experience in China and in the Netherlands. Thereafter

several discussions with specialists were organized, and revisions were made after each discussion. In order to test the questionnaire, a small pilot trial was held at the TUE in the Netherlands. The questionnaire was issued to a group of Dutch students, some Chinese students and scholars, as well as to some Dutch teachers & researchers, Dutch ICT specialists and Dutch managers at the TUE. Based on the experience of the pilot, some revisions were again made to ensure that the questionnaire was more suitable and understandable.

The questionnaires that were translated into Chinese were distributed to attendants of the 6th annual conference of EMISA in China in July 2002. This annual event started in 1990 and is held once every one and half years in China. From year to year, the conference topics reflect an increasingly greater interest in issues and subjects of ISM at Chinese universities. The conference is an important event for IS researchers and developers of Chinese University systems. In that respect, we addressed a well-informed and very interested public with the Chinese questionnaire.

There were 136 representatives from 79 Chinese universities, attending the conference. Apart from the commercial sponsors, some specially invited leaders were from the state education ministry, and invited speakers were from Taiwan, Hong Kong and the mainland of China; thus, all the 107 representatives were directly involved in ISM work at Chinese universities. Because our questionnaires were designed for ISM at universities, only the representatives coming from universities received and filled in the questionnaires. The professions of those representatives were: administrative managers at the university, ICT department managers, ICT specialists, and teachers and researchers engaged in teaching and researching Computer Science or IS. They were all familiar with IS at the universities in China.

To collect answers from Chinese students, questionnaires were issued and collected before the end of 2002 at Xi'an Jiao Tong University (XJTU). The Chinese students involved were PhD students and Masters students of the Computer Science discipline, and third year Bachelor students in the Communication discipline. All students were familiar with IS at the universities in China. The detailed information on the questionnaires and the people involved in China is summarized in Table 5.3.

The number of Questionnaires	Issued	Collected	Valid	Percentage	
				Valid/Issued	Valid/ Collected
Issued at Conference	107	95	88	82.24%	92.63%
Issued to Students	52	43	39	75%	90.70%
Total	159	138	127	79.87%	90.03%

Table 5.3: Summary of the Survey in China

Supported by the generous help from the author's colleagues, the other important and comparable part of the study was realized. Questionnaires were issued to Dutch people at two universities, namely the Eindhoven University of Technology and the

Tilburg University in the Netherlands. Both groups had also managers, teachers and researchers, students and ICT specialists. All persons working at universities in the role manager, ICT specialist and teacher/researcher are called university staff in table 5.4, which summarizes the survey in The Netherlands.

The number of Questionnaires	Issued	Collected	Valid	Percentage	
				Valid/Issued	Valid/ Collected
University staff	59	45	45	76.21%	100%
Students	56	56	50*	89.29%	89.29%
Total	115	101	95	82.61%	94.06%

Table 5.4: Summary of the Survey in the Netherlands.

All questionnaires distributed to both Chinese and Dutch were solicited on a strictly voluntary basis. The respondents were quite familiar with the IS at the university. Therefore, there is confidence that the samples, both Chinese and Dutch, are a relatively representative set of data, suitable for this research.

After carefully checking the collected questionnaires, some invalid questionnaires were eliminated. Reasons for invalid questionnaires included three possibilities. First, the collected questionnaire was answered partly, so was not finished completely; thus, some of them had to be eliminated because of too many blanks in them.

Second, some people who were neither Chinese nor Dutch answered the questionnaires. We left those questionnaires out because they did not belong to the target groups.

Third, some responses in questionnaires had responses that were almost entirely answered with neutral choices. These were also eliminated because they were not meaningful for the analysis of the impact of cultural differences on ISM. Table 5.5 presents an overview of the valid questionnaires, used for further analysis.

	Profession/ISM actor				Total
	ICT specialists	Managers	Students	Teachers & Researchers	
Chinese	20	35	39	33	127
Dutch	15	14	50	16	95
Total	35	49	89	49	222

Table 5.5: General Information about the Survey

5.6 Chapter Summary

In this chapter we described first the several cultural aspects in relation to ISM. Thereafter five main hypotheses were formulated regarding the impact of cultural differences on ISM. The following sections specified the survey, which was executed for analyzing the cultural influences on ISM. The relevant data regarding target groups, number of participants and the useful responses were presented.

In chapters 6 and 7, the questionnaire outcomes will be tested and the results will be analyzed according to our research objectives.

6. Survey Study I: National Cultural Influences on ISM

6.1 Introduction

In order to verify how national cultural differences between the Chinese and Dutch influence ISM, the hypotheses formulated in the previous chapter will be tested in this chapter. The ISM Cube will be used for analyzing the cross-cultural comparisons between the Chinese and Dutch. The rest of this chapter is constructed as follows: The hypotheses about the influences of national culture on ISM for both Chinese and Dutch will be tested in section 6.2. We will explain step by step which questions in the questionnaire addressed specific hypotheses and what the responses were in the survey from the Chinese and Dutch. The results of the hypotheses testing are analyzed in detail in section 6.3. The implications of the testing are discussed in the section 6.4. Finally, this chapter ends with a summary.

To test the hypotheses of this research, the statistical software package SPSS was employed to process the collected questionnaire responses. Means, standard deviations and differences of the means were reported, respectively, from both the Chinese and Dutch. One of the functions of SPSS, the ANOVA, was used to test the significance of the mean difference for the several groups, Chinese and Dutch. The target reliability of the instrument was 0.95. Therefore, in the subsequent analysis $p < 0.05$ means that the means difference, indicating the different attitudes between the Chinese and Dutch, is significant. In most cases we will report only the significant answers in the result tables. In cases where we are presenting also non-significant results for special reasons, we will mark these results by NS (Non Significant), indicating that the difference in the attitudes is not significant.

When we are reporting on questions with multiple answers, the favored answer of the multiple choices from both the Chinese and Dutch will be highlighted in the various result tables for convenience purposes. If a result occurs which is contrary to the formulated hypothesis, we will mark that result with an asterisk.

6.2 Hypotheses Testing

6.2.1 The Impact of National Culture on Function Management

As mentioned, we will use the ISM Cube in order to analyze the impact of cultural differences on ISM between the Chinese and Dutch. The Z-axis of the ISM Cube will be denoted by the set {Chinese, Dutch}. Thus, the slice of the ISM Cube in Figure 6.1 which is highlighted as the first step, indicates that the focus is on the relationship between function management and national culture for this subsection.

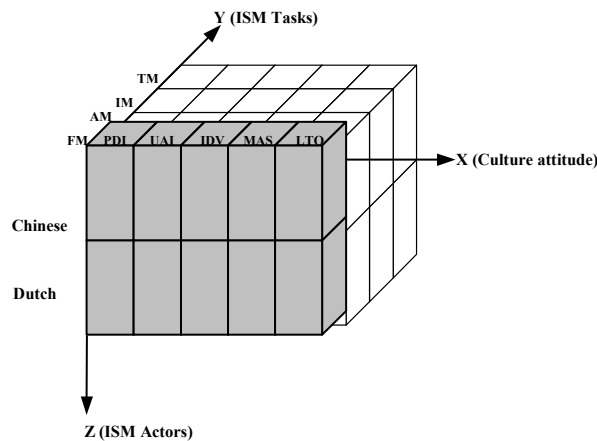


Figure 6.1: The Cultural Impact on FM

As we discussed in a previous chapter, FM includes three management levels (strategic, tactical and operational level). As far as content is concerned, FM covers all managerial functions regarding what the functionality of the IS should be, such as the kind of information processing, communication, information exchange, information access, information publishing, information updating, etc. For all these issues FM will be involved in setting the rules and regulations regarding function management. The aim of these rules or regulations is to keep the IS working properly, and to facilitate the cooperation among people on such systems.

People from different national cultural backgrounds, might have different attitudes, when dealing with these rules and regulations. That is the reason to focus on that the particular assumption in the next section.

Questions in the Survey Regarding Function Management

FM–PDI

National culture PDI could influence FM because people, coming from different countries, might have different attitudes to rules and regulations regarding Function Management. The question in the questionnaire addressing this, was the following:

Who should make rules and regulations for the functional management of a student information system (SIS)?

- Ministry of education
- Local government
- The university administrative department
- The university ICT department
- The SIS system manager
- Representatives from all user groups: (e.g.: teachers, students, ICT and administrative managers)

FM-UAI

National cultures might also influence FM due to differences in uncertainty avoidance. As we have seen, people likely try to shun ambiguous situations if they come from a strong uncertainty avoidance culture. Rules and regulations regarding IS are very often directly related to uncertainties in the applications. More rules and regulations might contribute to reducing the ambiguity in the application. Therefore, the following question was asked in the questionnaire:

What do you think about the number of management rules and regulations of a SIS? (Please choose one)

- As many as possible to limit unexpected occurrences (uncertainty) in the use of a SIS
- As few as possible to provide a convenient use of a SIS

FM-IDV

The national culture aspect IND and FM are expected to also be related. In a collectivism culture, people like to stick to agreed standards. They might prefer that system functions work should conform to standard profiles. In an individualistic culture, people are used to being free and therefore might prefer to individualize/customize the output and the use of an IS. The relevant question in the questionnaire was:

What kind of format for the several courses should be used in a SIS?

- A standard format for all courses
- A standard format for the required courses only and a free format for electives
- Free personal format for all courses, as the teachers like

FM-MAS

National cultural differences between high and low MAS could also influence FM. People might have different attitudes when the IS are misused. The following question was asked in the questionnaire:

What would you prefer to do in case the SIS is misused (please choose one)?

- give a warning to the user
- give a penalty to the user

Descriptive Statistics and Findings

All relevant answers to the questions mentioned above, were processed with the software package SPSS. The statistical results of these answers are listed in Table 6.1.

	F(df, N)	p.	Chinese		Dutch		DX	Explanation
			X	SD	X	SD		
FM-PDI	F(1,215)=196.442	.000	.92	1.135	- 1.21	1.076	2.13	rules from ministry
	F(1,218)=29.898	.000	1.24	.911	.42	1.309	.82	rules from university administrative office
	F(1,220)=8.536	.004	.87	1.191	1.28	.834	-.42	rules from all users
FM-UAI	F(1,167)=7.647	.006	.39	.848	-.02	.831	.41	prefer more rules
	F(1,167)=5.201	.024	.71	.818	1.05	.844	-.33	prefer less rules
FM-IDV	F(1,215)= 23.428	.000	.12*	1.322	.97*	1.213	-.85	standard format for all courses
	F(1,215)=76.846	.000	.80*	1.084	-.54*	1.170	1.35	free format for elective
	F(1,216)=41.306	.000	-.16*	1.422	-1.26*	.961	1.09	always free format
FM-MAS	F(1,219)=21.261	.000	.52	.756	1.03	.905	-.52	warning for misuse
	F(1,219)=23.246	.000	.99	.863	.43	.846	.56	punishment for misuse

(X=mean, SD=standard deviation, DX=difference between means)

Table 6.1: The Statistical Results of the Relationship FM–National Culture

The statistical results in Table 6.1 indicate some significant findings between the Chinese and Dutch. First, PDI influences FM profoundly. The results reveal the significant different attitudes for this issue between Chinese and Dutch. The Chinese are willing to accept rules and regulations from the State Ministry of Education; the Dutch are strongly against this. The difference of the means of the Chinese and Dutch attitude is 2.13.

Although both Chinese and Dutch agree that rules and regulations for the information system can be made by the administrative office at university level, the differences between both attitudes are also significant. According to the results, the Chinese prefer rules and regulations made by the central administrative office at university level, which shows the highest mean among the Chinese choices. By contrast, the Dutch prefer to have rules and regulations, made by all representatives of the university.

The foregoing is consistent with the hypothesis H1: *The extent of accepting the authority of ISM is more prevalent in the Chinese culture than in the Dutch culture.* In other words, the Chinese are more willing to accept rules and regulations from superior management levels, while the Dutch prefer to have rules and regulations from the operation levels.

Table 6.1 confirms also the relationship between UAI and FM. The Chinese agree to have more rules and regulations to limit uncertainties in the application of a SIS; the Dutch do not. Although the difference of the Chinese and Dutch mean is not very large (namely 0.41), it is significant ($p=0.006$). As a matter of fact, the Dutch prefer to have less rules and regulations than the Chinese. This outcome is in accordance to the hypothesis H2: *The extent of avoiding uncertainty of ISM is more prevalent in the Chinese culture than in the Dutch culture.*

Third, IDV also influences FM. The main concern of this issue is how far people tolerate or accept an individualized information format. Both Chinese and Dutch accept standard profiles for courses, and are against completely free course formats. However, the Dutch agree more to the standard course profile than the Chinese do. Meanwhile, the Dutch disagree much more with the completely free course format than the Chinese do. Interestingly, the Chinese would like to accept much more free formats than the Dutch. This is a reverse result with regards to hypothesis H3: *The extent of individualization of ISM is more prevalent in the Dutch culture than in the Chinese culture.* One would expect that the Dutch would prefer much more customized and individualized formats, but the contrary is the case.

Last but not least is the relationship between MAS and FM. Both the Chinese and Dutch agree to give a warning for misuse of the IS or even to give a punishment. However, the Dutch agree much more to give only a warning for misuse than the Chinese do. By contrast, the Chinese agree much more to give a punishment for misuse. This result is consistent with hypothesis H4: *The extent of masculinity of ISM is more prevalent in the Chinese culture than in the Dutch culture.*

The tested results regarding the impact of National Culture on FM are summarized in Table 6.2.

	Hypotheses		Results		Support hypothesis?		p?
	Chinese	Dutch	Chinese	Dutch	Chinese	Dutch	
FM-PDI	+	-	+	-	Y	Y	Y
FM-UAI	+	-	+	-	Y	Y	Y
FM-IVD	-	+	+	-*	N	N	Y
FM-MAS	+	-	+	-	Y	Y	Y

*: Reversed result

Table 6.2: The Results Regarding FM-National Culture

6.2.2 The Impact of National Culture on Application Management

This subsection will concentrate on the impact of national cultural on the application management of IS (see the highlighted slice in the ISM Cube in Figure 6.2).

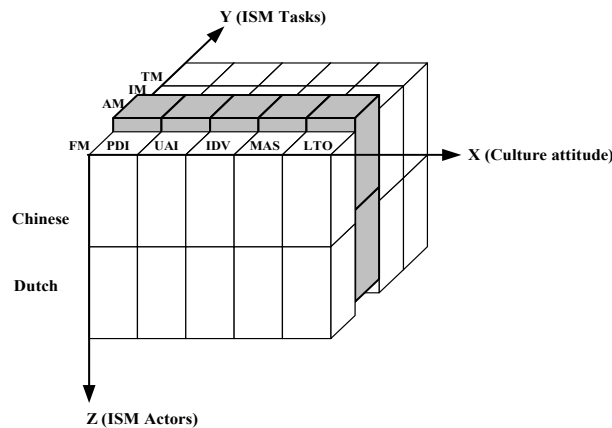


Figure 6.2: The Relationship between the Several Cultural Aspects and AM

In this research, AM is mainly oriented to application systems that are required for the operational processes within a university. The application systems might be self designed, coalition designed, as well as outsourced.

Questions in the Survey Regarding Application Management

AM – PDI

National culture could impact AM. In a large PDI culture, order is significant and very important. To keep the proper order, things must be strictly organized or even over organized. In a small PDI culture the contrary will be true. Therefore, the attitude to order could be different between a large and a small PDI culture. The relevant question for this issue is listed below:

In what order should project participants be listed in the Research Project Information system (PRIS)?

- Ordered by administrative title
- Ordered by academic title
- Ordered by project responsibility
- Project manager first, others alphabetically
- Ordered alphabetically

AM – UAI

In a strong UAI culture, people prefer to have a harmonious situation and try to avoid conflict. As said in the preceding sections, this can be seen as keeping or preserving “face”. In a weak UAI culture, people prefer to be straight and direct. The foregoing can have impact on the attitude toward anonymity in the communication. Consequently we will focus on the attitude for anonymity communication. The relevant question in the questionnaire addressing this issue was:

Which automated communication facilities do you prefer?

- Groupware, CSCW, BBS in public and anonymous?
- Groupware, CSCW, BBS in public but not anonymous?
- Private interaction? (e.g.: email between student and teacher)

* CSCW—Computer Support Collaborative Work

* BBS—Bulletin Board Systems

AM – IDV

Collectivism versus individualism might influence AM. In a collective culture (Low IDV), the individual initiative is not highly valued. The interests and the shared values of the group are considered to be superior to the individual. However, in an individual culture (High IDV), the contrary will be the case. For getting responses to this cultural aspect, we focused in the questionnaire on the issue whether students can tailor elective courses according to their individual interest. The relevant question was:

Should students be allowed to tailor elective courses, provided through the SIS?

- Students are not allowed to tailor any part of the course
- Students can choose some parts of an elective course in a predefined way
- Students are free to tailor any part of the course

AM–LTO

In a low LTO culture, people outweighed the present on the account of the future consequences. This aspect may also influence AM. We focused in this respect on the updating of the information system. The relevant question in the questionnaire was as follows:

How flexible should a SIS be maintained?

(Please tick one)

- Anytime if necessary
- 1~2 year
- 2~3 year
- >3 years

In order to process the responses, we allocated the different scores to the four choices respectively. The score of maintaining for ‘anytime if necessary’ is 0, for the period between ‘1 and 2 years’ is 1, for ‘2 to 3 years’ is 2, and for ‘more than 3 years’ is 3.

Descriptive Statistics and Findings

The important statistic results are reported in the Table 6.3 below, after processing the questions from the questionnaires of both the Chinese and Dutch.

	F(df, N)	p.	Chinese		Dutch		DX	Explanation
			X	SD	X	SD		
AM-PDI	F(1,215)=46.722	.000	.44	1.391	-.78	1.151	1.22	order by academic titled
AM-UAI	F(1,215)=22,642	.000	1.07	.985	.32	1.358	.76	public and anonymous communication
AM-IND	F(1,214)= 1.628	NS	.24*	1.385	-.01*	1.443	.25	tailoring elective courses
AM-LOT	F(1,219)=16.375	.000	.69	.907	.25	.618	.44	updating applications

* reversed results

Table 6.3: The Statistical Results of the Relationship AM–National Culture

The results in Table 6.3 reveal some important findings. First, there is a big difference for ordering the participants when publishing their names. The mean of the Chinese is 0.44, of the Dutch –0.78. The means difference is 1.22, which is significant. This result strongly suggests that Chinese accept status differences much more than Dutch.

In China, academic titles indicate the personal academic capability and ability. The higher or more academic the titles, the higher the probability to be awarded with extra research money and the more attractive the academic climate. The more research fellows that join a research project, the higher the chance of getting the project. As a matter of fact, research projects are very often assigned to those who have the higher academic titles. They become the leader of the research projects and hold the key responsibilities in the research team. So, the higher the academic title, the more respect a researcher receives in China.

The situation is different in the Netherlands. A researcher with a good idea can apply for a large research project and might be awarded the project; others who are interested in the project will join the research team. The leader of the research project would not necessarily be the most senior academic. So, the one with higher academic title will not be superior to those within a research team. This result is consistent with the hypothesis H1: *The extent of accepting authority of ISM is more prevalent in the Chinese culture than in the Dutch culture.*

Both the Chinese and Dutch support anonymous communication. However, the Chinese support is much stronger than for the Dutch. The mean for Chinese is 1.07, for Dutch 0.32. The mean difference is 0.76, which is significant. This indicates that most Chinese are in favour of anonymous communication. This result reflects the Chinese uncertainty avoidance culture. In order to keep harmony, Chinese would like to keep “face” in exchanging standpoints or opinions. Chinese prefer, therefore, the anonymity mode instead of an open discussion. This result is consistent with hypothesis H2: *The extent of avoiding the uncertainty of ISM is more prevalent in the Chinese culture than in the Dutch culture.*

The results regarding the opportunity for students to tailor elective courses according to their individual interest are reversed for both Chinese and Dutch. The Chinese mean is 0.24; the Dutch is –0.01. The mean difference is 0.25 which is not significant.

Nevertheless, this is still an interesting result. It gives the reversed results for the hypothesis H3: *The extent of individualization of ISM is more prevalent in the Dutch culture than in the Chinese culture.*

The attitudes regarding the maintenance of IS are also different. The Chinese mean is 0.69; the Dutch mean is 0.25. That gives a mean difference of 0.44, which is significant. It means that the Chinese support the updating of an information system on a longer period than the Dutch. This result is consistent with hypothesis H5: *The extent of long term orientation of ISM is more prevalent in Chinese culture than in Dutch culture.* In the Table 6.4 all results are summarized.

	Hypotheses		Results		Support?		p. ?
	Chinese	Dutch	Chinese	Dutch	Chinese	Dutch	
AM-PDI	+	-	+	-	Y	Y	Y
AM-UAI	+	-	+	-	Y	Y	Y
AM-IVD	-	+	+*	-*	N	N	NS
AM-LOT	+	-	+	-	Y	N	Y

*: Reversed result

Table 6.4: The Results Regarding the Relationship AM–National Culture

6.2.3 The Impact of National Culture on Information Management

Information must be organized and maintained, so information management is very substantial. In this subsection, we will focus on some items of information management that might relate to national cultural differences. Items are, for example, delivering information, censoring and ratifying information, publishing information, accessing information and updating information.

Figure 6.3 presents the highlighted slice in the ISM Cube, which indicates the relationship between the national culture differences between the Chinese and Dutch and information management.

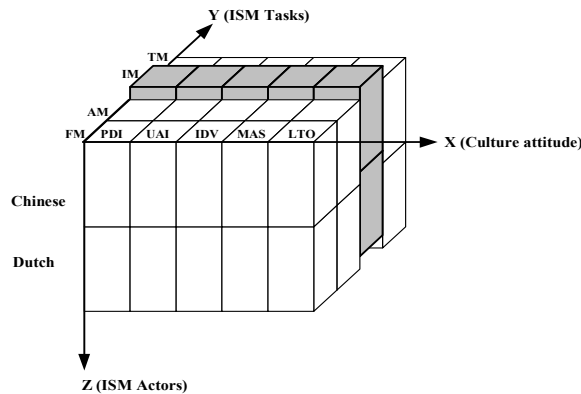


Figure 6.3: The Cultural Impact on IM

Questions in the Survey Regarding Information Management

IM-PDI

In a large PDI country, responsibilities are closely related to status and position in the organization. Regarding information delivery and access, the superior management levels will emphasize the need for censoring, ratifying and assessing procedures. In contrast to large PDI countries, in low PDI countries one will show an open attitude toward ownership of information and access to information. The relevant questions asked in the questionnaire were the following:

Who should have the formal authority to ratify the contents of a SIS?

- Ministry of education
- Local government
- High-level specialists outside the university
- Central university administrative department
- The group/department in which the teacher is working
- Each teacher himself who is involved in the teaching activity

Who should be in charge of evaluating courses?

- Specialists invited by the Ministry of Education
- Specialists invited by the Local government
- Peers, invited by the university
- Self-evaluation (departments or faculties that provide the courses)
- Students who follow the courses

IM-UAI

Strong UAI and weak UAI will also influence IM. In a strong UAI culture, people prefer that everything should be predicted and under control. Therefore, accessing information might be strictly controlled in order to avoid conflict or lose “face”. In a low UAI culture, it is supposed that there are fewer limitations and controls to accessing information or delivering information. Accordingly, the following questions were taken up in the questionnaire:

Who should be able to access students’ evaluations of courses?

- the dean (or chairman) only
- only the teacher himself
- all staff
- all students
- anyone, both inside and outside the university

Do you support the set up of a BBS (Bulletin Board Systems) to collect anonymous information for management?

- yes/no

IM-IDV

In a low IDV culture (collectivistic society), people are used to promoting behavior leading to harmony. In other words, people prefer to avoid a public dispute. In a high IDV culture (individualism), individual opinions are quite important and expressed in public. Therefore, the attitudes regarding storing and publishing information might be different between low IDV and high IDV cultures. The relevant question was:

What is your opinion about what information should be stored in a RPIS?

- Only items the research group agreed upon
- Only items, important for the control of the project
- All discussed items

IM-MAS

In a high MAS culture (masculine society), management prefers to inspire employees with awards according to their performance. It is apt to have performance and awards information displayed publicly. In a low MAS culture (feminine society), management prefers to emphasize the working environment. The more satisfying the working environment, the better the performances of employees will be. The following question is raised in the questionnaire to analyze potential cultural impacts on IM:

Do you agree/disagree with storing the following information in a Human Resource Information System (HRIS)?

- Information about personal performance in relation to salaries
- Information about education and training facilities and/or requirements
- Information about job requirements, vacancies etc.
- Information on participative decision-making about labor conditions, job satisfaction, etc.

IM-LOT

As we have seen, people in a low LTO culture are concerned more about the present situation than about the future. Related to IM, the following question was taken up in the questionnaire:

What is your opinion about the necessity to include the following information in the research IS?

- Potential negative aspects of the research project
- Potential shortcomings of the research project
- Potential social benefits of the research project
- Potential achievements of the research project

Descriptive Statistics and Findings

The results from the foregoing questions are represented in Table 6.5.

	F(df, N)	p.	Chinese		Dutch		DX	Explanation
			X	SD	X	SD		
IM – PDI(1)	F(1,213)=154.310	.000	.77	1.287	-1.24	1.044	2.02	information should be ratified by ministry
	F(1,213)=59.765	.000	.54	1.057	-.67	1.230	1.21	specialists outside university
	F(1,217)=8.240	.005	.93	1.123	.49	1.114	.44	central administrative department
	F(1,214)=8.979	.003	.39	1.393	.93	1.203	-.54	teacher themselves
IM – PDI(2)	F(1,218)=165.935	.000	1.16	1.127	-.95	1.290	2.11	information should be assessed by ministry
	F(1,218)=30.729	.000	1.17	.840	.36	1.320	.81	peer review
	F(1,218)=12.968	.000	.71	1.380	1.29	.850	-.58	student assess
IM – UAI(1)	F(1,216)=292,516	.000	1.39	.798	-.96	1.228	2.35	only dean access
	F(1,215)=69.784	.000	1.17	.880	-.11	1.369	1.28	teacher access
	F(1,215)=7.751	.006	.01	1.489	.56	1.376	-.22	students access
IM – UAI(2)	F=(1,215)=116.379	.000	1.28	.903	-.24	1.171	1.52	collect anonymous information
IM – IDV	F(1,214)= 72.525	.000	1.28	.795	.22	1.051	1.07	publish consensus
	F(1,210)=5.668	.018	-.19	1.367	.24	1.219	-.43	publish all discussed items
IM – MAS	F(1,213)=30.955	.000	.68	1.082	-.17	1.142	.85	store information regarding performance and salary
IM – LTO	F(1,216)=.014	NS	.50	1.198	.48	1.254	.02	negative aspects
	F(1,216)=1.004	NS	.64	1.139	.48	1.175	.16	shortcomings
	F(1,216)=8.175	.005	1.09	.941	.68	1.151	.41	social benefit
	F(1,215)=.462	NS	1.00	.975	.89	1.150	.11	achievements

Table 6.5: The Statistics Results of the Relationship IM–National Culture

The statistical results in Table 6.5 present again some interesting findings. First, in attitudes related to PDI, all results regarding cultural impact of PDI are significant. The mean for the Chinese ratifying the information by the State Education Ministry is 0.77. The mean of the Dutch is -1.24 , completely disagreeing with any ratifying influence of the State Education Ministry. While the Chinese agree that specialists outside the university should ratify also part of the information of a SIS (mean 0.54), the Dutch don't agree (mean -0.67). Both the Chinese and Dutch agree that the central administrative office of the university should ratify the information of the SIS. The mean of the Chinese is 0.93, versus 0.44 for the Dutch. However, the Chinese agreement is much higher than the Dutch. Again, both the Chinese and Dutch agree that the teacher himself should ratify the information in the SIS, in so far as it concerns information of his own educational activities (courses, examinations, laboratory work, etc). The mean of the Chinese is 0.39; the Dutch is 0.93. Nevertheless, the agreement from the Dutch is much higher than from the Chinese. It is interesting to see the large difference between the Chinese and Dutch regarding the role and responsibility of the central university administrative office. The Chinese prefer that such an office should ratify the information, while the Dutch prefer that the teacher himself should ratify the information in a SIS. Statistically, all the differences between the Chinese and Dutch for the questions discussed above are significantly different.

Another issue is the assessment of program and courses, which results also in a significant difference between the Chinese and Dutch. The Chinese accept that the State Education Ministry assesses the quality of educational programs and courses with the mean of 1.16. The Dutch are opposed with the mean of -0.95 . Both Chinese and Dutch agree on peer review assessments. But the agreement from the Chinese is much stronger than from the Dutch. For the Chinese as well as for the Dutch, the peer review means inviting famed specialists from outside the university. These specialists are often academic authorities. The Chinese are more willing to accept such academic authorities than the Dutch.

Surprisingly, both the Chinese and Dutch agree with student assessments of educational activities. That students evaluate and assess courses is a typical Dutch habitude. It is understandable that this is the most preferred choice for the Dutch. The Dutch mean is 1.29. However, such assessing method has never existed in Chinese universities. Although the Chinese accept it with the mean of 0.39, this is much less than for the Dutch.

The results related to UAI include two parts. One part is the access right for the students' evaluations of course information. The Chinese strongly agree that only the dean should have access to the students' assessments, with the mean 1.39. The Dutch are opposed, with the mean -0.96 . The Chinese also agree that the teacher himself should have access to that kind of information, with the mean 1.17. The Dutch are against this, with -0.11 . Both the Chinese and Dutch agree that all students should have access to that information. However, the mean of Chinese is only 0.01, while the mean from the Dutch is 0.56.

Another part of the cultural impact of UAI is the anonymity issue. This was addressed by the question whether one would agree with the set up of a bulletin board system to collect anonymous information. The Chinese agree to this approach, with the mean 1.28, but Dutch are against it, with the mean -0.24. This implies a significant difference.

The results related with IDV are as follows: The Chinese agree to publish consensus information, with the mean 1.28, and are against publishing all the discussed information, with the mean -0.19. For the Dutch, there is no big difference between publishing consensus information and all the discussed information (the means are 0.22 and 0.24, respectively). The differences between the Chinese and Dutch for these questions are significantly different.

The attitude related to MAS is measured via the question about performance and salary information. The Chinese agree, with the mean 0.68. However, Dutch oppose it, with the mean -0.17. The difference between the Chinese and Dutch is significant.

The attitude related to LTO is as follows: generally speaking, both Chinese and Dutch agree to collect information for the research project management. Statistically, all the means of the corresponding questions from the Chinese are higher than the Dutch. In other words, the Chinese pay more attention than the Dutch to the necessary information about research projects. But, the attitude of the Chinese to collect potential social benefit information of research projects is the only one that is significantly higher than the Dutch. In Table 6.6 all the results are summarized.

	Hypotheses		Findings		Support?		p?
	Chinese	Dutch	Chinese	Dutch	Chinese	Dutch	
IM-PDI(1)	+	-	+	-	Y	Y	Y
IM-PDI(2)	+	-	+	-	Y	Y	Y
IM-UAI(1)	+	-	+	-	Y	Y	Y
IM-UAI(2)	+	-	+	-	Y	Y	Y
IM-IDV	-	+	-	+	Y	Y	Y
IM-MAS	+	-	+	-	Y	Y	Y
IM-LTO	+	-	+	-	Y	Y	NS/Y

Table 6.6: The Results of the Relationship between IM and National Culture

6.2.4 The Impact of National Culture on Technology Management

This subsection will focus on the influence of national cultural on technology management (see the highlighted slice in the ISM cube in Figure 6.4).

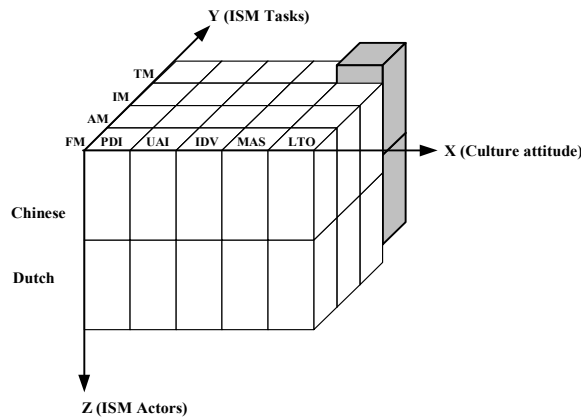


Figure 6.4: The Impact of Culture on TM

Technology management includes different management levels and many activities. In this subsection, we only focus on the IT facilities and products, that is, on the hardware and software platform, as well as on communication networks. The relevant question in the questionnaire was as follows:

Not taking into consideration the price of ICT facilities, what type of IT products do you prefer to use? (please select one)

- Brand new products
- Proven technology for at least one year
- Proven technology for at least 2 to 5 years

In order to process the responses, scores were allocated to the three choices respectively. The score for the choice for brand new IT products was 0, for the second choice was 1, and for the last choice was 2. In that way we were able to calculate an average score. In total, 212 answers were usable of the 222 collected questionnaires. The mean of the Chinese is 0.22 with a standard deviation 0.487. The mean of the Dutch is 0.94 with the standard deviation 0.768. The difference of the means between the Chinese and Dutch is -0.72 and indicates a significant difference between the Chinese and Dutch. The results reveal that the Chinese generally prefer to use brand new IT products while the Dutch prefer to use proven technology. The finding is consistent with the hypothesis H5: *The extent of long term orientation of ISM for TM is more prevalent in the Chinese culture than in the Dutch culture.*

6.3 Some Additional Analysis and Interpretation

In the previous sections, the results of the survey were reported and discussed. As we have seen, national cultural differences between the Chinese and Dutch do exist and do influence ISM. In order to clarify the differences, we will analyze and interpret the foregoing results in this section.

The Impact of PDI on ISM

Our investigation has shown that the national cultural dimension PDI profoundly influences ISM in many ways. Particularly, the results with respect to FM, AM, IM are repeatedly consistent with our hypothesis H1: *The extent of accepting authority in ISM is more prevalent in the Chinese culture than in the Dutch culture.*

As we have remarked before, the responsibilities for Chinese are closely related to their posts and positions in an organization. Who is doing what and what should be done is clearly divided over different posts with different responsibilities. This is a general concept for Chinese at their work places. Organizations are hierarchical structures with an extreme labor division. Seen from that perspective, the Chinese are familiar with accepting management guidelines, instructions and directives from superior levels. They are less willing to participate in management and to take responsibilities if they are not appointed to a manager's post. Consequently, the Chinese respect and accept managerial authorities in their work. This is also consistent with the organization structure of "coordination by supervision" [Mintzberg, 1979].

The Chinese respect authority not only from managerial levels in their working environment, but also in academic fields. Famed specialists in the academic field are expected to be natural authorities for assessing academic work. It is quite common that famed specialists are invited by governmental or university management to assess teaching, researching, and the management of a university as well. Academic seniors are in favor of applying for extra funding for research projects. They are in a far better position to apply than a not as well-known specialist.

For the Dutch the situation is quite different from the Chinese. Management is to a large extent based on consultation and discussions with all stakeholders. Before an important decision is taken, management takes care of what is called "draagvlak", so takes care of everybody's commitment and involvement. Anyone who is involved is supposed to provide his ideas, proposals, remarks, and comments, as well as criticisms. So the Dutch are actively involved in management. Accordingly, the Dutch are also ready to take responsibility for their own work. As a consequence, the Dutch are also prepared to receive feedback and assessments from others (superior levels, colleagues, external bodies, etc.) They are accountable for their work and their results.

The differences mentioned above explain the findings in the survey both from the Chinese and Dutch point of view. As we have seen, the survey shows that the Chinese are much more willing than the Dutch to accept rules and regulations from superior managerial levels like the State Education Ministry. The Dutch are certainly not. The Chinese prefer to accept rules and regulations from the central administrative office of the university; however, the Dutch prefer to have rules and regulation that are made by all stakeholders involved: students, teachers, researchers, managers and ICT professionals. While the Chinese prefer that a central administrative office should ratify the teaching material, the Dutch are in favor for ratification by the teacher himself. The Chinese prefer only specialists to assess the teaching quality; the Dutch have a mixed system in which specialists will assess the teaching quality from time to

time (the external visiting committees procedure) but students are also involved in evaluating and assessing the courses and programs in place.

One example from the practices of ISM might illustrate better the differences between the Chinese and Dutch. Normally, when an IS project or application is finished in China, it is not only tested by the users, but it will be also assessed by invited specialists before formal implementation. Generally speaking, the most attention is paid to the assessment of the invited specialists. Such a situation is almost unknown in The Netherlands. Once I had the opportunity to interview an ICT manager at the Eindhoven University of Technology. IS project management was one of the topics during that interview. He clarified that it is common practice at the TUE that an IS project is considered as a contract that will be signed by both sides: designers and users. After the analysis, design and coding are finished; testing will be carried out according to the signed contract. If the users accept the developed system, it will be installed without further assessments internally or externally. So, the most attention is paid to the acceptance from the system users.

The results from the survey and the observation above regarding the impact of PDI on ISM reveal that the Chinese emphasize the authority by superior levels or by top specialists while the Dutch emphasize participation of all stakeholders. Such difference profoundly influences ISM and its organizational structure. The results suggest that the Chinese ISM organization structures are more *hierarchical and very complicated*, while the Dutch ISM organization are *flat*, as all organizational processes are structured.

In addition, many managerial procedures of ISM in China might be experienced as an enormous *redundancy* in the Netherlands. Meanwhile, the managerial procedures of ISM in the Netherlands might be experienced *as far from sufficient* in China. In chapter 8 we will return to these consequences and implications for ISM in China and The Netherlands.

The Impact of UAI on ISM

The national culture dimension UAI also significantly influences the Chinese and Dutch ISM. As a matter of fact, all survey findings regarding FM, AM and IM are consistent with our hypothesis H2: *The extent to avoid uncertainty in ISM is more prevalent in the Chinese culture than in the Dutch culture.*

The Chinese, having a strong UAI culture, prefer to have a harmonious situation and try to avoid conflict. The most important thing is to give “face” to someone and to preserve one’s “face”. Giving “face” to someone means doing him a favor. Preserving “face” means preventing him from being embarrassed. Giving “face” and preserving “face” both help to explain the findings about the attitude regarding anonymous communication and collecting anonymity information. Anonymity is more prevalent in the Chinese culture than in the Dutch. Anonymity enables the exchange of information between people without intervening, such as the relations, the status, the backgrounds and so on.

Giving “face” and preserving “face” also helps to explain the findings that the Chinese prefer to limit the access of information differently from the Dutch. For

example, the Chinese accept that the dean should have access right to students' assessments of courses because this is necessary for his management job. Also, the teacher himself should have access because teaching could benefit from such kinds of assessments. However, students shouldn't have access right to their own assessments in order to preserve "face" for the teacher in case of poor evaluations.

In order to have harmony and avoid conflict, the Chinese prefer that things should be predictable and under control. Therefore, the Chinese likely try to shun the ambiguous situations. This cultural attitude helps to explain why the Chinese prefer to have extensive rules for limiting, for example the misuse of IS. If such a misuse could be reduced by more rules, then ISM certainly would come up with more regulations for stimulating a harmonious environment for all IS users.

The Dutch, having a weak UAI culture, prefer to be straight and direct. This explains why the Dutch attitude regarding access rights of information differs significantly from the Chinese. For example: there is no preference of the Dutch to differentiate the access rights in the case of students' evaluations and assessments of courses. Also students should have access to their own assessment information, without embarrassing the concerning teachers.

Since the Dutch prefer the straight and direct ways for communication, they prefer to tell the facts, feelings and thoughts as they are without making them nicer or better than they are. People are used expressing their opinions clearly and are always ready to accept opinions from others. Consequently, this helps to understand that the Dutch support much less the anonymity mode of communication, although they agree to have anonymous communication for some purposes and occasions.

As weak UAI cultures are tolerant regarding differences and prefer to have less limitation, it is logical that the Dutch prefer to have as few rules as possible, also in the domain of ISM. In their opinion, it is not necessary to enforce conditioned use of IS by regulating everything. They accept in that sense unexpected, uncertain behavior.

The differences in UAI between the Chinese and Dutch, elucidated above, will deeply influence ISM in practice. The research findings prove that there are much ***more ISM rules and regulations in China than in the Netherlands***, for reducing ambiguity, and avoiding uncertainty. On the contrary, the Dutch disagree to have more rules and regulations. The differences between the Chinese and Dutch provide a clue for ISM. In China many managerial rules and regulations in the IS domain will be ***necessary***, which might be ***useless*** and even ***counterproductive*** in the Netherlands. This is also consistent with the statement: "In countries with very weak uncertainty avoidance, there rather seems to be an emotional horror of formal rules. Rules are only established in case of absolute necessity" [Hofstede, 2001].

Furthermore, combining the findings of the impact of PDI on ISM in China, it is not only more rules, regulations and limitations that will be in place but also these rules etc. will be settled and controlled by the higher management levels. The Chinese are used indeed to accepting instructions from superiors. So, ***ISM instructions from superiors might dominate in China***.

The Netherlands will certainly have fewer ISM rules and regulations and also, it will be normal that these rules and regulations are formulated on the working floor, and not so much by superiors. Therefore, *the opinions and self-control from users will dominate ISM in the Netherlands.*

The Impact of IDV on ISM

Although the differences in IDV between the Chinese and Dutch are significant, the findings in the survey **only partly support** the hypothesis H3: *The extent of individualization of ISM is more prevalent in the Dutch culture than in the Chinese culture.*

China is labeled as a collective culture, so has a low IDV culture. The most significant characteristic of a collective culture is the emphasis on the interest of the collectivity, not of the individual. Therefore, the Chinese are familiar with accepting standards of behavior and do not support the individualization of ISM regarding FM, AM, and IM. By contrast, the Dutch are living in an individual culture and support the individualization, that is, they are against too many ISM standards.

The findings regarding FM and AM however do not support our hypotheses but they are significantly reversed. In other words, the Chinese support the flexible individualization and are against a standard style for FM and AM. Surprisingly, the Dutch are against a flexible individualization and support the standard form. Two reasons might explain the reversed findings. First, the Chinese perhaps expect that the flexibility of IS would support the successful implementation of IS. The more flexible, the more people would like to use the IS. Because of many other causes, the use of computers and IS at universities in China are still not as prevalent as in The Netherlands. Therefore, encouraging people to use IS is still a hot topic for the IS-community in China. Secondly, the Dutch support probably the standard style of using IS because of efficiency and effectiveness reasons. They might have experienced the negative impact of too much individualization in practice. If FM and AM are flexible and individualized, it takes more time to become familiar with it for the users, and it also consumes more resources to support such implementations.

The findings of the impact of IDV on ISM provide a warning. People's reactions about ISM might not always be consistent with the national culture theory on individualization. Some reasons might help to explain and understand this.

Firstly, the people's individualized behaviors in relation with national culture were studied in the social environment. However, the IS environment is not completely equal to a social environment. So, there might be some *limitations or blanks* of national culture studies, if they are applied in an IS setting. Consequently, it is important to notice if people react unexpectedly regarding the dimension individualization and to try to find reasonable arguments for that unexpected behavior.

Secondly, people's *individualized behavior might be revised* from their former experiences and lessons. In an IS environment, people might change their individualized behaviors and attitudes because of less positive experiences and

lessons from the past practice. An example: people can have experienced that customization is quite attractive but is also very expensive and almost uncontrollable. Therefore, people change their minds and attitudes. It is in that respect important to notice that the national culture *might not always dominate* the people's behavior in an IS environment.

Here the findings about IND with respect to FM and AM are not in accordance with the cultural expectation. We would have expected that the Dutch would prefer free format output and non standard software packages. Later we will explain this by stating that the Dutch are much more in favor for efficiency regarding normal IS use. The findings regarding IM are consistent indeed with our hypotheses H3. The difference between the Chinese and Dutch not only reflects the cultural characteristic of individualization, but also is understandable and reasonable. Having a low IDV culture, the Chinese are used to seeing the group's opinion as superior to the individual; they emphasize the "we" instead of the "I". Therefore, the Chinese support publishing of information if there is consensus about that information inside the research team. This refers to the typically harmonious characteristic of the collectivity, which cultivates that the *group value is dominant*.

By contrast with the Chinese culture, the Dutch with a high IDV culture, show support, for example, to publishing all the discussed information of a research team, including consensus and conflicting issues as well. The Dutch attitude offers the opportunities to express the opinions from the majority, minority and individuals. The individual is even very often superior to the group: *the individual interest is highlighted* in a high IDV culture.

The foregoing underlines that result that the individualized opinions from both the Chinese and Dutch on making information public, are consistent with our hypothesis H3. The findings reveal that *the standpoints of the Chinese and Dutch on information management are very different*. A proper organization of ISM from the IDV perspective might be *extremely important* in China, but of much less importance in the Netherlands.

The Impact of MAS on ISM

The statistical results related to MAS are not only significantly different between the Chinese and Dutch, but also consistent with our hypotheses H4: *The extent of masculinity of ISM is more prevalent in the Chinese culture than in the Dutch culture*. The findings in the survey confirm that the Chinese behave *more decisively and assertively* than the Dutch, resulting in, among others, punishment rules for misusing an IS. On the contrary, the Dutch behave *more tolerantly and milder* than the Chinese, resulting in warning rules instead of punishments.

Furthermore, the attitudes between the Chinese and Dutch toward collecting information about performance and salary are significantly different. The Chinese support collecting such information, since people in masculine cultures pay more attention to achievement and success. That type of culture prefers *assertive management*. The Dutch, living in a feminine culture, believe that the better the working environment, the higher the satisfaction of employees and the better the work outcome and performance. Therefore, the Dutch are opposed collecting

performance information in relation to salaries. A feminine culture is used to having *milder management*.

Apart from the different findings in the survey mentioned above, an example of the Chinese masculinity culture can also be seen from a website of the German Siemens company in China [Marcus, et al, 2000]. The Chinese version of the website of Siemens is adapted to the Chinese masculine culture tradition **Bo (博), Da (大), Jing (精) and Sheng (深)**. Thus, it declares that the products of Siemens are plentiful, leading, excellent and abstruse. The English version of the same website from Siemens only lists their products simply without any emotional word.

According to the author's experiences and observations, some typical differences related to MAS between the Chinese and Dutch do exist in ISM practice. For example, when the Chinese assess an IS project, the most often used criteria are three aspects: *powerful, leading* and *innovating and challenging*, which is closely related to the Chinese "**Bo, Da, Jing and Shen**". As a matter of fact, the term '**powerful**' refers to the scope of the businesses that IS can cover. The *wider the scope*, the better it is. The term '**leading**' refers to the latest and newest functions and technologies of the introduced IS. The newer, the better it is. The term '**innovating and challenging**' indicates that the introduced IS is outreaching all others in similar application fields.

Most assessments in China will not be done by the users of the various information systems, but will be done by experts. Famed specialists are thought to have more knowledge and expertise to judge the above-mentioned important IS characteristics. In this respect, the Chinese are more concerned about the (advanced) functionality and the latest technology than the Dutch.

The Dutch are used to paying much more attention to the users, both in IS research and in practice. "Understanding why people accept or reject computers has proven to be one of the most challenging issues in information system research" [Swanson, 1988]. Therefore, "Different models have been used over the last ten to twenty years as a basis for investigating the acceptance and use of IT(IS)" [Pijpers, 2001]. Of these models, "TAM is well known and widely accepted in the MIS literature"[Dishow, et al, 1999]. Two very important indexes are used in TAM to assess an information system namely: *perceived usefulness* and *perceived ease of use*. Perceived usefulness is defined as the user's subjective probability that using a specific application system will increase his or her job performance within an organizational context. Perceived ease of use refers to the degree to which the prospective user expects the target system to be free of effort. In that sense, the Dutch are more concerned about the application perspective.

In addition, the Chinese prefer to use tough punishment rules to stop misuse of IS. They emphasize the plusses and minuses of IS from an achievement perspective (e.g., powerful, leading, innovating and challenging). Such measures and attitudes are closely related with the *decisive, assertive* and *tough* characteristics of a masculine culture. The Dutch prefer to use warning rules if the information system is misused. Furthermore, the Dutch emphasize the users' perspective (e.g. easy use and usefulness). From the national culture dimension, the Dutch attitudes are closely related with the *tolerant* and *milder* characteristics of a feminine culture.

Because the orientations of MAS between the Chinese and Dutch are significantly different, it could be expected that the Chinese *might not be satisfied with* a Dutch concept of ISM in China. Conversely, the Dutch *might not accept* a Chinese ISM concept in The Netherlands.

The Impact of LTO on ISM

The findings on LOT between the Chinese and Dutch are generally consistent with our hypothesis H5: *The extent of long term orientation of ISM is more prevalent in the Chinese culture than in the Dutch culture*. Although some of the differences are significant, some are not.

The periods of updating the applications are significantly longer in China than the Dutch are aiming at. The Chinese prefer to update the applications between one and two years. The Dutch like to update the applications anytime, whenever it is necessary. Both attitudes from the Chinese and Dutch are consistent with their LTO national culture orientations, respectively. This might explain that the Chinese have a much more long term orientation and plan much more in advance. This is typical in a high LTO culture. The Dutch are concerned about the implementations at any moment. In that respect, they do not plan so long in advance. Furthermore, the Dutch might expect to be satisfied as soon as possible, whenever a need for an additional IS occurs. This is typical behavior in a low LTO and present-oriented culture. In this respect, the Chinese might think that the quick updating from the Dutch is *not necessary*. Meanwhile, the Dutch might see the slow updating by the Chinese as *an unacceptable delay*.

There could also be another serious effect on this type of attitude. Naturally, the economic circumstances in The Netherlands are far better than in China. From that perspective, the Dutch can permit themselves the luxury to update and renew IS as soon as they like or as soon as changing business processes request that update or renewal. The Chinese with much fewer resources have to plan very carefully the update and renewal of IS. It is scarcity that forces the Chinese to plan very carefully and in advance. At the beginning of automation in western countries, when it was still a very expensive and costly business, the people in The Netherlands also had to plan very carefully and on a long term perspective. This shows that cultural attitudes may change over time if economic and other circumstances change.

The different attitudes between the Chinese and Dutch regarding potential information is also meaningful. The Chinese generally pay more attention to potential information than the Dutch do (see the results regarding research information). Potential information is related to future orientations and the Chinese are future oriented. Meanwhile, the Dutch attitudes show the focus to be on the present state. So, some information might be *very important and meaningful* for the Chinese, but could be *useless* for the Dutch.

There is also a significant different attitude in selecting IT products and facilities between the Chinese and Dutch. The Chinese prefer to use the brand new IT, that is, IT products and facilities that are just introduced to the market. Brand new IT products and facilities are supposed to be more advanced, to have more functions, and

can be used for a longer period. Also, this relates to the Chinese future orientation. The same question answered by the Dutch shows different results: the Dutch are in favor of proven technology, that is, technology which has been on the market for one year or longer. The Dutch in that sense prefer to have mature technology; it is cheaper and it is better to earn a euro today than tomorrow!! This is a very pragmatic attitude, closely related to the present orientation, belonging to a low LTO culture.

6.4 Implications of the Findings

The analysis and discussion of the survey findings in the previous sections clearly indicate that there exist significant national cultural differences on ISM between Chinese and Dutch. In this section, we will deduct some implications of the survey findings.

First, the findings in this chapter about the attitudes from both the Chinese and Dutch significantly support the national cultural profile of Hofstede's study in general. Therefore, **Hofstede's culture dimensions could be useful for creating and settling an internationalized ISM.**

For example, the national culture dimension PDI significantly influences ISM for both the Chinese and Dutch. Therefore, the significant components of the ISM Cube could be very different between the Chinese and Dutch. Take for example the several actors into account like managers, designers, users and maintainers. In Figure 6.5 this is denoted on the Z-axis of the ISM Cube by the Set {M, D, U, Mt}. According to our survey findings, managers play a very important role in the Chinese concept of ISM. Therefore, the significant components of the Chinese ISM-Cube are the management part of the cube (see Figure 6.5).

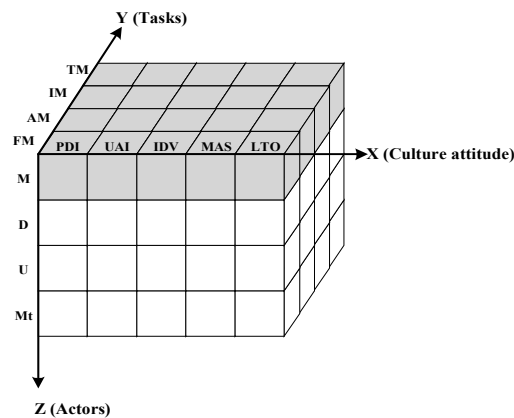


Figure 6.5: The Important Components of Chinese ISM Cube

In contrast to the Chinese, the Dutch users are supposed to play the most important role for ISM. Consequently, the significant components of the Dutch ISM-Cube is highlighted and presented in Figure 6.6.

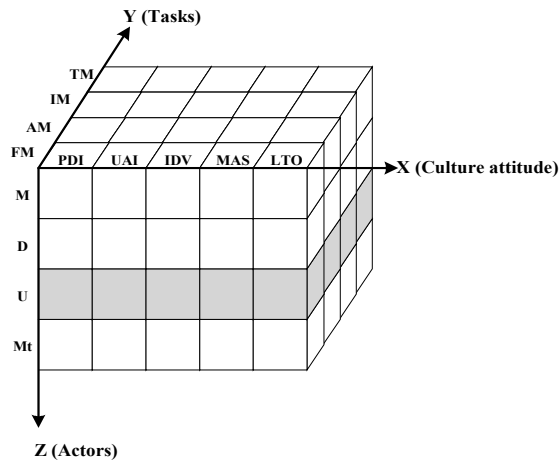


Figure 6.6: The Important Components of Dutch ISM Cube

Second, the significant components above between the Chinese ISM Cube and the Dutch ISM Cube are obviously different. Such dramatic differences are not only meaningful to be noticed, but do exist practically in every stage over the life cycle of IS, that is, the stage of IPP, D, AI, U1/U2, M1/M2 and E1/E2 (see Figure 4.4 in chapter 4).

Last, people’s attitudes can be changed over time, although people’s attitudes are deeply rooted in their national culture. Therefore, national culture does not absolutely dominate people’s attitudes. This could be a very important conclusion for supplementary research in future about ISM and cultural, as well as other impacts. For example, our findings reveal that the Dutch prefer to use standard applications instead of individualized application. This suggests that **the people’s attitude could change from past experiences and lessons**. In practice, this is a very important conclusion. ISM actors should take the opportunity to consider also the possibilities of adjusting their attitudes and wishes, instead of immediately asking for new IS or large renewals.

6.5 Chapter Summary

The ISM Cube is used in this chapter for analyzing the impact of national cultural differences on ISM. For that purpose we designed a survey in which both Chinese and Dutch were participating. It concerns a questionnaire about university IS and questions related to the several ISM tasks, such as FM, AM, IM and TM. More or less hidden in the questions were the expected cultural dimensions. Based on the responses, we discussed and tested the results step by step. The ISM cube was a handy instrument to show each step.

In summary, the analyses of the survey responses supported the following hypotheses:

F1: The extent of accepting the authority of ISM is more prevalent in the Chinese culture than in the Dutch culture.

F2: The extent to avoid the uncertainty of ISM is more prevalent in the Chinese culture than in the Dutch culture.

F4: The extent of masculinity of ISM is more prevalent in the Chinese culture than in the Dutch culture.

F5: The extent of long term orientation of ISM is more prevalent in the Chinese culture than in the Dutch culture.

The only not completely confirmed hypothesis was No. 3, so the findings should be:

F3: The extent of individualization of ISM is not always more prevalent in the Dutch culture than in the Chinese culture.

Based on the discussions of the findings, we speculated a little about possible implications for settling an internationalized ISM. We will elaborate about that issue in chapter 8. The findings and the results could make people sensitive to the relevancy of an internationalized ISM. However, considering the cross-cultural ISM, it is insufficient to know only the national cultural profiles and ISM tasks; one has to also take into account the ISM actors. Therefore, the following chapter 7 continues with a study about the different ISM actors' attitudes.

7. Survey Study II: National Cultural Influences on ISM from Professional Groups

7.1 Introduction

The study presented in this chapter focuses on the ISM actors. The aim of the study is to identify the national cultural differences on the ISM at the professional groups level and to test its consistency with the results gathered at the national level (see Chapter 6). In this chapter the same instrument will be used to study the ISM at the professional group level as was used in Chapter 6. The comparisons and the analyses were conducted on 8 samples, which are constitutive of the four contrast groups, namely, managers, teachers/researchers, students, and ICT professionals, respectively, for the Dutch and the Chinese population.

The ISM Cube is used in this chapter to theoretically support the analysis of the cultural differences and similarities observed in each of the 8 samples. The Z-axis of the ISM Cube is denoted by Set of {C-Manager, C-Teacher and Researcher, C-Student, C-ICT professionals; D-Manager, D-Teacher and Researcher, D-Student, D-ICT professionals, Chinese, Dutch}. Here, C stands for Chinese and D for Dutch. The example of the National cultural differences on ISM from the manager sample can be presented as follows in Figure 7.1.

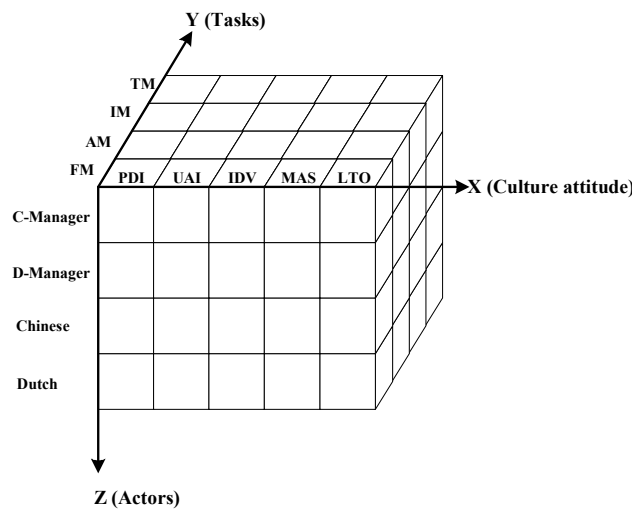


Figure 7.1: National Cultural Differences on ISM from Managers

After testing the following 5 hypotheses, the relevant cultural differences measured at the professional groups level are compared with the findings in chapter 6 at the national level: for example, Chinese manager group versus Chinese national in-group or Dutch teachers & researchers group versus Dutch national in-group. The implications of the results are discussed in section 7.6 and then summarized.

H1: The extent of accepting the authority of the ISM is more prevalent in the Chinese culture than in the Dutch culture.

H2: The extent of avoiding uncertainty of the ISM is more prevalent in the Chinese culture than in the Dutch culture.

H3: The extent of individualization of the ISM is more prevalent in the Dutch culture than in the Chinese culture.

H4: The extent of masculinity of the ISM is more prevalent in the Chinese culture than in the Dutch culture.

H5: The extent of the long-term orientation of the ISM is more prevalent in the Chinese culture than in the Dutch culture.

7.2 Chinese Managers–Dutch Managers

In this section, the cultural differences between the Chinese and Dutch managers will be presented.

7.2.1 Description of the Sample

The sample of the Dutch and Chinese managers concerned in this study is composed of: Deans of the faculties, the Directors of the schools, the Administrative Officers, the Chairmen of the departments, the Chiefs of Staff of the ICT departments, the Directors of the computer centers and of the information management centers at the universities. Their daily work is more or less related to IS. They might be involved in the ISM for the planning, designing, application, as well as the updating of IS. Their attitudes influence the ISM at the strategic level, tactical level, as well as the operational level. Consequently, it appears relevant to clarify the cultural differences on ISM between both groups at the professional level. The results should be helpful not only in understanding the ISM in the cross-cultural environment, but also in providing relevant evidence for designing the ISM in the globalization environment.

7.2.2 Results and Discussion

The results are organized in the following way:

FM–national culture, included FM – PDI, FM – UAI, FM – IDV, and FM – MAS;
AM–national culture, included AM – PDI, AM – UAI, AM – IDV, and AM – LTO;
IM–national culture, included IM – PDI, IM – UAI, IM – IDV, IM – MAS, IM – LTO.

The results concerning the FM–culture, AM–culture, IM–culture are reported, respectively, in the following tables: 7.1, 7.2 and 7.3. The favorite answers of the multiple choices questions from the contrast groups are highlighted in the tables. The reversed results are marked in the text with an asterisk. The results relative to the TM–cultural questions follow the tables. The relevant questions of TM can be referred to in chapter 6.

	t(Df)	p.	Chinese Managers		Dutch Managers		Means difference DX	Explanations
			X	SD	X	SD		
FM-PDI	t(46)=5.983	.000	.79	1.274	-1.50	1.019	2.29	rules from ministry
	t(45)=3.443	.001	1.48	.755	.36	1.499	1.13	rules from university administrative office
	t(47)=-1.308	NS	.74	1.221	1.21	.893	-.47	rules from all users
FM-UAI	t(46)=.425	NS	.20	.868	.08	.945	.12	prefer more rules
	t(46)=-.875	NS	1.00	.767	1.23	.927	-.23	prefer less rules
FM-IDV	t(46)=-1.385	NS	.06*	1.229	.64*	1.550	-.58	standard format for all courses
	t(47)=3.624	.001	1.03*	1.014	-.29*	1.437	1.31	free format for elective
	t(46)=2.604	.012	-.15*	1.351	-1.21*	1.122	1.07	always free format
FM-MAS	t(47)=-4.418	.000	.46	.741	1.5	.760	-1.04	warning for misuse
	t(47)=2.248	NS	1.09	.951	.43	.852	.66	punishment for misuse

Table 7.1: FM–National Culture from Managers

	t(Df)	p.	Chinese Managers		Dutch Managers		DX	Explanations
			X	SD	X	SD		
AM-PDI	t(44)=3.142	.003	.53	1.414	-.86	1.292	1.39	order by academic titled
AM-UAI	t(44)=1.505	NS	.85	1.149	.31	.947	.54	public and anonymous communication
AM-IND	t(46)=1.902	NS	.26*	1.358	-.62*	1.557	.87	tailoring elective courses
AM-LTO	t(47)=2.067	NS	.57	.884	.07	.267	.50	updating applications

Table 7.2: AM–National Culture from Managers

	t(Df)	p.	Chinese Managers		Dutch Managers		DX	Explanations
			X	SD	X	SD		
IM – PDI(1)	t(45)=5.184	.000	.52	1.395	-1.57	.852	2.09	information should be ratified by ministry
	t(44)=3.375	.002	.31	1.030	-.93	1.385	1.24	specialists outside university
	t(45)=3.979	.000	1.52	.619	.36	1.393	1.16	central administrative department
	t(44)=-.660	NS	.50	1.344	.79	1.369	-.29	Teacher themselves
IM – PDI(2)	t(46)=8.265	.000	1.18	1.218	-1.71	.726	2.89	information should be assessed by ministry
	t(46)=2.624	.012	1.32	.768	.50	1.401	.82	peer review
	t(45)=-1.160	NS	.82	1.336	1.31	1.109	-.48	student assess
IM – UAI(1)	t(44)=6.981	.000	1.43	.979	-1.00	1.095	2.43	only dean access
	t(44)=3.909	.000	1.40	.736	.09	1.514	1.31	teacher access
	t(43)=-.175	NS	-.09	1.443	.00	1.483	-.09	students access
IM – UAI(2)	t(47)=4.204	.000	1.14	1.141	-.50	1.454	1.64	collect anonymity information
IM – IND	t(46)=4.260	.000	1.41	.701	.07	1.492	1.34	publish consensus
	t(44)=-1.445	NS	-.31	1.424	.36	1.499	-.67	publish all discussed items
IM – MAS	t(45)=1.795	NS	.82	1.185	.14	1.167	.68	store information regarding performance and salary
IM – LTO	t(45)=1.094	NS	.55	1.227	.07	1.639	.47	negative aspects
	t(46)=1.732	NS	.76	1.130	.07	1.542	.69	shortcomings
	t(46)=3.251	.002	1.26	.828	.14	1.562	1.12	social benefits
	t(47)=1.647	NS	1.17	.954	.57	1.555	.60	achievements

Table 7.3: IM–National Culture from Managers

The attitudes of the Chinese managers ($X_{cm}=0.34$, $SD= 0.684$) and of the Dutch managers ($X_{dm}=1.31$, $SD=0.855$) toward the IT products are significantly different ($p=0.000$).

ISM-PDI

The results indicate significant differences between Chinese and Dutch managers with respect to accepting authorities. The Chinese managers accept the authorities from their superior level of management, such as the State Education Ministry, while the Dutch managers do not. In addition, the Chinese managers put more emphasis on the management from the administrative office of the university, which can be seen from the highlighted items in Table 7.1 (FM-PDI: $X_{cm}=1.48$) and Table 7.3 (IM-PDI: $X_{cm}=1.52$). This suggests that the relevant decisions about ISM are expected to be taken at the managerial level for the Chinese professional group of managers.

The Dutch managers rather like the decisions to be taken by the representatives of the university. Dutch managers rate the management from the representatives of the university as $X_{dm}=1.21$. They also consider that the teacher should be responsible for ratifying the course information ($X_{dm}=0.79$). This indicates that the relevant decisions of the ISM for the Dutch managers are expected from the application level.

These results are consistent with H1: *The extent of accepting the authority of the ISM is more prevalent for the Chinese managers than for the Dutch managers.* This is also consistent with F1 in Chapter 6.

ISM-UAI

Although some differences between the Chinese and Dutch managers are not significant, both attitudes are consistent with those of their national in-groups. Chinese managers support more rules and anonymous communication than the Dutch Managers do.

The significant differences between the Chinese and Dutch managers are the part of the IM. For example, concerning the students' evaluation of the course, the Chinese managers strongly agree that only the dean and the teacher should have accessing right to this information ($X_{cm}=1.43$ and $X_{cm}=1.40$, see Table 7.3) while the Dutch disagree regarding the dean's access rights ($X_{dm}=-1$) and are neutral concerning the teacher's ($X=0.09$). As for the right of students accessing the information, the Chinese managers disagree ($X_{cm}=-0.09$), and the mean of the Dutch managers is neutral ($X_{dm}=0.00$).

Another example concerns collecting information anonymously. The Chinese managers agree ($X_{cm}=1.14$) while the Dutch managers disagree ($X_{dm}= -0.50$).

The statistical results reveal that the differences of the ISM-UAI between Chinese and Dutch managers are consistent with H2: *The extent of avoiding uncertainty of the ISM is more prevalent for the Chinese managers than for the Dutch managers.* This is also consistent with the (F2) in chapter 6.

ISM-IDV

According to the results of the FM-IDV, AM-IDV and IM-IDV, presented in tables 7.1, 7.2 and 7.3, respectively, the differences between the Chinese and Dutch

managers can be generalized as follows: Chinese managers support more flexible and individualized functions and applications of ISM than Dutch managers do. This is not consistent with H3.

Nevertheless, regarding the attitude toward publishing consensus information, the Chinese managers strongly agree with this concept ($X_{cm}=1.41$) while the Dutch managers are neutral ($X_{dm}=0.07$). Meanwhile, Chinese managers disagree with publishing all discussed information ($X_{cm}=-0.31$), while Dutch managers are more positive about it ($X_{dm}=0.36$). This result is consistent with F3 in chapter 6.

Therefore, the differences related to the ISM–IDV between the Chinese and Dutch managers are partly consistent with H3, and partly not: ***The extent of individualization of the ISM is not always more prevalent for the Dutch managers than for the Chinese managers.***

ISM–MAS

The only significant difference between the Chinese and Dutch managers is the FM–MAS on the ISM. For example, concerning the misuse of IS, the Chinese managers agree to giving a punishment ($X_{cm}=1.09$), while the Dutch managers strongly agree to giving warnings ($X_{dm}=1.5$).

In fact, all results of FM and IM related to MAS presented in tables 7.1 and 7.3 are consistent with H4: ***The extent of masculinity of the ISM is more prevalent for the Chinese managers than for the Dutch managers.*** Both Chinese and Dutch managers react consistently with F4 in chapter 6.

ISM – LTO

The results related to the LTO concerning AM and IM, presented in tables 7.2 and 7.3 respectively, as well as the TM reflecting the differences between the Chinese and the Dutch managers, are consistent with F5 in chapter 6. That is, ***The extent of long term orientation of the ISM is more prevalent for the Chinese managers than for the Dutch managers.***

All these means related to IM–LTO of the Chinese managers are higher than those of the Dutch managers (see table 7.3), although some of the differences are not significant. Such a consistent trend implies that the Chinese managers pay more attention to potential information than the Dutch managers do.

The findings can be summarized as follows:

F1: The extent of accepting the authority of the ISM is more prevalent for the Chinese managers than for the Dutch managers.

F2: The extent of avoiding uncertainty of the ISM is more prevalent for the Chinese managers than for the Dutch managers.

F3: The extent of individualization of the ISM is not always more prevalent for the Dutch managers than for the Chinese managers.

F4: The extent of masculinity of the ISM is more prevalent for the Chinese managers than for the Dutch managers.

F5: The extent of long term orientation of the ISM is more prevalent for the Chinese managers than for the Dutch managers.

To conclude, the attitudes of Chinese managers are consistent with the Chinese cultural pattern, and this also is valid for the attitudes of the Dutch managers. The most significant cultural differences between Chinese and Dutch managers at the universities is:

The Chinese managers accept authority more for making rules and for ratifying, assessing, and allocation accessing information of IS than the Dutch manager do.

The Chinese managers behave more decisively and assertively than the Dutch managers do.

The Chinese managers prefer brand new IT facilities than the Dutch managers do.

7.3 Chinese Teacher & Researcher–Dutch Teacher & Researcher

In this section, the cultural differences between the Chinese and the Dutch Teachers and Researchers (T&R) will be presented.

7.3.1 Description of the Sample

The Chinese T&R work mainly with computer sciences while the Dutch T&R are involved mainly with IT (IS) subjects. Teachers and Researchers are one of the primary users group of the IS at the universities. Their attitudes play an important role for the IS applications and ISM as well.

7.3.2 Results and Discussion

The results concerning the FM–national culture, AM–national culture, and IM–national culture are presented in tables 7.4, 7.5, and 7.6, respectively.

	t(Df)	p.	Chinese T&R		Dutch T&R		DX	Explanations
			X	SD	X	SD		
FM-PDI	t(47)=7.301	.000	<u>1.15</u>	1.093	-1.31	1.138	2.46	rules from ministry
	t(47)=4.101	.000	1.48	.566	.19	1.642	1.30	rules from university administrative office
	t(47)=-2.460	.018	.33	1.315	<u>1.25</u>	1.000	-.92	rules from all users
FM-UAI	t(46)=2.798	.007	<u>.58</u>	1.001	-.20	.561	.78	prefer more rules
	t(46)=-2.964	.005	.55	.905	<u>1.33</u>	.724	-.79	prefer fewer rules
FM-IDV	t(46)=-1.958	NS	.09*	1.234	<u>.87*</u>	1.356	-.78	standard format for all courses
	t(46)=6.619	.000	<u>1.00*</u>	.829	-.87*	1.060	1.87	free format for elective
	t(46)=.454	NS	-.76*	1.324	-.93*	1.033	.18	always free format
FM-MAS	t(47)=-.817	NS	.61	.788	.81	.911	-.21	warning for misuse
	t(47)=.927	NS	<u>1.06</u>	.827	.81	.981	.25	punishment for misuse

Table 7.4: FM-National Culture from T&R

	t(Df)	p.	Chinese T&R		Dutch T&R		DX	Explanations
			X	SD	X	SD		
AM-PDI	t(45)=4.958	.000	.65	1.518	-1.38	.806	2.02	order by academic titled
AM-UAI	t(46)=4.380	.000	1.24	.902	-.33	1.589	1.58	public and anonymous communication
AM-IND	t(45)=1.123	NS	-.13	1.561	-.67	1.496	.54	tailoring elective courses
AM-LTO	t(47)=1.779	NS	.70	.951	.25	.447	.45	updating applications

Table 7.5: AM-National Culture from T&R

	t(Df)	p.	Chinese T&R		Dutch T&R		DX	Explanations
			X	SD	X	SD		
IM – PDI(1)	t(46)=7.953	.000	1.00	1.225	-1.67	.617	2.67	information should be ratified by ministry
	t(45)=10.590	.000	.88	.751	-1.60	.737	2.48	specialists outside university
	t(46)=3.211	.002	1.27	.761	.20	1.568	1.07	central administrative department
	t(45)=-2.981	.005	-.09	1.376	1.07	.884	-1.16	Teacher themselves
IM – PDI(2)	t(47)=6.337	.000	1.24	1.119	-1.06	1.340	2.30	information should be assessed by ministry
	t(47)=2.911	.005	1.18	.683	.25	1.571	.93	peer review
	t(47)=-2.091	NS	.18	1.610	1.06	.680	-.88	student assess
IM – UAI(1)	t(47)=9.855	.000	1.58	.708	-1.31	1.352	2.89	only dean access
	t(46)=4.741	.000	1.06	.827	-.53	1.506	1.59	teacher access
	t(47)=-2.561	.014	-.97	1.357	.19	1.721	-1.16	students access
IM – UAI(2)	t(45)=6.859	.000	1.58	.561	-.14	1.161	1.72	collect anonymity information
IM – IND	t(45)=4.097	.000	1.52	.795	.21	1.369	1.30	publish consensus
	t(44)=-.275	NS	-.41	1.434	-.29*	1.204	-.12	publish all discussed items
IM – MAS	t(45)=2.761	.008	.75	.916	-.20	1.424	.95	store information regarding performance and salary
IM – LTO	t(47)=-.486	NS	.06*	1.144	.25*	1.528	-.19	negative aspects
	t(47)=-.667	NS	.12*	1.166	.38*	1.408	-.25	shortcomings
	t(47)=1.338	NS	.97	.770	.56	1.365	.41	social benefits
	t(47)=.611	NS	.82	.808	.63	1.408	.19	achievements

Table 7.6: IM–National Culture from T&R

The attitudes toward the IT products of the Chinese T&R ($X_{ct} = 0.12$, $SD = 0.331$) and of the Dutch T&R ($X_{dt} = 1.15$, $SD = 0.801$) are significantly different ($p = 0.000$).

ISM-PDI:

The results of the FM-PDI, the AM-PDI and IM-PDI are presented in tables 7.4, 7.5 and 7.6, respectively.

The results reveal first that the Chinese T&R would like to accept authorities from every level, such as the state level, university level, as well as the academic specialists. Second, the Chinese T&R do not support accepting responsibilities. They are not willing to be involved in such responsibilities. For example, the mean of supporting rules made by the representatives from the university for Chinese T&R is $X_{ctr} = 0.33$. In addition, the Chinese T&R disagree that the teacher should be responsible for ratifying the course information. Furthermore, they support very little to have the students assess the course information with mean ($X_{ct} = 0.18$).

Such opinions from the Chinese T&R are significantly different from the opinions of the Dutch T&R. The Dutch T&R are not willing to accept the authorities. They support the idea that the rules of ISM should be made by the representatives of the university ($X_{dt} = 1.25$). In addition, The Dutch T&R actively support the idea that the teacher should be responsible for ratifying the course information ($X_{dt} = 1.07$). Meanwhile, they also support that students assess the course information with mean ($X_{dt} = 1.06$), which is their most favorite choice. Thus, these results are consistent with hypotheses H1: *The extent of accepting the authority of the ISM is more prevalent for the Chinese T&R than for the Dutch T&R*. This is also consistent with F1 in chapter 6.

ISM-UAI

The attitudes between the Chinese and the Dutch T&R on ISM related to uncertainty are all significantly different in Tables 7.4, 7.5 and 7.6.

The Chinese T&R support having more rules of ISM with the mean $X_{ct} = 0.58$. They agree to the anonymous communication approach with the mean $X_{ct} = 1.24$. Regarding the students' assessed course information, the Chinese T&R strongly supports that only the dean should have accessing rights ($X_{ct} = 1.58$) and the teacher himself have accessing rights (1.06); however, they disagree that the students should have accessing rights ($X_{ct} = -0.97$).

By contrast with the Chinese T&R, the Dutch T&R support having fewer rules of ISM with mean $X_{dt} = 1.33$. Regarding the students' assessed course information, the Dutch T&R strongly disagree that only the dean should have accessing rights ($X_{dt} = -1.31$) and disagree also that the teacher should have accessing rights ($X_{dt} = -0.53$), but agree that students should have accessing rights ($X_{dt} = 0.16$).

The results above are consistent with H2: *The extent of avoiding the uncertainty of the ISM is more prevalent for the Chinese T&R than for the Dutch T&R*. It is also consistent with F2 in chapter 6.

ISM-IDV

One significant difference between the Chinese and Dutch T&R is not consistent with hypothesis H3: support the course style with the discriminations between the required courses and the elective courses. The Chinese T&R support the flexible course forms with the mean $X_{ct}=1.00$, but the Dutch T&R disagree the mean being $X_{dt}=-0.87$.

Another significant difference between the Chinese and the Dutch T&R concerns publishing the consensus information. The mean of the Chinese ($X_{ct}=1.52$) is significantly higher than the mean of the Dutch ($X_{dt}=0.22$).

The attitudes above between the Chinese T&R and Dutch T&R reveal that both reactions are consistent with F3 in chapter 6. The results here are partly consistent with H3 and partly not, so the extent of individualization of ISM ***is not always more prevalent*** for the Dutch Teachers and Researchers than the Chinese Teachers and Researchers.

ISM-MAS

All the results concerning the FM and IM about ISM-MAS that are presented in tables 7.4 and 7.6 are consistent with H4: ***The extent of masculinity of the ISM is more prevalent for the Chinese T&R than for the Dutch T&R.***

For example, Chinese T&R support more the idea of a policy of punishment for misusing information system than a warning policy. Both Chinese and Dutch T&R reacted consistently with the findings F4 in chapter 6 on the previous questions.

ISM-LTO

The results related to the LTO between the Chinese and the Dutch T&R can be summarized as the following. The Chinese T&R ($X_{ct}=0.70$) support the idea of updating IS in a longer period of than the Dutch T&R ($X_{dt}=0.25$). The Chinese T&R pay more attention to the potential efficiency and achievement information than the Dutch T&R do. In addition, the Chinese T&R ($X_{ct}=0.12$) much more prefer to use brand new IT products than the Dutch T&R ($X_{dt}=1.15$) do. These differences are all consistent with F5 in chapter 6.

Nevertheless, the means ($X_{ct}=0.06$ and $X_{ct}=0.12$) of the potential negative information and potential deficiencies information of the Chinese T&R are smaller than the means ($X_{dt}=0.25$ and $X_{dt}=0.38$) of the Dutch T&R, respectively. These differences are not consistent with F5 of the national groups in chapter 6.

Therefore, the results of ISM-LTO of the Chinese and Dutch T&R are not completely consistent with H5: ***The extent of long term orientation of the ISM is not always more prevalent for the Chinese T&R than for the Dutch T&R.***

The results can be summarized as follows:

F1: The extent of accepting the authority of the ISM is more prevalent for the Chinese T&R than for the Dutch T&R.

F2: The extent of avoiding the uncertainty of ISM is more prevalent for the Chinese T&R than for the Dutch T&R.

F3: The extent of individualization of ISM is not always more prevalent for the Dutch T&R than for the Chinese T&R.

F4: The extent of masculinity of ISM is more prevalent for the Chinese T&R than for the Dutch T&R.

F5: The extent of long term orientation of ISM is not always more prevalent for the Chinese T&R than for the Dutch T&R.

To conclude, most of the **differences between the Chinese and the Dutch T&R are consistent with those of their national groups**. In other words, the attitudes of the Chinese or the Dutch T&R are mostly consistent with their cultural patterns. In this regard, some differences on ISM between the Chinese and the Dutch T&R could be more significant than the national cultural differences on ISM between the Chinese and Dutch in-group.

*The attitude to accepting the authority from the managerial levels;
The attitude of not willing to be involved in the individual's responsibilities;
The attitude to allocate the accessing information rights;
The attitude to support decisive and assertive management.*

7.4 Chinese Students–Dutch Students

The cultural differences between the Chinese and Dutch students will be presented in this section.

7.4.1 Description of the Sample

The Chinese students are studying in the computer sciences field. They are partly PhD students, and partly Master degree students. The Dutch students involved in the study are Master students, most of whom are studying IT and IS. Both Chinese and Dutch students that answered the questionnaires are familiar with the IS used at the universities.

7.4.2 Results and Discussion

The results concerning the FM–national culture, AM–national culture, and IM–national culture are reported in tables 7.7, 7.8 and 7.9, respectively. All relevant items will be organized the same as in the previous sections.

	t(Df)	p.	Chinese Students		Dutch Students		DX	Explanations
			X	SD	X	SD		
FM-PDI	t(86)=7.717	.000	.79	1.105	-1.02	1.090	1.82	rules from ministry
	t(87)=1.143	NS	.79	1.174	.50	1.233	.29	rules from university administrative office
	t(87)=-.547	NS	1.23	1.063	1.34	.823	-.11	rules from all users
FM-IDV	t(87)=-3.793	.000	.33*	1.457	1.28*	.882	-.95	standard format for all courses
	t(87)=5.911	.000	.69*	1.195	-.74*	1.084	1.43	free format for elective
	t(86)=6.046	.000	.29*	1.487	-1.30*	.974	1.59	always free format
FM-MAS	t(87)=-3.233	.002	.41	.751	1.00	.926	-.59	warning for misuse
	t(87)=3.974	.000	.95	.795	.28	.809	.67	punishment for misuse

Table 7.7: FM-National Culture from Students

	t(Df)	p.	Chinese Students		Dutch Students		DX	Explanations
			X	SD	X	SD		
AM-PDI	t(85)=3.810	.000	.54	1.282	-.48	1.199	1.02	order by academic titled
AM-UAI	t(86)=2.014	NS	1.23	.810	.78	1.212	.46	public and anonymous communication
AM-IND	t(86)=-.426	NS	.50	1.371	.38	1.260	.12	tailoring elective courses
AM-LTO	t(87)=2.668	.009	.67	.806	.26	.633	.41	updating applications

Table 7.8: AM-National Culture from Students

	t(Df)	p.	Chinese Students		Dutch Students		DX	Explanations
			X	SD	X	SD		
IM – PDI(1)	t(87)=8.378	.000	<u>1.08</u>	1.156	-.96	1.124	2.04	information should be ratified by ministry
	t(87)=2.713	.008	.46	1.166	-.22	1.183	.68	specialists outside university
	t(87)=-2.407	.018	.08	1.285	.64*	.921	-.56	central administrative department
	t(87)=-1.159	NS	.56	1.465	<u>.90</u>	1.266	-.34	teacher themselves
IM – PDI(2)	t(86)=7.879	.000	<u>1.28</u>	1.050	-.71	1.275	2.00	information should be assessed by ministry
	t(87)=3.119	.002	1.21	.951	.44	1.280	.77	peer review
	t(87)=-3.181	.002	.72	1.317	<u>1.44</u>	.812	-.72	student assess
IM – UAI(1)	t(86)=8.811	.000	<u>1.26</u>	.715	-.71	1.242	1.97	only dean access
	t(86)=3.600	.001	.92	1.061	.00	1.291	.92	teacher access
	t(86)=-.016	NS	.82*	1.295	<u>.82*</u>	1.131	.00	students access
IM – UAI(2)	t(85)=6.608	.000	1.19	.811	-.12	.982	1.31	collect anonymity information
IM – IND	t(85)=5.940	.000	<u>1.11</u>	.774	.10	.789	1.01	publish consensus information
	t(84)=-2.370	.020	-.19	1.390	<u>.46</u>	1.164	-.65	publish all discussed items
IM – MAS	t(86)=4.028	.000	.63	1.101	-.30	1.055	.93	store information regarding performance and salary
IM – LTO	t(85)=1.137	NS	.89	1.125	.62	1.086	.27	negative aspects
	t(85)=2.120	NS	1.08	.862	.64	1.025	.44	shortcomings
	t(86)=1.408	NS	1.16	1.079	.86	.904	.30	social benefit
	t(83)=-.025	NS	1.06*	1.170	1.06*	.944	.0	achievements

Table 7.9: IM–National Culture from Students

The attitudes towards the IT products of the Chinese students ($X_{cs}=0.18$, $SD=0.389$) and the Dutch students ($X_{ds}=0.72$, $SD=0.688$) are significantly different ($p=0.000$).

ISM-PDI:

The Chinese students generally accept the authorities more than Dutch students do. For example, the mean ($X_{cs}=0.79$) of accepting rules from the State Education Ministry is significantly different compare to the Dutch students ($X_{ds}=-1.02$). Chinese students support ratifying and assessing the information of IS from the State Education Ministry indicating means ($X_{cs}=1.08$, $X_{cs}=1.28$) that are significantly different from the Dutch students concerning the same items ($X_{ds}=-1.02$, $X_{ds}=-0.96$).

Dutch students support the idea of making rules, ratifying and assessing information differently than Chinese students do. They prefer rules to be made by the representatives of the university ($X_{ds}=1.34$) and prefer that the course information be ratified by teachers ($X_{ds}=0.90$) and assessed by students ($X_{ds}=1.44$).

The most important differences between the Chinese and Dutch students can be attributed to their motivation and involvement. Dutch students actively support the idea that students should assess courses. Although Chinese students also would like to assess courses, this is significantly less important to them than to the Dutch students ($X_{cs}=0.72$, $X_{ds}=1.44$, respectively). Furthermore, Chinese students are in favor of course information being assessed by the State Education Ministry, while Dutch students are against this idea ($X_{cs}=1.08$, $X_{ds}=-0.96$).

The evidence above is consistent with the national Chinese and Dutch group, that is, F1 in chapter 6. It confirms ***H1: The extent of accepting the authority of the ISM is more prevalent for the Chinese students than for the Dutch students.***

However, one point to be noticed is that the Chinese students support the representatives to make rules of the ISM ($X_{cs}=1.23$), that is, the most favored choice and quite close to the mean of the Dutch students ($X_{ds}=1.34$). The attitude of Chinese students on this question is very different from the Chinese in-group, Chinese manager group, as well as the Chinese T&R group.

This attitude reminds us that Chinese students are willing to accept rules from superior bodies; however, they also support rules made by representatives. This suggests that Chinese students have two different attitudes regarding making rules. However, as long as they are willing to accept authority and are not willing actively to fling themselves into management activities, such as assessing courses ($X_{cs}=0.72$, $X_{ds}=1.44$, $p=0.002$), it is believed that accepting authority would be the prime attitude for Chinese students.

ISM-UAI

The results regarding UAI presented in tables 7.8 and 7.9 are generally consistent with H2: ***The extent of avoiding the uncertainty of the ISM is more prevalent for the Chinese students than for the Dutch students.*** For example, the Chinese students support more the idea of anonymous communications than Dutch students do ($X_{cs}=1.23$, $X_{ds}=0.78$). Moreover, Chinese students support only the dean having access to students' assessed course information, but Dutch students are against this

idea ($X_{cs}=1.26$, $X_{ds}=-0.71$, $p=0.000$). Both the Chinese and the Dutch students react consistently with F2 in chapter 6.

ISM-IDV

Chinese students are more supportive of the concept of a flexible course style ($X_{cs}=0.69$), while Dutch students strongly support the standard course style ($X_{ds}=1.28$) and are against the flexible type ($X_{ds}=-1.30$). The differences between the Chinese and Dutch students are significant, but not consistent with H3.

Chinese students strongly support the idea of publishing consensus information ($X_{cs}=1.11$), but Dutch students are more willing to publish all discussed information ($X_{ds}=0.46$). This is consistent with H3. Therefore, the results reveal that the attitudes related to ISM-IDV between the Chinese and Dutch students are partly consistent with H3, and partly not. In other words, ***the extent of individualization of ISM is not always more prevalent for the Dutch students than for the Chinese students.*** This is also consistent with both national groups regarding F3 in chapter 6.

ISM-MAS

Chinese students support the idea of punishing the misuse of IS ($X_{cs}=0.95$), while Dutch students support the warning policy ($X_{ds}=1.00$). In addition, the Chinese students are willing to collect the awarded salary information ($X_{cs}=0.63$), but the Dutch students disagree with this proposition ($X_{ds}=-0.30$). These differences between the Chinese and Dutch students are significant and consistent with H4: ***The extent of masculinity of the ISM is more prevalent for the Chinese students than for the Dutch students.*** Meanwhile, opinions on ISM-MAS from both the Chinese and Dutch students are consistent with their national in-groups F4 in chapter 6.

ISM-LTO

The LTO results with regard to AM and IM are presented in tables 7.8 and 7.9. We reported the means about TM from both Chinese students and Dutch students thereafter. All the means reflecting the differences between the Chinese and the Dutch students are generally consistent with each of their national in-groups. Thus, they are consistent with H5: ***The extent of long term orientation of the ISM is more prevalent for the Chinese students than for the Dutch students.***

The results can be summarized as follow:

F1: The extent of accepting the authority of the ISM is more prevalent for the Chinese students than for the Dutch students.

F2: The extent of avoiding the uncertainty of ISM is more prevalent for the Chinese students than for the Dutch students.

F3: The extent of individualization of ISM is not always more prevalent for the Dutch students than for Chinese students.

F4: The extent of masculinity of ISM is more prevalent for the Chinese students than for the Dutch students.

F5: The extent of long term orientation of ISM is more prevalent for the Chinese students than for Dutch students.

To conclude, the differences between the Chinese and the Dutch students are generally consistent with those of their national in-groups. The most significant differences between Chinese students and Dutch students can be presented as follows:

***The attitude towards accepting authority from managerial levels;
The attitude towards participating in the management ISM activities;
The attitude regarding allocate information access rights;
The attitude to support the decisive and assertive management .***

In addition, the differences between Chinese and Dutch students also reveal another finding. Chinese students are more in favor of making rules by representatives, which is not consistent with the other Chinese groups, represented in the survey (national group, managers and the T&R group). Dutch students react consistently with all other Dutch groups.

The difference above reminds one that people's attitudes might not be absolutely consistent with their national cultural differences. This suggests that ***the attitudes of the cultural differences might vary slightly from the professional perspectives.***

7.5 Chinese ICT Professionals–Dutch ICT Professionals

The cultural differences between the Chinese and the Dutch ICT professionals will be presented in this section.

7.5.1 Sample Description

Both the Chinese and Dutch ICT professionals' daily job is to support the activities of education, research, as well as management based on ICT at their universities. In practice, they might be involved in some stages of ISM, such as IS designing, application, maintaining, and updating, etc. Therefore, their attitudes directly impact several aspects of the IS, such as the availability, compatibility, flexibility, maintainability, and so on. Consequently, the ICT professionals from both universities are selected as matched groups to examine the cultural differences in this study.

7.5.2 Results and Discussion

The results concerning the FM–national culture, AM–national culture, and IM–national culture are reported in tables 7.10, 7.11 and 7.12, respectively. All relevant items will be organized the same as in the previous sections.

	t(Df)	p.	Chinese ICT		Dutch ICT		DX	Explanations
			X	SD	X	SD		
FM-PDI	t(30)=6.994	.000	1.00	1.000	-1.41	.990	2.47	rules from ministry
	t(33)=2.752	.010	1.30	.733	.47	1.060	.83	rules from university administrative office
	t(33)=.197	NS	1.25*	.786	1.20*	.676	.05	rules from all users
FM-UAI	t(32)=.709	NS	.26	.653	.07	.961	.20	prefer more rules
	t(32)=-.077	NS	.58	.838	.60	.737	-.02	prefer less rules
FM-IDV	t(30)=-1.019	NS	-.18*	1.380	.33*	1.447	-.51	standard format for all courses
	t(29)=-.031	NS	.19*	1.223	.20*	1.014	-.01	free format for elective
	t(32)=3.842	.001	-.05*	1.311	-1.47*	.640	1.41	always free format
FM-MAS	t(32)=-.890	NS	.68	.749	.93	.884	-.25	warning for misuse
	t(32)=.841	NS	.79	.976	.53	.743	.26	punishment for misuse

Table 7.10: FM-National Culture of the ICT Professionals

	t(Df)	p.	Chinese ICT		Dutch ICT		DX	Explanations
			X	SD	X	SD		
AM-PDI	t(29)=1.871	NS	-.38	1.147	-1.07	.884	.69	order by academic titled
AM-UAI	t(33)=3.420	.002	.85	1.089	-.53	1.302	1.38	public and anonymous communication
AM-IND	t(31)=.914	NS	.28	1.074	-.13	1.506	.41	tailoring elective courses
AM-LTO	t(32)=1.571	NS	.95	1.079	.40	.910	.55	updating applications

Table 7.11: AM-National Culture of the ICT Professionals

	t(Df)	p.	Chinese ICT		Dutch ICT		DX	Explanations
			X	SD	X	SD		
IM – PDI(1)	t(32)=4.100	.000	.21	1.273	-1.47	1.060	1.68	information should be ratified by ministry
	t(31)=3.754	.001	.50	1.249	-1.00	1.000	1.5	specialists outside university
	t(33)=1.978	NS	1.05	.999	.40	.910	.65	central administrative department
	t(32)=-.867	NS	.63	1.257	1.00	1.195	-.37	Teacher self
IM – PDI(2)	t(33)=3.650	.001	.75	1.118	-.87	1.506	1.62	information should be assessed by ministry
	t(32)=2.027	NS	.79	.918	.07	1.163	.72	peer review
	t(33)=1.240	NS	1.35*	.813	1.00*	.845	.35	student assess
IM – UAI(1)	t(33)=8.765	.000	1.30	.733	-1.33	1.047	2.63	only dean access
	t(33)=4.412	.000	1.40	.681	-.20	1.424	1.6	teacher access
	t(33)=-.718	NS	.20	1.196	.53	1.552	-.33	students access
IM – UAI(2)	t(32)=3.955	.000	.85	1.089	-.53	1.032	1.7	collect anonymity information
IM – IND	t(32)=.842	NS	1.00	.882	.73*	.961	.27	publish consensus information
	t(32)=1.449	NS	.37*	1.012	-.13*	.990	.50	publish all discussed information
IM – MAS	t(31)=.976	NS	.39	1.145	.00	1.134	.39	store information regarding performance and salary
IM – LTO	t(31)=-.561	NS	.44*	1.199	.67*	1.047	-.22	negative aspects
	t(32)=.018	NS	.47*	1.264	.47*	.990	.01	shortcomings
	t(31)=.254	NS	.83	1.098	.73	1.163	.10	social benefit
	t(32)=-.118	NS	.89*	.875	.93*	1.033	-.04	achievements

Table 7.12: IM–National Culture of the ICT Professionals

The attitudes towards the IT products from the Chinese ICT professionals ($X_{cict}=0.25$, $SD=0.444$) and the Dutch ICT professionals ($X_{dict}=1.13$, $SD=0.74$) are significantly different ($p=0.000$).

ISM-PDI

According to the results on the FM and the IM presented in tables 7.10 and 7.12, the differences between the Chinese and Dutch ICT on the ISM-PDI show that the ***Chinese ICT professionals accept the authority more prevalently than Dutch ICT professionals do***; this is consistent with H1.

There are some other interesting findings which should be interpreted cautiously. Chinese ICT professionals support the individual participation for the ISM. For example, they support the idea of representatives participating in making the rules of the ISM ($X_{cict}=1.25$). Surprisingly, the mean is even higher than the mean of the Dutch ICT ($X_{dict}=1.20$).

In addition, Chinese ICT professional also support the idea that students should assess courses ($X_{cict}=1.35$). This is again higher than the mean of the Dutch ICT ($X_{dict}=1.00$). In this regard, the opinions of Chinese ICT differ more from those of the Chinese national in-group, while the opinions of the Dutch ICT are consistent with Dutch national in-group. In this regard, the Chinese ICT professionals react differently in some ways from the Chinese group.

The findings here are similar to the Chinese students group. It is revealed again that attitudes are not only influenced by culture but also by professional perspectives.

ISM-UAI

The results concerning UAI presented in tables 7.11 and 7.12 are consistent with H2: ***The extent of avoiding the uncertainty of the ISM is more prevalent for the Chinese ICT professionals than for the Dutch ICT professionals***. For example, the Chinese ICT significantly support the idea of anonymous communication ($X_{cict}=0.85$) more than the Dutch ICT do ($X_{dict}=-0.53$). The Chinese ICT strongly support the idea that the dean and the teacher have accessing rights to the students' assessed course information (respectively, $X_{cict}=1.30$ and $X_{cict}=1.40$), while the Dutch ICT are against this (respectively, $X_{dict}=-1.33$ and $X_{dict}=-0.2$).

However, Chinese ICT also supports having fewer rules for ISM with the mean ($X_{cict}=0.58$), which is quite close the Dutch ICT ($X_{dict}=0.60$). In addition, Chinese ICT also support the students having access rights to students' assessed course information. Both means are also quite close ($X_{cict}=0.20$, $X_{dict}=0.53$). Therefore, the attitude from Chinese ICT is not completely consistent with the Chinese group.

The findings above have similarities with the findings of the Chinese ICT professionals on ISM-PDI mentioned in the previous paragraph. This indicates that attitudes are also conditioned by professional perspectives.

ISM-IDV

The attitudes concerning the FM, AM and IM, related to ISM-IDV between the Chinese ICT and Dutch ICT, are partly consistent H3, and partly not. In addition, both of the groups react partly consistent with their national in-groups, and partly not.

For example, the Dutch ICT supports the idea of publishing consensus information ($X_{dict}=0.73$), and disagrees with the idea of publishing all discussed information ($X_{dict}=-0.13$). The latter result is not consistent with the Dutch national in-group. In addition, the Chinese ICT supports the idea of publishing consensus information ($X_{cict}=1.00$) and also all discussed information ($X_{cict}=0.37$). The latter is not only opposed to the opinion of the Dutch ICT, but also not consistent with the Chinese national in-group.

These findings reveal that not only the Chinese ICT professionals react differently with respect to other Chinese groups, but the Dutch ICT professionals as well (see the relevant mean with an asterisk in the Table 7.10, 7.11 and 7.12). The data clearly indicates again that attitudes are not only culture influenced but also task influenced.

ISM–MAS

The results concerning FM and IM regarding ISM–MAS, presented in the tables 7.10 and 7.12, respectively, are consistent with H4: *The extent of masculinity of the ISM is more prevalent for the Chinese ICT than for the Dutch ICT*. For example, the Chinese ICT professionals support the idea of punishment rules for misuse of IS, but the Dutch ICT professionals support warning rules for misuse of IS. However, the differences between the attitudes of the Chinese and Dutch ICT professionals on ISM–MAS are not significant. In other words, the attitudes between the Chinese and Dutch are similar. Apparently, the professional activities and tasks are the important influences for this professional group.

ISM–LTO

The results of the LTO regarding the AM and IM are presented in the tables 7.11 and 7.12. The relevant TM means both for Chinese and Dutch ICT professionals are reported separately. The differences between the Chinese and the Dutch are partly consistent with H5, and partly not. The findings in this paragraph are similar to the earlier findings of both Chinese and Dutch ICT professional groups. For example, some of the means of the LTO from the Dutch ICT professionals are even higher than those of the Chinese ICT colleagues.

All results can be summarized as follows:

- F1: The extent of accepting the authority of the ISM is more prevalent for the Chinese ICT than for Dutch ICT professionals.*
- F2: The extent of avoiding the uncertainty of ISM is more prevalent for the Chinese ICT than for Dutch ICT professionals.*
- F3: The extent of individualization of ISM is not always more prevalent for the Dutch ICT than for Chinese ICT professionals.*
- F4: The extent of masculinity of ISM is more prevalent for the Chinese ICT than for Dutch ICT professionals.*

F5: The extent of long term orientation of ISM is not always more prevalent for the Chinese ICT than for Dutch ICT professionals.

To conclude, the differences between the Chinese and Dutch ICT professionals are partly consistent with their national in-groups, and partly not. In other words, the attitudes of the Chinese ICT are not always consistent with the cultural pattern of the Chinese cultural reactions. The most significant difference between the Chinese and Dutch ICT professionals can be presented as follows:

The attitude towards accepting authority from managerial levels is more prevalent for the Chinese ICT than for the Dutch ICT.

7.6 Implications of the Results

The significant results described previously indicate that national culture profoundly influences the attitudes of the participants concerning ISM at the universities. It is valuable to acknowledge these differences, as well as to understand them. In addition, it is necessary to analyze the most important implications of these findings to manage the IS in a proper way.

According to the four summaries we extracted from the large amount of data, the Chinese accept the authorities for the ISM from every aspect in all professional groups studied: managers, teachers and researcher, students and ICT professionals. This implies that the managers are very important for ISM in China. Therefore, ***the ISM is administrative driven, and managers play a significant role.*** Figure. 7.2 presents the significant components of Chinese ISM Cube for the Chinese university. The Z-axis of the ISM Cube will be denoted by Set of {M, T&R, S, ICT}. Here, M represents Managers, T&R denotes Teachers and Researchers, S points to Students, and ICT indicates the ICT professionals at the university.

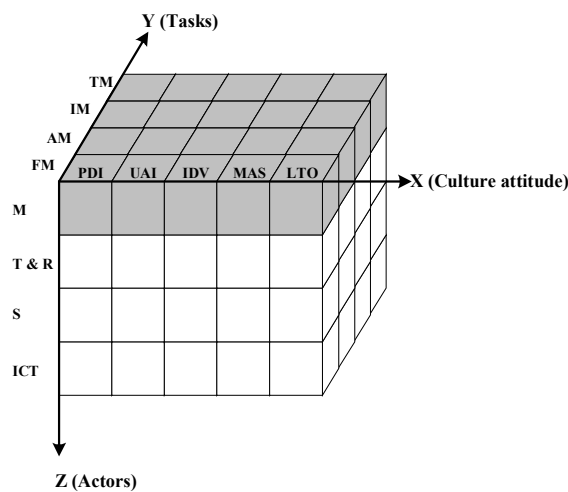


Figure 7.2: The Significant Components of ISM Cube for Chinese University

Congruently, the related attitudes of Chinese managers on ISM, such as UAI, IDV, MAS, and LTO, will be the dominating attitudes for ISM at the Chinese university.

The results also reveal that the Dutch participants of this study are more willing to be involved in ISM, to participate in the ISM and to accept the ISM decisions from representatives. All these results are consistent throughout the professional group level. This suggests that the users are considered to be more important for ISM in The Netherlands. Therefore, *the information system management is application driven, and teachers, researchers and students (e.g., users) play a significant role.* Figure 7.3 presents the significant components of the Dutch ISM Cube for the Dutch university.

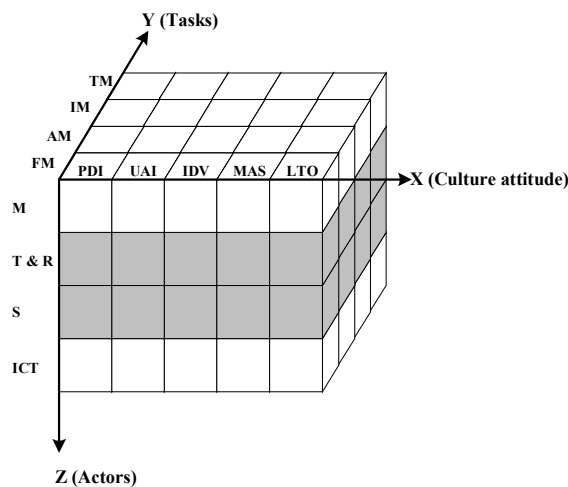


Figure 7.3: The Significant Components of ISM Cube for Dutch University

Congruently, the users' attitudes will dominate the ISM at universities in the Netherlands. Therefore, the ISM must pay more attention to cultural attitudes of the users, such as the UAI, IDV, MAS and LTO.

In addition, one should also realize that national culture does not absolutely dominate people's attitudes. In this chapter, the people's attitudes were examined according to several groups (managers, T&R, students, ICT professionals), both Chinese and Dutch. The findings suggest that people's attitudes are also influenced by professional perspectives.

These professional influences could intensify the national cultural influences, increasing the gaps between the different national cultures. Examples are the attitude of accepting authority between Chinese and Dutch managers and the attitude regarding uncertainty avoidance between Chinese and Dutch T&R.

On the other hand, professional influences could also weaken the national cultural influences or might lead to even reverse attitudes. For example, the attitudes from both Chinese and Dutch ICT professionals are opposed to their national in-groups. This might indicate that the particular profession influences heavily the people's attitude due to the technology, the specialized work environment and the peculiarities of the ICT profession.

In this research, we have concentrated on national cultural differences. Our findings indicate that the national culture profoundly influences the attitudes of the participants on the ISM. Therefore, the ISM should be treated carefully and cautiously. This is particularly important when the ISM is in globalization environments. In order to manage the IS in a proper way, the following chapter proposes a design for ISM.

8. A Framework for the Design of ISM

8.1 Introduction

The research objective of this thesis, was described in Chapter 1, was to provide a comprehensive approach to improve ISM with a special emphasis on national cultural influences.

To pursue this objective, we developed the ISM Cube that was based on existing models in literature. We elaborated and applied the dimensions of the ISM Cube, step by step. In a large survey of 222 participants we sought to verify the impact of national cultural differences on ISM, focusing on Chinese and Dutch. The main findings of this research revealed that the extent of authority acceptance, uncertainty avoidance, masculinity and long-term orientation are more prevalent in Chinese culture than in Dutch culture. Regarding individuality, one would expect that Dutch culture would be prevalent. However, that was not the case. There was evidence of no significant difference between the Dutch and Chinese culture in some instances.

This survey demonstrates that national cultural differences between the Chinese and Dutch deeply influence ISM, because culture influences the ISM stakeholders' attitudes, as well as their behaviors. (see Figure 6.5, Figure 6.6, Figure 7.5 and Fig 7.6).

Awareness and understanding of the cultural influences are very important for the design of a global ISM. As Nage et al. stated: "Most academic research in management is based on the notion that the mission of all science is to understand, i.e. to describe, explain and possibly predict" [Nage et al., 1979]. Van Aken added: "However, understanding a problem is only halfway to solving it" [Aken, 2002]. Accordingly, knowing and understanding the national cultural impact on ISM is not enough for an appropriate design of ISM in practice. What we need is *general knowledge* to design *specific solutions* for *specific problems*. After establishing the cultural influences, we developed a framework for ISM, taking into account some general principles for a proper ISM, as developed in previous research and reported in the literature. One of those principles is the so-called 'Closed Loop Principle', developed and experimented by Bemelmans [2000].

The rest of this chapter is constructed as follows. First, in section 8.2, we present a generic framework for ISM. How to deal with ISM in a Chinese context, especially referring to a university context, will be discussed in section 8.3. In contrast to the proposals for a Chinese university, those for a Dutch university will be specified in section 8.4. The differences between the two designs will be compared and elucidated in section 8.5. Subsequently, the challenges of designing a culturally influenced ISM are elaborated upon in section 8.6. In addition, we use a specific case to demonstrate the application of the framework. That will be the case in section 8.7. Finally, the chapter will end with a summary.

8.2 Components of a Generic Framework for a Culturally Influenced ISM Design

The objective of this section is to identify the relevant variables for a framework for the design of a culturally influenced ISM in a global environment. Therefore, it is useful to introduce some relevant design issues and clarify meanings. Subsequently, the relevant variables of the generic framework will be presented, as mentioned in the findings of previous chapters.

According to literature, one of the basic issues for an appropriate ISM is the so-called “Closed Loop Principle” [Bemelmans, 2000]. That principle is based on the following: developing, using and maintaining IS will only be successful in case the stakeholders involved have (direct) incentives to do their ISM tasks in an appropriate way. In case (positive or negative) incentives are missing, one may expect that stakeholders will not be really committed to their ISM tasks with the consequence that the information system will deteriorate over time and will become useless. In other words: stakeholders should have “benefits” (positive or negative incentives) from being involved in ISM. Accordingly, the “Closed Loop” with its entities, as well as the relationships between the entities, can be depicted in Figure 8.1.

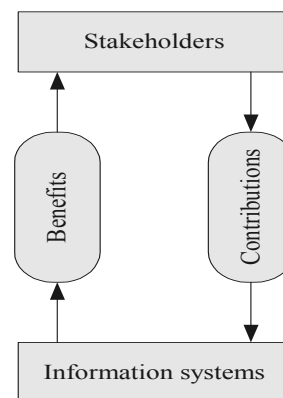


Figure 8.1: Closed Loop Model

The relationship between IS and their stakeholders can be classified into two parts: contributions and benefits. In effect, the stakeholders contribute to the relevant IS. The contributions differ, depending on the positions and responsibilities of the persons concerned. Contributions will be delivered if, and only if, stakeholders experience incentives for doing so. One of the best motivators is a direct benefit for doing the ISM tasks in the prescribed way. Another aspect may be a penalty in case somebody is doing his/her job in an inappropriate way.

The closed loop principle emphasizes the importance of creating incentives for all stakeholders in an ISM design. If one is designing and implementing an ISM concept without being aware of the importance of incentives for the involved people and organizations, the concept will not work according to plans and ambition. This is not a matter of poorly motivated people (intrinsic motivation) but is a matter of awarding appropriate behavior (extrinsic motivation) and thus highlighting the importance of doing ISM jobs in the advised and designed way.

Many kinds of people in different organizations belong to the various stakeholders. Those who are directly or indirectly involved in the IS are generally referred to as users, designers, managers, system maintainers, representatives of labor unions, etc. Organizations involved can be internal organizations or departments, as well as external (superior) control bodies. In this research, we focused on ISM at universities. The stakeholders involved in such university systems were previously identified as the actors of ISM according to Zachman's specification (See chapter 4 paragraph 4.3). We distinguished Managers, Designers/Builders, Users and Maintainers. Apart from the people who are directly involved in ISM at a university, the various superior bodies inside and outside the university are considered as stakeholders of ISM. Examples are the several central offices at a university, the State Education Ministry, the Provincial Education Bureau, the national accreditation body, etc.

Regarding the tasks of ISM described earlier, the four main task domains are Function, Application, Information and Technology Management. These domains based on Looijen's MCM model were introduced and specified in detail in Chapter 4.

The last relevant variable for our framework is the impact of national culture on ISM. As we have elaborated upon, especially in chapter 6 and 7, we investigated the national cultural impact on ISM in a Chinese and Dutch university. Five perspectives were distinguished based on Hofstede's research [1980, 1991], namely PDI (Power Distance Index), UAI (Uncertainty Avoidance Index), IDV (Individuality), MAS (Masculinity) and LTO (long Term Orientation).

Synthesizing the preceding sections, a comprehensive ISM design should take into account the following variables:

- national cultural influences,
- the several stakeholders,
- the several ISM tasks,
- the relationships between stakeholders and the IS, depicted as the "Closed Loop Principle".

Thus, the framework for a design of an internationalized ISM could be presented as follows (see figure 8.2):

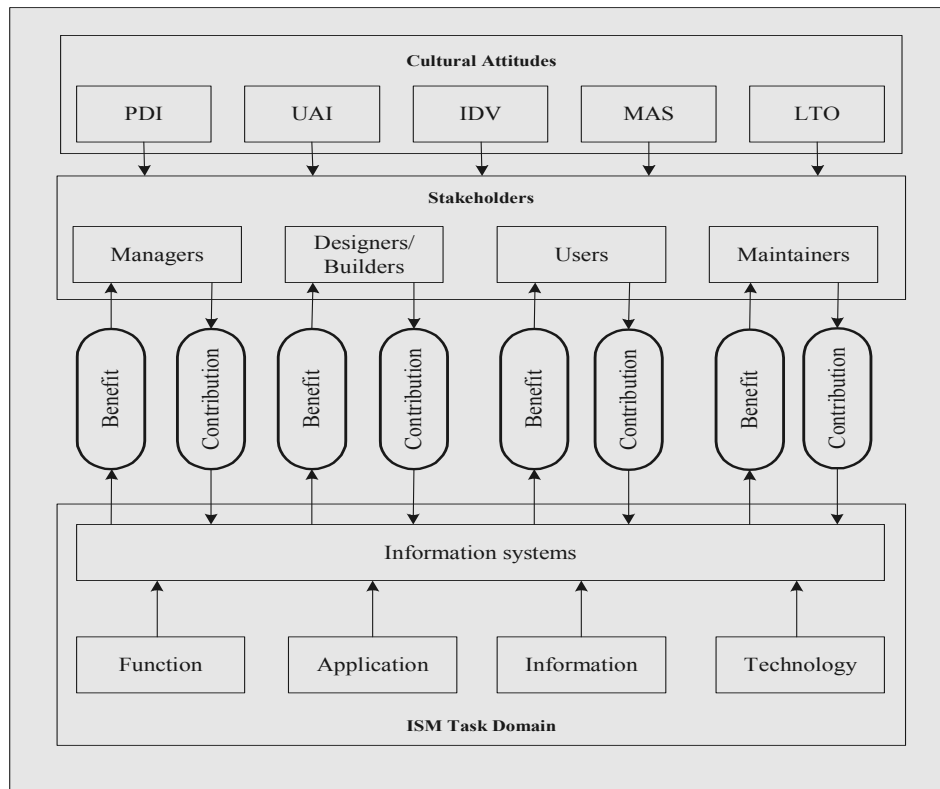


Figure 8.2: Components of a Framework for the Design of ISM

8.3 Designing ISM for a Chinese University

In this section, we will present a design of ISM for a Chinese university, starting from the previous framework presented. The prior research findings about Chinese national cultural influences on ISM will be reflected in the design.

According to the findings in chapter 6 and 7, the Chinese generally accept authority in many aspects that is quite in contrast to the Dutch. This acceptance is due to the Chinese national culture, represented by a large PDI. We denote the stakeholders of ISM for a Chinese university as the Superior body, the Governor, the Users and the ICT specialists.

The superior body stands for the external management and control organizations, such as the State Education Ministry or local education management bureau. The Governor denotes the internal management offices and officers of a university. Users are the many researchers and teachers, as well as the students, at a university. The ICT specialists include the IS designers and maintainers. We are representing these stakeholders via the set {Superior body, Governor, Users, ICT specialists} on the Z-axis in our ISM cube. The most significant components of the ISM Cube for a Chinese university could be presented in Figure 8.3 by the shaded parts.

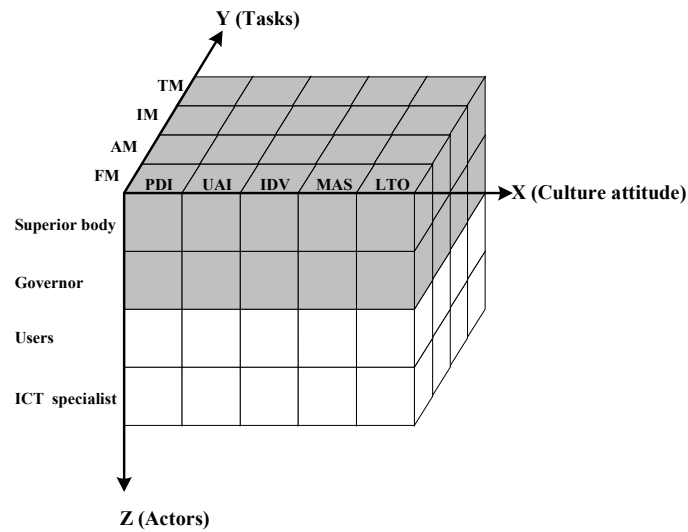


Figure 8.3: The Most Significant Components in the Chinese ISM Cube

Figure 8.3 suggests a clue that the superior body of a university and the governors of a university will play very important roles for ISM at a Chinese university. Thus, the primary stakeholders of the IS at a Chinese university are the superior body and the governor.

Accordingly, it is reasonable to accept that the benefits and contributions of these two kinds of stakeholders should be considered more important than those of the end-users and the ICT-specialists. The contributions of the two superior management levels will be shaped and influenced by the Chinese national cultural dimensions PDI, UAI, IDV, MAS, and LTO. We will elucidate this in short.

First, the large PDI of the Chinese culture will influence very much both the superior body and the governor. They will consider their dominant roles in ISM as normal for a Chinese university. Meanwhile, all other actors of ISM will have the same idea and will accept the authority of the superior levels. Therefore, the decision-making is apt to be a top-down mechanism, in which the superior body and the governor will play the most significant roles as “the ultimate” decision-makers. The ISM tasks will be management oriented, where the benefits of the superior body and governor have to be taken into account explicitly. The main benefits will be in the area of constituting and continuously confirming their superior positions. The first question that superior managers will ask themselves will always be “what is in it for my supervising work?” Managers will also want to know the extension to which their supervising will be enforced or become more decisive. A design of ISM has to consider such benefits explicitly, or else superior management will become serious opponents of the concerned information systems. At the same time, the ISM will be administrative driven, because the contributions of the superior body and the governor will be closely related to the (daily) administrative and managerial processes.

Second, the strong UAI Chinese culture will fundamentally influence the contributions of both the superior body and the governor. Since they would like to shun ambiguity and prefer ISM to be interpretable and predictable, it is reasonable to

assume that both managerial levels will do everything in their power to exclude uncertainty and unpredictable occurrences. That will be the case for all four ISM task domains. Consequently, it is very important for all functions of ISM to be manageable, that the information of the IS is controllable, that the applications of the IS can be tailored or even re-tailored, and that the technology is reliable and durable, etc. All this should be considered as preconditions to gaining positive admittance and contributions from the superior body and the governor.

Third, the low IDV in the Chinese culture will also strongly influence the contributions of both the superior body and the governor of a Chinese university. According to the findings of this research, the consensus information is highly emphasized by the Chinese. Therefore, the ISM task in the domain of Information Management deserve special attention, much more than is the case in western cultures. Superior management levels in China are engaged in assessing and controlling the content of information, as well as the access rights of information. They will be decisive regarding who should have access to what information. No information should be distributed if there is any danger that chaos happens because of the inconsistent information. The foregoing is typical of a collectivist culture.

Fourth, the high MAS of the Chinese culture will also influence the contributions of both the superior body and the governors of a Chinese university. The Top–Down strategy on ISM will emphasize the responsibilities of the various managers. They are expected not only to be responsible, but also decisive and assertive. The Chinese prefer, as we have seen, strong leadership. This fits in with the Chinese Masculinity culture. Top management is very concerned about the power base, which is related to the scope of the business. The wider the scope, the more powerful, since they are then in charge of a larger business domain. Meanwhile, they will also pay much more attention to the latest and newest functions and technologies of an Information System to be implemented. Top management levels prefer that such new systems outdo all other systems in similar application fields. The newer and the more advanced, the better, as this will give status to the superior management levels. Since they were in charge of these outstanding systems, they deserve respect. The dimension of Masculinity versus Femininity elaborated by Hofstede [1980] is better understood by Trompenaars' dimension of **Achievement versus Quality of life** [1994, 1997, 2004]: Cultures scoring high on value competition, assertiveness, and materialism will typically value winning/rewarding; while cultures scoring high on the other end of the scale will value relationships, well-being and the quality of the work more than achievement.

Finally, the high LTO of the Chinese culture will have influence on the contributions of the superior management levels to ISM. Previous findings of this research revealed that the Chinese prefer new technologies. On the other hand, once developed, they will stick to the same applications. So the long-term perspective hinders the quick substitution of applications by newer ones. It slows down the (perfective and adaptive) maintenance and updating of the implemented IS.

The discussions above explain what and why of the highlighted entities in Figure 8.4, that is, why they should be considered as being more significant than the other parts of the cube. In addition, it highlights the fact that the Chinese culture impacts the contributions of the key actors of ISM. For a proper design of ISM, it is important to

get the key actors, such as the control body and the governors, committed to their contributions. Where one is paying insufficient attention to that crucial point, the system will probably fail. It will not be backed by the superior management levels and therefore be relegated as a failure.

Cameron studied several organizational cultures. He distinguished four main cultures: the clan culture, the adhocracy culture, the hierarchy culture and the market culture [Cameron et al., 1999]. The typology of four cultures is based on two dimensions, namely internally versus externally oriented and flexibility versus stability. Though organizational culture is not the same as national culture as was used in this study, there exists a high correspondence between both. The Chinese cultural impact on ISM, as described before, could be characterized as a hierarchy culture or market culture, terms used by Cameron. It is an organizational structure, which is strongly top down controlled and supervised. Cameron states the following about a hierarchy culture: “A very formalized and structured place to work. Procedures govern what people do. The leaders pride themselves on being good coordinators and organizers who are efficiency-minded. Formal rules and policies hold the organization together. The long-term concern is on stability and performance with efficient, smooth operations” [Cameron et al., 1999]. About a Market culture Cameron states: “A results-oriented organization whose major concern is with getting the job done. People are competitive and goal-oriented. The leaders are hard drivers, producers and competitors. They are tough and demanding” [Cameron et al., 1999]. Certainly, one has to consider the very important element of national and the derived organizational culture in setting up ISM within and between organizations. As Bouno suggested, “By uncovering and critically examining the beliefs, values, and assumptions on which the culture is based, organizations can more effectively plan and implement an appropriate cultural integration strategy” [Bouno et al., 1989]. In other words, taking into account the impact of national (and organizational) culture on ISM as outlined above, does open the opportunity for an appropriate design of ISM.

According to the foregoing, our design proposal for a structure of the ISM stakeholders in a Chinese university will be as sketched in Figure 8.4. In that figure the entities and relationships between the entities are depicted in two ways. The highlighted entities and relationships already exist in Chinese practice. The broken line entities and relationships between those entities do not exist today but would be proposed for a future ISM.

The proposed ISM stakeholder structure for a Chinese university in Figure 8.4 is a highly hierarchical structure. Such kind of stakeholder structure is supposed to fit in with the large PDI of the Chinese culture. As we have seen, the Chinese generally accept authority. The proposed stakeholder structure can be divided into three levels, namely the strategic, tactical and operational level. The managerial responsibilities, rights and obligations can be mapped into the relevant levels, respectively. We will briefly introduce and explain the relevant functions of each level within the structure.

At the strategic level, the State Education Ministry is expected to be involved in the ISM of a university, quite common for Chinese universities. The ministry is in charge of the overall policy, for the funding decisions of the universities and for the performance. In that respect, the Ministry is strategically involved in what is happening and what should happen at the universities concerned.

The president of a university is responsible for the entire decision-making, also regarding the strategic decision making about ISM. Naturally, he/she will take into account the briefings and advice from the IT-specialists, from middle managers and from the central ISM office. In all his decisions he will keep close contact with the State Education Ministry. His decisions should be in line with that of the highest managerial level.

Technology specialists are supposed to support the president of the university in their decision-making about technical issues. In Chinese culture, specialists are widely thought to have state of the art knowledge about ICT and IS, both nationally and internationally. Therefore, they are very respected persons, able to work as “the” technical advisors for the top executives of a Chinese university.

On the tactical level, decisions are made regarding the allocation of resources and with respect to the overall policy of the university. Therefore, the most important issues are about the ‘what’ and the ‘how’. Important advisors in this domain are the various specialists on the one hand, and the middle level managers, on the other. The middle level managers are responsible for the explicit fit between the several IS and the departmental business. They are entitled to judge whether the concerned IS are matching the various business requirements. In practice, these managers are empowered to organize and reorganize the business processes in order to fit in with the introduced IS or vice versa. So they are also qualified to put forward the requirements or modifications for the (running) IS. In other words: the middle managers are mainly in charge of what we earlier indicated as Function Management and Application Management. In this respect, the middle level managers will act as the internal transaction processes advisors for the president of a Chinese university.

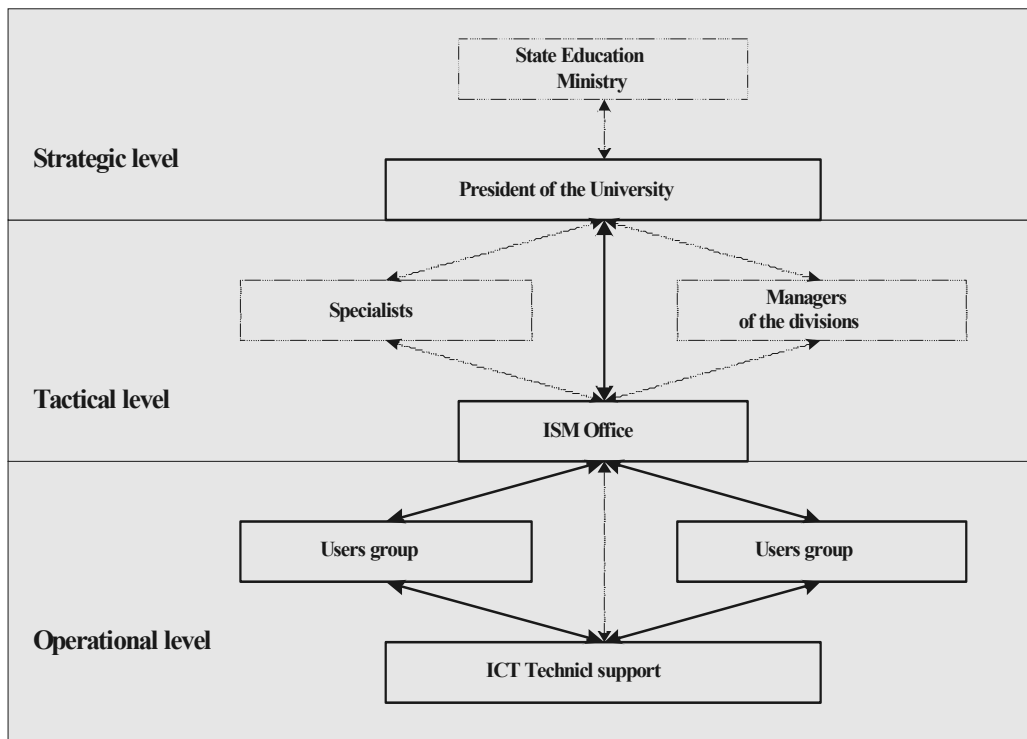


Figure 8.4: The ISM Stakeholder Structure for a Chinese University

In a regular Chinese university one will also find a central ISM office at the tactical level of decision-making. This office is responsible for collecting the information desired both internally and externally, for identifying and analyzing inconsistency problems, and for presenting proposals to the president of the university for possible solutions. The ISM office will act as the leverage advisor for the president of a Chinese university.

The operational level is responsible for the implementation of the several IS, in close relationship with the daily business management requirements. One part is concerning the users who are doing the regular business processing. Another part is the technical support from ICT professionals, who are expected to provide qualified services in order to maintain and to keep running the diversity of IS for the regular business processing.

It is believed that such structure not only fit in with the large PDI of Chinese culture for the top-down mechanism, but also the strong UAI Chinese culture as well, since the tactical level could be the consulting body for the top manager.

8.4 Designing ISM for a Dutch University

In contrast with section 8.3, this section will focus on a design of ISM for a Dutch university. The relevant findings in the previous chapters will be also used as designing considerations for the ISM concept in a Dutch university.

Our research findings substantially reveal that the Dutch reactions on ISM issues pertain to a small PDI culture, consistent with Hofstede’s conclusions. In contrast to the Chinese, Dutch people are not used to accepting strong authority from superior manager levels, but prefer to participate in the decision-making activities in some way or another. At the same time, Dutch people generally accept the opinions of others. Therefore, it is believed that the most significant components in the ISM Cube for a Dutch university are different from the Chinese case. The most important stakeholders are the users, as presented in Figure 8.5.

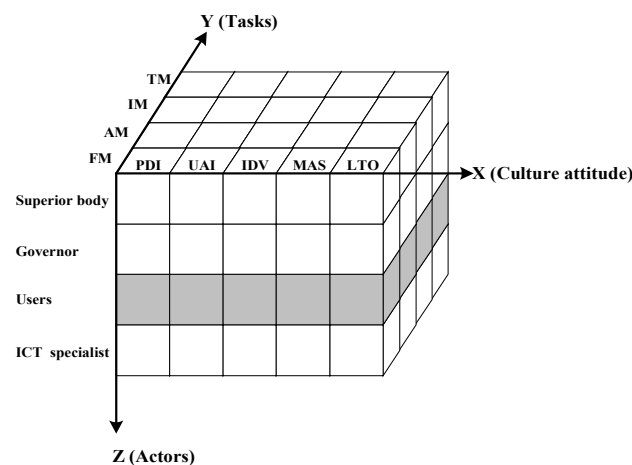


Figure 8.5: The Significant Components of ISM Cube for a Dutch University

Since the Dutch belong to a small PDI national culture, users will obviously play the most important roles in ISM at a Dutch university. Consequently, the benefits and contributions of the users should be highly emphasized. In this way, the impact of the national cultural dimensions PDI, UAI, IDV, MAS, and LTO influences on ISM from the users' perspective should deserve more attention than from the perspective of the other stakeholders. In the following discussion we will focus on how to get the optimal users' contributions for ISM at a Dutch university.

The small PDI Dutch culture makes the Dutch feel equal and therefore they treat others equally at their work places. According to our research findings, the Dutch are eager to be actively involved in the ISM decision-making procedures. In this way, users should and could play the most significant role for ISM. Because users are generally closely related to all the business processes at the operational level, the ISM could be expected to be business driven instead of hierarchy driven. ISM should be user-centered, and the ISM decision-making should be bottom up instead of top down. Furthermore, since users pay more attention to the applications, the ISM is expected to be application-oriented, which relates directly with the four ISM tasks domains: Functional management, Information Management, Application Management and Technical Management.

The weak UAI Dutch culture accepts and tolerates more ambiguity compared to a strong UAI culture. ISM in this case would be restricted less by all kinds of limitations and preconditions from superior management levels. In that sense, the use of IS will be more or less free for everybody. There will not exist extensive supervision nor strict regulations regarding "who will have access to what information" and what information is communicated among the several participating persons at a university. Information management therefore is relatively weak. Each person is his own "information manager".

The high IDV Dutch culture is leading to an individualization of the various ISM tasks. Individual contributions to the (running) IS strongly depend on the individual interest of the several users. In the case where a person does not have high interest, it is to be expected that his contributions will stay at a low profile. It does not help to try to change that kind of an attitude by regulations and managerial supervision. In that type of an (cultural) environment the only thing, which works, is the intrinsic motivation of the users involved. And that motivation strongly depends on the experienced benefits of a system for each user. In that respect, the closed loop principle optimally works in individualized society. Users of IS are "calculating persons", always looking after individual benefits for themselves.

The low MAS Dutch culture indicates that the Dutch pay more attention to the satisfaction of the individual employees. For the ISM, the satisfaction of the implemented or planned IS for the several users should be an important issue. This helps to explain, among others, why the Dutch prefer standardized functions and applications. As we have seen in chapter 7, the Dutch prefer a standardized course style, and disagree with having a flexible course style. This is not only true for the Dutch in general, but also true for all Dutch subgroups, distinguished earlier. Particularly, Dutch students and Dutch teachers & researchers strongly agree with the standardized course style. From a pragmatic point of view, a standardized course style

is efficient and convenient. That could be an important reason why the Dutch are in favor of standardization.

Finally, the low LTO Dutch culture will also influence the users' contributions to ISM. According to the statistical results from our survey, the Dutch like to use mature ICT facilities and products, although the price of those products was clearly excluded in the questionnaire. In practice, if the ICT products exist in the market for more than half a year, these products are generally accepted and reliable. From a pragmatic point of view, the Dutch believe that such kinds of ICT products are "useful" because more people have tested them. In that sense, users do emphasize the "usefulness" in many ways. Again, this stresses that the ISM concept should be application oriented and user-centered.

Based on the foregoing reasoning, we propose the following simple construct of ISM stakeholders for a Dutch university (see Figure 8.6).

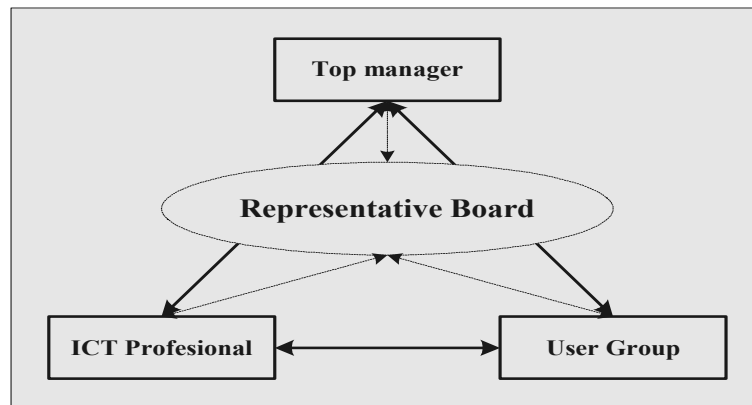


Figure 8.6: The ISM Stakeholder Structure for a Dutch University

The highlighted entities and relationships in figure 8.6 exist already in actual practice. The broken line entity: the representative board does not exist in all cases but could be a very fruitful body in the setting of ISM in a Dutch university. That board can be seen as a coalition body of users, technology service specialists and university managers. It is feasible to construct such a coalition structure because Dutch people are used to it traditionally and culturally. The findings in this research obviously reveal that Dutch people strongly prefer to participate in the decision-making process.

Although the proposed ISM stakeholder structure for a Dutch university is flat and has few hierarchies, there are also three decision-making levels: the strategic, tactical and operational level. However, these three levels overlap and there are no strict boundaries and distinctions of who is in charge for what decision-making level. Decision-making is regarded as a common and shared responsibility.

Earlier we referred to Cameron's study regarding organizational culture and characterized the Chinese culture as a Hierarchy culture. Using the typology of Cameron, one could say that the Dutch culture is a Clan culture or an Adhocracy culture. The main difference between both of these is that the clan culture is internally oriented while the adhocracy has an external orientation. Both cultures are focused on flexibility while the earlier mentioned hierarchy and market culture are strongly

oriented toward stability. Regarding the Clan culture (internally oriented and flexible), Cameron states: “A very friendly place to work where people share a lot of themselves. It is like an extended family. The leaders, or the heads of the organization, are considered to be mentors and perhaps even parent figures. Commitment is high. The organization emphasizes the long-term benefit of human resources development and attaches great importance to cohesion and morale” [Cameron et al, 1999]. With regard to adhocracy, Cameron states: “A dynamic, entrepreneurial, and creative place to work. People stick their necks out and take risks. The leaders are considered innovators and risk takers. The glue that holds the organization together is commitment to experimentation and innovation. The organization’s long-term emphasis is on growth and acquiring new resources” [Cameron et al, 1999].

The foregoing citations characterize some of the culture within Dutch organizations. It may be clear that the characterization corresponds closely to Hofstede’s view of national culture.

8.5 The Contrast between the Chinese and Dutch ISM Concepts

Since national cultural differences profoundly influence ISM, we presented some major findings for ISM for both Chinese and Dutch universities. The proposals presented above take into account national cultural differences. The major differences between the proposed ISM designs for a Chinese and Dutch university can be generalized as follows:

Differentiation in Initiative

From the point of view of the national cultural differences between the Chinese and Dutch, the initiative taking will be very different in the several ISM concepts.

The **Manager’s Initiative** should be highly emphasized for a Chinese ISM. The higher the managers’ interests, the more they will be committed to the ISM responsibilities, and consequently, the more support and coordination from the managers.

In contrast with the Chinese, the **users’ initiative** should be strongly highlighted for a Dutch ISM. In every stage of ISM, the users’ interests are always primary. The users’ satisfaction always dominates. The more users are involved in and committed to ISM, the more successful the IS will be.

Differentiation in strategy

Clearly related to (among others) the PDI, the Chinese approach will be hierarchical and could be characterized as top-down, while the Dutch prefer as low as possible a level of authority and are in favor of a bottom up approach.

Differentiation of the ISM Emphasis

National cultural differences between the Chinese and Dutch pointed to the fact that the practical **emphases** of ISM will be very different. **Control and coordination** should deserve high attention for the Chinese ISM, directly related to the question of how to manage IS in proper ways.

In contrast to the Chinese, **Satisfying** the users' requirements is the most important issue for a Dutch ISM, related to the question of how to manage IS based on pragmatic applications.

Differentiation in number of regulations

In the Chinese concept of ISM, a lot of energy will be spent on regulating the assessment and the access of information. In that respect, information management by superior management levels, including content management, will be an important issue.

On the contrary, in the Dutch culture accessing and assessing information will be more or less free for everybody, except in some particular cases. Information is considered as free for anybody. No strong regulations, no extended access procedures and controls, etc. Having all these regulations would be in contradiction to the Dutch culture.

8.6 Some Remarks about a Culturally Influenced ISM Design

The findings and observations in this research revealed that both the Chinese and Dutch culture fundamentally influence ISM. In the previous section we indicated an ISM design, taking into account the various cultural impacts. However, it is necessary to also point out other parts of our research findings. As we have seen, regarding the several hypotheses of this research, ISM actors reacted differently from the presumed. The following examples particularly deserve our attention in designing a culturally influenced ISM.

First, all Dutch ISM actors disagree with the individualization of FM and AM, which is reversed with the research hypotheses, as well as with the Dutch individual culture characteristic. We think the possible reason is that the Dutch adapt their attitudes over time because of their experiences and lessons in the past with an individualized concept. Dutch people do not insist anymore on the individualization because they have experienced a more central approach for FM and AM as being more convenient and more effective. In this regard, the Dutch individualized culture characteristic changes in some ways over time.

Another example is that the Chinese students group reacted very differently on the relationship FM-PDI compared with the Chinese national group. The students favored choice is that management rules for IS should be made by all representatives at the university, although they accept that such rules could be made by superior management. This attitude reminds us that the Chinese attitudes on PDI sometimes are different between seniors and juniors (see the reversed item in Table 7.7). If the juniors keep that very different attitude over time when they become managers, the Chinese high PDI culture will change in the long run.

The third example is that both Chinese and Dutch ICT professionals reacted differently with their national groups on some questions. Particularly, the attitudes of Chinese ICT professionals group are quite different from the Chinese national group on many ISM questions (see the reversed items in Table 7.10 and 7.12). Such

reactions suggest that the IS environment and IT technology influence the attitudes of the Chinese ICT professionals substantially. It may be expected that the more Chinese access modern ICT technology and products such as the Internet, the more the attitudes and viewpoints of the Chinese will change. It is therefore likely that the Chinese culture will change with further introduction of modern information and communication technology.

The last example is the data from a pilot survey study of this research that reveals an interesting phenomenon. The attitudes of Chinese students are very different if they studied abroad longer than for two years. Especially, on some questions related to PDI and UAI, their attitudes are neither different from the Chinese national group, nor different from the Dutch group, but are more or less in the middle between the Chinese and Dutch. This example indicates that people will adapt their attitudes and viewpoints if they frequently communicate to others from different cultural backgrounds.

All examples above indicate that culture is dynamic, not static. People will not react as always from generation to generation without any change. In fact, culture can be changed in many ways, based on peoples' mutual communication, understanding, and progress. With the rapidly developing trend of globalization, the differences between national cultures will also be affected. From this point of view, it would be necessary to study cultural influences on ISM in a longitudinal way, because cultural influences on ISM change over time. It would be risky to use cultural research theory and outcomes without considering the potential dynamics. Outcomes of classical cultural research could be out of date and therefore also the design concepts of management and organization.

Since culture is dynamic, the design of a culturally influenced ISM will always be open-ended. In practice, it is not possible to design an all-purpose scheme for ISM, which can be used anywhere, anytime. In this regard, the national cultural influences will remain critical challenges for IS researchers, practitioners and producers of ICT products and services in a global world.

8.7 An Example of ISM for an International Course

In previous sections we sketched ISM designs for the Chinese and Dutch organizations, taking into account the strong impact of (national) culture. As an application, in this section we provide a practical example for illustrating how to use ISM design rules in a particular case. As a case we selected an existing international course, named the HKNET project. We now describe what has to be done in the ISM domain for a university course.

8.7.1 The Backgrounds of the HKNET

“The HKNET project started in 1998 between the City University of Hong Kong and the Eindhoven University of Technology” [Vogel et al., 1998]. Since then, the project has continued and more universities have become interested and involved. In 2003, five universities participated in this project from different parts of the world: the City

University of Hong Kong in China, the Eindhoven University of Technology, the Tilburg University and the University of Groningen in the Netherlands, as well as the University of Central Florida, Orlando in U.S.A. This Master's course on ICT and related issues at these universities has participation of many students, working together in teams on special assignments.

The HKNET project invites students to work as virtual teams. Team members from multiple continents and cultures collaborate on a joint assignment. The project normally lasts approximately six weeks. At the end of the project, "The output of the virtual team will be an integrated description of the Asian, European and American perspectives of their subject. The entire team will receive the same grade from the Dutch, American and Hong Kong instructors" [Bemelmans et al., 1999, 2000, 2001, 2002].

According to recently internal scripts of HKNET [Bemelmans et al., 1998, 1999, 2000, 2001, 2002 and Genuchten et al., 2003], the objectives of the HKNET can be generally summarized as follows:

- To gain insight into the current situation of IT-developments in Europe, Asia and America on a certain subject.
- To increase understanding of the global differences and similarities of the subject.
- To experience co-operating with team members at large distances from different cultures and different time zones.
- To experience using a remote Group Support System.
- To become familiar with several applications of GroupWare, an invaluable support for your study and for your (future) profession.
- To evaluate working in virtual teams and how IT changes the world.
- To become more sensitive to the cultural richness of international cooperation.

The project experiences in recent years have been interesting: "The team members will discover that finding a structured approach to their assignment and reaching consensus in their team will turn out to be quite a challenge" [Genuchten et al., 2003].

Compared to the traditional teaching at universities, the HKNET project proceeded in a very different way. The most significant differences are distant communications, virtual collaboration and negotiations, as well as multinational ISM. The project provides a special opportunity for students to study not only the national culture related research issues as mentioned above, but also the national culture related management issues, such as modern higher education management and ISM in a global environment. One of the Chinese universities in Beijing would like to join the project. The initiators of the project both in the Netherlands and Hong Kong are willing to start this project in China.

In order to set up such a project at a university in Beijing, the previous findings and the design approaches will be applied as a practical example for designing ISM. In the following subsections, the relevant matters will be discussed in detail.

8.7.2 The Identification of Tasks and Actors for Setting up HKNET in China

Identifying the Tasks for HKNET Management

According to the HKNET documents mentioned above and the course information for students [Barrell, 2003], as well as our previous study (see chapter 4), the tasks of the HKNET management could be divided into FM, AM, IM and TM as follows.

- **FM: (Function Management)** includes Asynchronous Communication, such as a group discussion board, virtual classroom, file exchange and e-mail functionality and Internet search services. FM also includes the rules of play as well as the roles and responsibilities of students and teachers, which will regulate the behavior of the individual participants of the project.
- **AM: (Application Management)** provides blackboard, e-mail (or alternative tools), and Microsoft front-page software, group ware software, Internet, several security packages, etc., which can be used by the participants during the project.
- **IM: (Information Management)** refers to the regulations regarding information content, created by all participants during the project. It could include the research assignment items, the content of the general discussions, the group discussions, and the final deliverables from the various teams. It also covers the supervising information from all teachers, as well as the relevant monitoring messages from the ICT specialists. IM has to set clear rules for who has access to what information and who has the task of assessing the corresponding deliverables. Questions related to whether only teachers are allowed to give assessments and final marks or whether students are also involved in assessing their own work and their level of team cooperation need to be answered. In the original set up of HKNET both students and teachers were involved in several assessment tasks. Regarding access rights, almost everybody was able to get most information from anyone. In that sense, information was more or less free for everyone.
- **TM: (Technology Management)** has to support all technical facilities, platforms and relevant interfaces, such as Web Servers, PC's, Internet, firewall provisions, Groupware tools, Videoconferencing facilities, telephone facilities, etc. All universities involved so far could use the already existing infrastructure of technical facilities, so, in fact, no extra investments had to be made, except the implementation of special Groupware. For universities that join later that may not be the case. Joining the HKNET will imply that many technical provisions have to be made available, possibly requiring extra investments in hardware and software.

Identifying the Possible Actors of the HKNET

The prospective actors of the HKNET at the Beijing University could be identified as follows:

- **Superior Body:** a control body outside the university;
- **Managers:** the internal management offices and managers;
- **Teachers:** responsible for giving lectures and for delivering and supervising the course;
- **Students:** formally registered as students and allowed to follow the course;
- **ICT specialists:** responsible for all technical issues during the course.

Identifying the Significant Components of a HKNET ISM Cube

Referring to our earlier findings in the chapters 6, 7 and 8, the HKNET project management could be depicted with the ISM Cube specified previously. If we denote the actors of the HKNET as a set {Superior body, Managers, Teachers, Students, ICT specialists} on the Z axis, and the national culture and ISM tasks on the X axis and Y axis respectively, the HKNET ISM Cube looks like Figure 8.7. The most significant components can be depicted as the shaded parts in the cube.

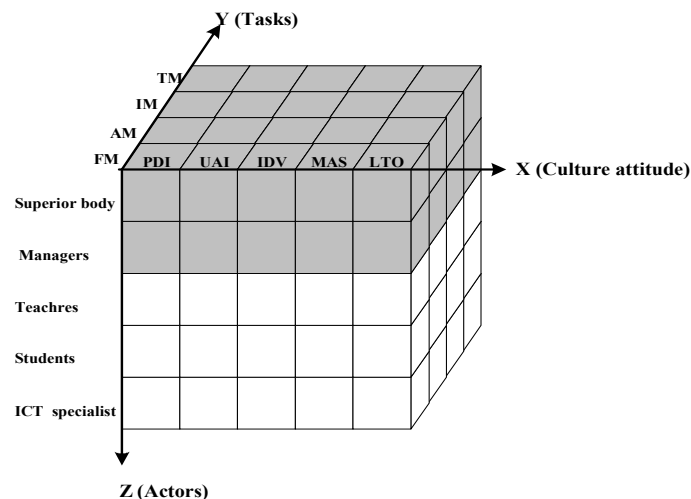


Figure 8.7: The Most Significant Components of the HKNET ISM Cube

Figure 8.7 indicates that the superior body and the internal managers would play the most significant roles for the HKNET project in China, as indicated earlier in this chapter regarding an ISM design in China. Based on the identified significant components of the HKNET ISM Cube, we illustrate the relationships between the actors of the HKNET project and the management of HKNET, based on the “Closed Loop Principle” and the framework specified in the previous subsections.

8.7.3 Designing ISM for HKNET in China

Contributions and benefits from HKNET for the various ISM Actors

- **Superior Body:**

Generally speaking, the superior body of the university will not directly be involved in ISM in practice. However, some regulations and rules do exist regarding information use and exchange from the Superior Body, which it will check and control. For example: it is strictly forbidden to produce, deposit, duplicate or exchange information that may hinder public order.

The benefit of a HKNET experiment for the Superior Body would be to build up an international environment, where one can integrate Chinese teaching, studying and education management with the European, American and Hong Kong model.

- **Internal Managers:**

The Internal Managers include administrative offices and officers in the high and middle levels within the university. They are responsible for carrying out the guidelines that come from the superior body in general, for examining the various IS projects and for approving the financial budgets for the necessary investments and operational expenses. Therefore, the internal managers are expected to play the real key management role in a case such as the HKNET project.

The benefit for managers will be the honor of having a new advanced teaching approach at the university, providing a multinational culture environment that can be used to observe and study several international issues.

- **Teachers:**

Teachers will play two kinds of participant roles in the HKNET project. One is the executive role, responsible for initiating and conducting the project, generating reports and summarizing project results, achievements and lessons learned, etc. Another role is teaching, responsibility for lecturing and supervising the students during the project, helping and guiding students to finish their assignments on time and in the proper way.

Teachers will have special benefits, for example, having the opportunity to interact with an international environment locally, guiding students from abroad, studying national cultural differences, exploring critical factors of global cooperation and collaboration, and questing for international software management issues, etc. In short: the real benefit for teachers will be job enrichment.

- **Students:**

Students will play a significant role in the HKNET project. They need to contribute their time and effort to the project. In order to finish their assignments in the proper way and on time, they have to work as a virtual team. That will bring extra difficulties due to cultural differences, different time zones, and different backgrounds of the students involved. From an efficiency point of view, some students may prefer to work alone without initially recognizing the need to reach (time consuming) consensus with their teammates.

The benefits for students will be diverse. During the project, students will experience modern ICT-tools that support their team's processes, they will gain knowledge about working in virtual teams, and will also experience issues such as distant communication, negotiation, and collaboration in an international mode, not only

from a technology perspective, but also from a multicultural perspective. In addition, students will learn state-of-the-art software applications, as well as software management theory and practice.

• **ICT specialists:**

ICT specialists will be responsible for all technical issues. They are expected to provide the necessary technology to keep the project running properly. Their work will facilitate the availability, reliability, continuity, controllability, interoperability and security of the whole technical system.

The ICT specialists will also benefit from such an international experiment like HKNET. They will have the opportunity to become familiar with modern ICT technologies. In addition, they are expected to get more advanced knowledge and experience in dealing with international distance communication facilities, as well as the relevant application approaches.

The Crucial Role of Managers in a China Implementation of HKNET

As stated before, the most crucial roles will be played by the superior body and the various university managers. Due to the fact that the superior body has only an indirect role in local university ISM, we will highlight in the section below the role of managers.

First, managers will be very concerned about Function Management of HKNET. They will think and puzzle about the rules, regulations, responsibilities and obligations that are all closely related with a HKNET project. Especially the question “Who is entitled to do what?” will be raised.

Second, managers will also pay extra attention to the Application Management of HKNET. Questions to be addressed will be:

- What kind of software packages will be adopted?
- Who will provide them?
- How much will be the expenses?
- What about the controllability, interoperability, compatibility and the maintainability of the applications?
- What about the necessary information resources (internal or external)?
- What kinds of information activities are necessary for what package of software?

All questions above will be influenced by all national culture aspects (PDI, UAI, IDV, MAS and LTO). Consequently, detailed analysis will be very important, to see what the managers’ roles will be and how and why they are executed as they are.

Third, managers will certainly be concerned about Information Management Questions, such as: allocating access rights of information, information censoring, information updating, information publishing, information dissemination, information abstracting, information editing, information deleting etc. The typical questions related to IM will be:

- Should all teachers have the same rights to deal with the information in the HKNET experiment?
- Should all students have the same rights?
- Should students have the same information available as the teachers?
- To what extent should ICT professionals be involved in IM?
- How can it be guaranteed that the right person will act on the right information?

Naturally, all of these questions above are also influenced by the varied Chinese cultural characteristics. As stated before, one can expect from that perspective that Information Management will be much more an issue in China than in all other countries involved in HKNET. Due to the fact that information is not free for everybody in China, one can expect that many rules and regulations will be presented by university management to prevent misuse of information in one way or another. Needless to say, much effort will be involved in supervising and maintaining rules and regulations! Therefore, concise and precise prescriptions are expected.

Fourth, university managers will consider Technical Management, such as ICT infrastructures and facilities, as well as the system platform to be used. Particularly, they will pay attention to the technical differences between the local situation and the international situation. They will admit a different hard- and software infrastructure for that international experiment (if all other questions mentioned before are addressed properly), as is normally the case for the local university situation. In that sense, participating teachers and staff will enjoy a privileged position. Certainly, managers will be very selective in deciding who is allowed to participate. They will certainly ensure that their local people who are involved in the project (teachers as well as students and technical staff) are qualified.

The foregoing has presented the considerations from the managers' perspective on ISM, as influenced by the Chinese national cultural background. In the following section, the procedures of starting HKNET project in China will be briefly discussed. As is also the case in other countries, starting and running a project will go through a project cycle. In the case of China that cycle will consist of the following main steps: project introduction, specification, explanation, mutual visitations and last, but not least, the formal agreement.

- **Project Introduction**

The first step will be an introduction of the project to the managers involved. That introduction can be formal or informal. The content of the introduction should be clear, precise and reliable, and addressing, in particular, the basics of the project, the benefits for the university, in general, and for the managers, the issues to be regulated and peculiarities, such as time scheduling and costs. If the introduction fails to convince managers of the benefits and advantages, the project will have to be abandoned.

- **Specification**

After a successful introduction, it is quite normal to receive various questions about starting and running the project. These questions could be related to any aspect of the project, such as functionality, application management, and

information and technology management. In order to answer all these questions properly, detailed specifications need to be in place since this is very helpful in reducing ambiguity and uncertainties for the Chinese.

- **Explanation**

Although the majority of questions will be answered by the previously mentioned specification, some questions or confusion might still remain in practice, again because of national cultural differences. Patience will be necessary for the project initiator and to have as many as possible necessary explanations provided. This is particularly useful in gaining confidence in the project. Managers should feel confident that the project would not harm their superior orientations, as well as their management guidance. Things should be interpretable and predictable.

- **Mutual Visitations**

When all previous steps have been passed successfully, it will be advantageous to take time for mutual visitations for both sides (managers as well as project initiators). Face-to-face communication and site visits are highly recommended in this step. On the one hand, it helps to make sure that everything is clear and no unexpected things are going to happen; on the other hand, it is important to become familiar with one another before the final 'go-no go' decision is made.

- **Formal Agreement**

The last step before starting a project is to get a formal agreement. Chinese people are used to having a (formal) procedure for this purpose. The basic element of that procedure is for the responsible management to have a formal moment of declaring its decision. In that sense, it has also a symbolic value in reinforcing the (formal) decision power of management. The formality in China can be very simple in context but is very important indeed for getting the formal approval for a project. Normally, there will be a formal ceremony for signing an official agreement.

The foregoing has sketched the major steps in recommending how a project could be handled from the beginning. Due to several characteristics of the Chinese culture, it has to re-emphasize continuously that management has to play a key role in decision-making. In that sense, it looks like a very formal procedure in which all the elements of Chinese decision-making are recognizable as described earlier in this chapter.

8.8 Chapter Summary

In this chapter, a framework for the design of ISM was presented and issues of ISM for both Chinese and Dutch ISM universities were elaborated upon. The aim of this description was to answer the question: How can we set up and organize an ISM concept by taking into consideration national cultural differences? Our design framework was based on our research findings on both the Chinese and Dutch culture. Starting with these results, we sketched a framework for Chinese and Dutch ISM. Subsequently, an ISM stakeholder structure for both the Chinese and Dutch was presented respectively. The main differences between the Chinese and Dutch ISM concepts were examined. We explained that culture will not be static but will be

dynamic and so will change over time. This, in fact, makes multi-longitudinal studies necessary in order to take into account the cultural impact on ISM concepts. Finally, for a practical example, we applied the design framework to an international Master's course for demonstrating the value of our approach in initiating an educational project at a Chinese university in Beijing. We were trying to illustrate again the huge impact of national culture on those projects, especially regarding the role of management who are in charge of final decision-making.

9. Conclusions and Recommendations

9.1 Conclusions of the research

The results of this research confirmed that national cultural differences do exist and also influence considerably ISM from many aspects. Our study regarding the impact of the national cultural differences on ISM between the Chinese and Dutch revealed the following:

The extent of accepting the authority of ISM is more prevalent in the Chinese culture than in the Dutch culture.

The extent of avoiding the uncertainty of ISM is more prevalent in the Chinese culture than in the Dutch culture.

The extent of individualization of ISM is not always more prevalent in the Dutch culture than in the Chinese culture.

The extent of masculinity of ISM is more prevalent in the Chinese culture than in the Dutch culture.

The extent of long term orientation of ISM is more prevalent in the Chinese culture than in the Dutch culture.

Based on the research findings, the insights into the cultural impact on ISM can be summarized as follows:

- The national cultural aspect PDI fundamentally influences ISM much more than all other national cultural dimensions (UAI, IDV, MAS, and LTO), because it determines in practice who will play a prime role in ISM. In this research, the findings indicate that managers will play a very significant role of ISM in China (see Figure 6.5 and Figure 7.5). However, end-users will play a very important role in The Netherlands (see Figure 6.6 and Figure 7.6). Therefore, in a country with a large PDI, people in the various managerial levels should have the prime role in an ISM design. By contrast, end-users should have the prime role in a small PDI country. This suggests also that the management emphasis and involvement will be quite different between a large and a small PDI culture.

- Depending on PDI the orientations on ISM will also be quite different. In a large PDI country, ISM will be service oriented to the various management levels. Moreover, ISM will be administrative-driven and top-down oriented. In a small PDI country, ISM will be service oriented to all end users. ISM will be application-driven and bottom-up oriented. It is for that reason that the design approaches for, as well as the development and the maintenance of information systems, will be quite different between large and small PDI countries.
- The Uncertainty acceptance also significantly influences ISM. Although the requirements such as availability, compatibility, controllability, adaptability, flexibility, interoperability, durability, maintainability, and reliability are the same in both strong UAI and weak UAI countries, the bias in a strong UAI country will be the realization of predictable management and control. It is preferred to eliminate all uncertain events and the unexpected events. This helps to explain why the information systems are differently organized in practice at the Xi'an Jiaotong University and the Eindhoven University of Technology.
- Masculinity versus femininity also influences ISM. This is indicated in the findings in this research, both the survey data as well as the observed examples. In a high MAS culture, more attention will be paid to the several IS from the functional and technical perspective. In a low MAS culture, more attention will be paid to the IS from the application point of view, which is directly related to the end users.
- The national cultural dimension LTO impacts also ISM. The findings of this research reveal that people from a high LTO culture prefer new technology and slow updating of applications. On the contrary, people from a low LTO culture prefer mature technology and quick updating of the various applications.
- National culture *might not always dominate* the people's attitude and behavior as also shown in this research (see chapter 6 and chapter 7). For example, the Dutch responses about individualized applications of IS are not consistent with the Dutch individualism. Furthermore, both Chinese and Dutch ICT professionals reacted differently in some ways as expected from their national cultural characteristics. As we have indicated, national culture can change because of certain circumstances, such as the living, working and communicating environments. In this regard, we are confidently to say, national culture is *dynamic* in the long run. Consequently, it might be dangerous to use the cultural research theory, such as Hofstede's model, simply as a "formula" without taking into account the possible dynamics of culture in practice. In fact, one should always investigate and examine the people's attitudes very carefully before applying the stereotypes or platitudes of culture to particular (management) issues.

The research findings discussed above contribute to a deeper understanding of the impact of national cultural differences on ISM. They also contribute to the design of an appropriate ISM in practice. The key achievements of this research can be formulated as following:

1. Our research results reveal how and why national cultural differences influence ISM (see the differences in ISM between Chinese and Dutch). In this respect, the investigations of our research present a direct relationship between national cultural differences and the set up of information systems management.
2. The ISM Cube created in this research specifies the many relationships among national culture characteristics, ISM actors and ISM tasks in general. The Cube not only helps to describe the relationships, but also helps to understand and analyze those relationships.
3. The research findings also provide some very useful conclusions regarding the dynamics of the culture over time. The national culture is dynamic and can be changed in the long run. Therefore, it is necessary to treat cultural issues cautiously and carefully before applying results reported in earlier literature.
4. At the end of our study we presented a framework for designing an appropriate ISM in practice. That framework of a design of an internationalized ISM provides a useful clue for embedding national cultural attributes and constructing an ISM stakeholder structure. The framework makes clear what attention points are the most relevant ones and what perspectives should be taken as the prime perspectives.

9.2 Recommendations for further research

As mentioned at the beginning of this research, we focus only on the national cultural influences on ISM. The research findings and solutions provided previously are meaningful and useful for the design of an internationalized ISM. It helps to understand the national cultural influence on ISM from both a theoretical and practical point of view.

An internationalized ISM faces other external influential factors. Apart from national culture, other country specific factors also deserve a detailed study. We discussed some factors earlier in our study such as the political environment, the legislation/regulation, the economic situation of a country, the impact of organizational structures, and influence of the technological environment (see chapter 3). At the beginning of our research, we mentioned that studying the national cultural impact on ISM would lead only to limited conclusions. The impact of all other factors has not been taken into account. Therefore, further research should consider the

influence of other external country specific factors on ISM. Particularly, it would be meaningful and useful to find out which country specific factors are the most prime and significant, dominating the best design of information systems management.

During the development of this research, we committed ourselves to studying how to deal with the national cultural influences on ISM in a proper way. Our design solutions proposed are related to some national cultural traits. We cannot claim that our research is complete in this respect. For example, we were not able to quantify the impact of national culture on the efficiency and effectiveness of certain ISM designs. Therefore, the direct implication and conceivability for further research could be how to cope with that type of question and to analyze further the effectiveness and efficiency of several alternative ISM designs.

A last recommendation for further research would be the following: research regarding ISM in general is very rare. There does not exist substantial serious literature about ISM, compared to the many books and articles regarding the design and development of new information systems. That is to say that ISM and the belonging tasks of ISM are undervalued, compared to other (computer science) subjects. We recommend that much more research needs to be done in the domain of ISM, taking into consideration the enormous (economic and societal) importance of already existing and running information systems. The main effort should not be only in the area of developing new systems, but also should be in the area of the appropriate management of existing information systems. If not, the IT sector would cause a continuous capital destruction and would create a tremendous and probably unsolvable legacy problem.

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Appendix A: Questionnaires (in English)

Dear Sir or Madam:

I would be grateful if you could spare some time (approximately 20 minutes) to respond to the following questionnaire. Your responses will provide valuable data for a research study that looks at the impact of different national cultural backgrounds on information systems management at universities. All the results will be treated anonymously. Anyone who is interested in the results can add a note to that effect. I will make sure to send a summary to you after collecting all the results.

I would appreciate very much if you could return your responses back to me as soon as possible.

You might be involved more or less in the information systems discussed here. In any case I would like your reaction.

In completing the following sections, try to reflect on the following questions and fill **all of the questions** in your personal opinion.

With regard to each item, please fill a “v” in case you agree and would say **Yes** to the corresponding question, otherwise skip the item.

There are also questions with multiple choices,

-2 -1 0 1 2

[] [] [] [] [] please **mark your single selection** from the 5 choices.

The meaning of these choices is explained as follows:

-2 is **strongly disagree**

-1 is **disagree**

0 is **indifferent**

1 is **agree**

2 is **strongly agree**

Thank you very much for your help and cooperation. I am looking forward to your response.

Questionnaire 1: Student Information System (SIS)

The SIS mainly has three categories of information. One orients to the administration of the students at the university; such as registrations, tuition fees, grade reports, teaching plans and so on. The other one is meant to teachers and students for the daily education activities. The third one is to provide special communication facilities between teachers and teachers, students and students, as well as teachers and students.

A0. What information should in your opinion be collected for a SIS:

	yes
Curriculum schedules	<input type="checkbox"/>
Teaching materials	<input type="checkbox"/>
Student home work and answers	<input type="checkbox"/>
Former exam papers and answers	<input type="checkbox"/>
Required previous courses	<input type="checkbox"/>
General information regarding the course	<input type="checkbox"/>
A course literature list	<input type="checkbox"/>
Courseware: (e.g.: study materials, readers, electronic books, video tapes)	<input type="checkbox"/>
Instruction on how to use the SIS	<input type="checkbox"/>
Rules and regulations for using the SIS	<input type="checkbox"/>
Course assessment information	<input type="checkbox"/>
Students opinions about courses	<input type="checkbox"/>
Teachers personal information (e.g.: homepage)	<input type="checkbox"/>
Other (Please mention it):	<input type="checkbox"/>

A1. Who should make the rules and regulations for the functional management of a student information system (SIS)?

	-2	-1	0	1	2
Ministry of education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The university administrative department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The university ICT department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The SIS system manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Representatives from all user groups: (e.g.: teachers, students, ICT managers, and administrative managers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A2. Who should have the formal authority to ratify the contents of a SIS?

Ministry of education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High-level specialists outside the university	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Central university administrative department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The group/department in which the teacher is working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Each teacher himself who is involved in the teaching activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A3. Who is in charge of evaluating courses?

	-2	-1	0	1	2
Specialists invited by the Ministry of Education	[]	[]	[]	[]	[]
Specialists invited by the Local government	[]	[]	[]	[]	[]
Peer invited by the university	[]	[]	[]	[]	[]
Self-evaluation (departments or faculties that provide the courses)	[]	[]	[]	[]	[]
Students who followed the courses	[]	[]	[]	[]	[]

Other option:

A4. Who should be able to access student's evaluations of courses?

the dean (or chairman) only	[]	[]	[]	[]	[]
the teacher himself	[]	[]	[]	[]	[]
all staff	[]	[]	[]	[]	[]
all students	[]	[]	[]	[]	[]
anyone both inside and outside the university	[]	[]	[]	[]	[]

Other option:

A5 Which automated communication facilities do you prefer?

(CSCW—Computer Support Collaborative Work)					
(BBS—Bulletin Board Systems)					
Groupware, CSCW (BBS) in public and anonymous?	[]	[]	[]	[]	[]
Groupware, CSCW (BBS) in public but not anonymous?	[]	[]	[]	[]	[]
Private interaction? (e.g.: email between student and teacher)	[]	[]	[]	[]	[]

Other option:

A6. What kind of format for the several courses should be used in a SIS?

A standard style for all courses in the SIS	[]	[]	[]	[]	[]
A standard style for required courses only and free style for elective courses	[]	[]	[]	[]	[]
Free personal style for all courses as the teacher likes	[]	[]	[]	[]	[]

A7. Should students be allowed to tailor elective courses, provided through the SIS?

Students are not allowed to tailor any part of the course	[]	[]	[]	[]	[]
Students can choose some parts of the elective courses	[]	[]	[]	[]	[]

- in a predefined way -2 -1 0 1 2
 Students are free to tailor any part of the course [] [] [] [] []
- A8. What do you think about the number of management rules and regulations of SIS? **(please choose one)**
- As many as possible to limit uncertain use of SIS [] [] [] [] []
 As less as possible to provide convenient use of SIS [] [] [] [] []
- A9. What would you prefer to do in case the SIS is misused? **(please choose one):**
- give a warning to the user [] [] [] [] []
 give a penalty to the user [] [] [] [] []
- A10. Do you think it is necessary to collect and publish the following information from students, teachers and the relevant administrators regarding the SIS?
- Degree of satisfaction with the content [] [] [] [] []
 Degree of satisfaction with the system itself [] [] [] [] []
- A11. How flexible should a SIS be maintained? **(please tick one)** yes
- Anytime if necessary []
 1~2 year []
 2~3 year []
 >3 years []
- A12. How often should the contents of course in SIS be updated? **(please select one)**
- any time if the teacher wants []
 1~2 year []
 2~3 year []
 >3 years []

Questionnaire 2: Research Project Information Systems (RPIS)

RPIS is mainly dealing with three aspects. The first one is to provide report information to the relevant administrative departments at university, stockholders, financial sponsors and governments etc. The second one is to provide communication facility for the research team members. The rest is to provide a valuable resource for exchanging information on a campus website for people both inside and outside university.

B0. What information should be collected for RPIS:

	yes
The aim of the research project	<input type="checkbox"/>
The participants of the research project	<input type="checkbox"/>
The origin of the research project	<input type="checkbox"/>
The financial supporters of the research project	<input type="checkbox"/>
The expenses of the research project	<input type="checkbox"/>
The (planned or realized) start date of the research project	<input type="checkbox"/>
The (planned or realized) end date of the research project	<input type="checkbox"/>
The research area in which the project takes place	<input type="checkbox"/>
The relationships to other research projects	<input type="checkbox"/>
Project results (e.g. publications) per year	<input type="checkbox"/>

Others:

B1. In what order should the project participants be listed in the Research Project Information System (RPIS)?

	-2	-1	0	1	2
Ordered by administrative title	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ordered by academic title	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ordered by project responsibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ordered by project manager first, others in alphabet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ordered all by alphabet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B2. Who is responsible for providing project information to RPIS?

Only the project manager can provide project information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The person who was appointed by the project manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The person who was proposed by the project team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anyone who is a member in the project team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B3. Which expected project results should be published in RPIS?

Expected achievements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expected publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expected impact on economic or society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B4. Which automated communication facilities do you prefer in RPIS ?

(CSCW—Computer Support Collaborative Work)
(BBS—Bulletin Board Systems)

- | | -2 -1 0 1 2 |
|---|---------------------|
| Paper report in electronic version | [] [] [] [] [] |
| Groupware, CSCW (BBS) in public and anonymous? | [] [] [] [] [] |
| Groupware, CSCW (BBS) in public but not anonymous? | [] [] [] [] [] |
| Group interaction within the research team | [] [] [] [] [] |
| Private interaction?
(e.g.: an email between members of research team) | [] [] [] [] [] |
|
 | |
| B5. What kind of forms do you think should be used for the RPIS? | |
| A standard style and fixed items | [] [] [] [] [] |
| A standard style but flexible items | [] [] [] [] [] |
| Both flexible style and items | [] [] [] [] [] |
|
 | |
| B6. What is your opinion about what information should be stored in a RPIS? | |
| Only items the research group agree upon | [] [] [] [] [] |
| Only items, important for the control of the project | [] [] [] [] [] |
| All of the discussed items | [] [] [] [] [] |
|
 | |
| B7. Which information on the impact of the research project should be provided in RPIS? | |
| positive research results to the society or economics | [] [] [] [] [] |
| negative research results to the society or economics | [] [] [] [] [] |
| limitations of the research projects | [] [] [] [] [] |
| deficiencies of the research projects | [] [] [] [] [] |
| experiences of the research projects | [] [] [] [] [] |
| lessons learned of the research projects | [] [] [] [] [] |
|
 | |
| B8. Do you think it is necessary to include the following information in RPIS ? | |
| Potential negative aspects of the research project | [] [] [] [] [] |
| Potential shortcomings of the research project | [] [] [] [] [] |
| Potential social benefits of the research project | [] [] [] [] [] |
| Potential achievements of the research project | [] [] [] [] [] |
|
 | |
| B9. Do you think the following information is important for you from RPIS? | |
| | yes |
| Current research projects | [] |
| Current relevant research information | [] |
| Finished research projects | [] |
| Research plans for next year | [] |
| Research plans for next 5-10 years | [] |

Others:

B10. How often should a RPIS be updated as far as system structure is concerned ? **(please select one)**

- Anytime it is necessary
- 1~2 year
- 2~3 year
- >3 year

- yes
-
-
-
-

Questionnaire 3: Human Resource Information System (HRIS)

Human resource information includes all staff information for administration and management purposes at a university. Some of this information can be shared by managers, staff, students and even people outside of university on the campus website. It is also very important to know the right information from HRIS for finding a right place and a right person.

C0: What information in your opinion should be placed on the HRIS:

	yes
General business policy	[]
Management policy	[]
Human resource policy	[]
Employee's rights	[]
Staff information	[]
Statistics based on staff information	[]
Salary information for the staff	[]
Well-being information of the staff	[]
Regulations and rules of the organization	[]
Organization role information	[]
Personal website information	[]
Vacancy information	[]

Others:

C1. Who is responsible to provide recruiting information for HRIS ?

	-2	-1	0	1	2
The personal department of the university	[]	[]	[]	[]	[]
The faculty, school or institute	[]	[]	[]	[]	[]
The department	[]	[]	[]	[]	[]
The working group	[]	[]	[]	[]	[]

C2. Who is responsible for ratifying recruiting information for HRIS?

The personal department of the university	[]	[]	[]	[]
The faculty, school or institute	[]	[]	[]	[]
The department	[]	[]	[]	[]
The working group	[]	[]	[]	[]

C3. What is your opinion having free access to staff information?

Only managers information is accessible	[]	[]	[]	[]
Only famed academic persons are accessible	[]	[]	[]	[]
All staff is accessible	[]	[]	[]	[]
Non of the staff should be listed but the information of staff can be found if the name is known	[]	[]	[]	[]

- C4. What should be the orientation of the HRIS ?
- | | |
|---|---------------------|
| | -2 -1 0 1 2 |
| Administration oriented | [] [] [] [] [] |
| Communication oriented inside of the university | [] [] [] [] [] |
| It should be a “window” to show the university | [] [] [] [] [] |
- C5. Do you support the set up a BBS (Bulletin Board Systems) to collect anonymous information for management?
- [] [] [] [] []
- C6. If we have “C5” functionality, who can access this information?
- | | |
|-------------------------------------|---------------------|
| Managers only | [] [] [] [] [] |
| Managers and appointed persons only | [] [] [] [] [] |
| Relevant persons only | [] [] [] [] [] |
| All employee | [] [] [] [] [] |
| All people if they want | [] [] [] [] [] |
- C7. Do you agree that HRIS should include the following individual personal information?
- | | |
|---|---------------------|
| Personal private information
(such as the family information if the staff likes) | [] [] [] [] [] |
| Personal various interests | [] [] [] [] [] |
| Personal hobbies | [] [] [] [] [] |
| Personally provided resume | [] [] [] [] [] |
- C8. Do you agree/disagree with storing the following information in HRIS?
- | | |
|---|---------------------|
| The information about personal performance in relation to salary | [] [] [] [] [] |
| The information about education and training facilities and/or requirements | [] [] [] [] [] |
| The information about job requirements, vacancies etc. | [] [] [] [] [] |
| The information on participative decision making about labor conditions, job satisfaction, etc. | [] [] [] [] [] |
- C9 Do you agree to include data of satisfaction in HRIS?
- | | |
|------------------------------------|---------------------|
| About the staff’s job satisfaction | [] [] [] [] [] |
| About the information in the HRIS | [] [] [] [] [] |
| About the system’s functionality | [] [] [] [] [] |
- C10. How often should an implemented HRIS be update (**please select one**)?
- | | |
|-------------------------|-----|
| | yes |
| Anytime it is necessary | [] |
| 1~2 year | [] |
| 2~3 year | [] |
| >3 years | [] |

General questions

D1. On the average, how often do you use information systems?
(please select one)

- | | |
|-----------------|--------------------------|
| | yes |
| Daily use | <input type="checkbox"/> |
| Weekly use | <input type="checkbox"/> |
| Irregularly use | <input type="checkbox"/> |

D2. Not taking into consideration the price of ICT facilities, what type of IT products do you prefer to use? (please select one)

- | | |
|--|--------------------------|
| Brand new products | <input type="checkbox"/> |
| Proven technology for at least one year | <input type="checkbox"/> |
| Proven technology for at least 2 to 5 year | <input type="checkbox"/> |

Please fill in a mark “v” to indicate your own situation according to the following information:

P1. What is your nationality?

- | | |
|---------|--------------------------|
| | Yes |
| Chinese | <input type="checkbox"/> |
| Dutch | <input type="checkbox"/> |

P2. Have you ever been studied or worked abroad longer than two years before:

- | | |
|-----|--------------------------|
| Yes | <input type="checkbox"/> |
| No | <input type="checkbox"/> |

P3 Your age is:

- | | |
|-------|--------------------------|
| < 30 | <input type="checkbox"/> |
| 31~45 | <input type="checkbox"/> |
| 46~60 | <input type="checkbox"/> |
| > 61 | <input type="checkbox"/> |

P4. What is your main activity?

- | | |
|------------------------------------|--------------------------|
| Student | <input type="checkbox"/> |
| Teaching staff / researching staff | <input type="checkbox"/> |
| Manager | <input type="checkbox"/> |
| ICT professional | <input type="checkbox"/> |

P5. How many years have you been at the university until now:

- | | |
|-------|--------------------------|
| < 4 | <input type="checkbox"/> |
| 4~10 | <input type="checkbox"/> |
| 11~20 | <input type="checkbox"/> |
| 21~30 | <input type="checkbox"/> |
| >31 | <input type="checkbox"/> |

Thanks again for your help and cooperation. Please send your respond to me.

Appendix B: Questionnaires (in Chinese)

关于 大学信息系统管理调查问卷 填表说明

为了研究和改进大学信息系统及其管理,我们设计了一套大学信息系统管理问题调查问卷。期望通过对下述问题的调查与分析,为大学信息系统管理工作提供重要的参考依据。

本问卷采用匿名方式调查。填写过程中,请完全按照您个人意愿回答以下问题。

所有问题均以标号“v”作为您选定的**肯定**回答。其答案方式共有二种:

方式一:

是

[v]表示您的**肯定意见**,保留空格则表示您的**否定意见**;

方式二:

-2 -1 0 1 2

[][][][][]要求在这5个选项中,用“v”标出您的**一项唯一选择**。每个选项的含义如下:

-2 表示**坚决不同意**

-1 表示**不同意**

0 表示**无所谓**

1 表示**同意**

2 表示**非常同意**

非常感谢您提供的宝贵意见。

调查问卷 1: 学生信息系统 (SIS)

从宏观角度看, 大学 SIS 的主要内容包括三个方面。一是面向学校的学生管理工作, 诸如学生注册管理、收缴学费管理、学生成绩管理、教学计划管理等; 二是面向教师与学生的日常教学活动管理; 三是为教师与教师、学生与学生和教师与学生提供一种特殊的通讯联系方式。

A0. 您认为 SIS 是否应该收集下列信息:

	是
课程时间表	<input type="checkbox"/>
教学资料	<input type="checkbox"/>
学生作业与答案	<input type="checkbox"/>
历年试题与答案	<input type="checkbox"/>
预修课程要求	<input type="checkbox"/>
课程简要信息	<input type="checkbox"/>
课程文献目录	<input type="checkbox"/>
课件	<input type="checkbox"/>
(如: 学习资料、阅读资料、电子书刊、录象带等)	
SIS 的使用说明	<input type="checkbox"/>
SIS 的应用规定	<input type="checkbox"/>
课程评估信息	<input type="checkbox"/>
学生考试成绩	<input type="checkbox"/>
学生修课意见	<input type="checkbox"/>
授课教师信息 (如教师个人主页)	<input type="checkbox"/>

其它(请补充):

A1. 您认为谁应参与制定 SIS 的有关管理规定?

	-2	-1	0	1	2
国家教育部	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
地方政府	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
学校有关行政管理部门	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
校网络管理中心	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SIS 管理员	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SIS 的用户代表	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(教师、学生和网络中心, 行政管理和各级领导干部等)					

A2. 您认为谁有权批准 SIS 的信息内容?

国家教育部	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
地方政府	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	-2 -1 0 1 2
学校聘请的校外专家	[][][][][]
学校行政管理部门	[][][][][]
授课教师的教研室	[][][][][]
授课教师本人	[][][][][]
A3. 您同意谁可以评估教学课程？	
国家教育部组织的专家	[][][][][]
地方政府组织的专家	[][][][][]
学校邀请的同行专家	[][][][][]
校内院系自我评估	[][][][][]
学生评估（正式注册听课的学生）	[][][][][]
其它补充：	

A4. 谁可以阅览学生评估课程的信息？	
院长（系主任）	[][][][][]
授课教师本人	[][][][][]
校内全体教师	[][][][][]
校内全体学生	[][][][][]
校外人员	[][][][][]
其它补充：	

A5. 您是否同意 SIS 为师生提供下列信息沟通方式？	
组件(Groupware)或电子公告牌(BBS) 匿名公开方式	[][][][][]
组件或电子公告牌 署名公开方式	[][][][][]
个别联系（一对一的电子邮件方式）	[][][][][]
其它补充：	

A6. 您认为 SIS 的课程要求是	
所有课程应使用统一标准形式	[][][][][]
必修课为统一标准格式、选修课为自由形式	[][][][][]

- 2 -1 0 1 2
- 全部课程均采用授课教师认可的自由形式 [] [] [] [] []
- A7. 您认为学生是否可以自由裁选 SIS 提供的选修课内容?
- 学生不能裁选选修课的任何部分 [] [] [] [] []
- 学生可以按指定方式选择 [] [] [] [] []
- 学生可以自由截选有兴趣的部分内容 [] [] [] [] []
- A8. 您同意 SIS 的管理规定为: (请选一项)
- 尽可能多, 以便限制滥用 SIS [] [] [] [] []
- 尽可能少, 以利于使用 SIS [] [] [] [] []
- A9. 如果有人误用 SIS, 您认为应该(请选一项):
- 警告该用户 [] [] [] [] []
- 对该用户给予处罚 [] [] [] [] []
- A10. 您同意收集并公布来自教师、学生和管理人员对 SIS 的下列信息吗?
- 对 SIS 内容的满意程度 [] [] [] [] []
- 对 SIS 系统的满意程度 [] [] [] [] []
- A11. 您认为何时应该更新 SIS 系统(请选一项)?
- 是
- 任何时间, 只要需要。 []
- 1~2 年 []
- 2~3 年 []
- 3 年以上 []
- A12. 您认为何时应该更新 SIS 内容(请选一项)?
- 任何时间, 只要需要。 []
- 1~2 年 []
- 2~3 年 []
- 3 年以上 []

调查问卷 2: 研究项目信息系统 (RPIS)

RPIS 主要包含三个方面内容。首先是为校内管理部门，上级主管部门、有关地方政府部门以及项目资助者提供信息；其次是为研究项目参与人员提供适当的联系沟通方式；第三是通过校园网为校内外科学研究同行提供信息交流的资源 and 渠道。

B0. 您同意 **RPIS** 收集下列信息吗？

	是
项目的研究目标	<input type="checkbox"/>
项目参与人员	<input type="checkbox"/>
项目来源	<input type="checkbox"/>
项目资助者	<input type="checkbox"/>
项目经费数额	<input type="checkbox"/>
项目（计划和实际）开始时间	<input type="checkbox"/>
项目（计划和实际）结束时间	<input type="checkbox"/>
项目所属研究领域	<input type="checkbox"/>
与其它研究项目的关系	<input type="checkbox"/>
项目的阶段成果（如发表文章情况）	<input type="checkbox"/>
其它补充:	<input type="checkbox"/>

B1. 在 **RPIS** 中，您认为项目参与者的名字排序应为：

	-2	-1	0	1	2
以行政管理级别为序	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
以学术职称级别为序	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
以项目分工责任为序	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
以项目负责人为首，其他人以姓氏笔画为序	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
所有项目参与者均以姓氏笔画为序	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B2. 您认为谁应负责向 **RPIS** 提供信息？

只有项目负责人可以提供	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
由项目负责人指定专人提供	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
项目组推荐专人提供	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
项目组内任何人都可提供	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B3. 您同意在 **RPIS** 上公布那些预计的研究信息如

预期研究成果	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
预计发表文章情况	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
预计对经济或社会的影响	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- B4. 您同意 **RPIS** 用户使用那些通讯联系方式
- 2 -1 0 1 2
- 电子版本的书面报告 [] [] [] [] []
- 组件或电子公告牌**匿名公开方式** [] [] [] [] []
- 组件或电子公告牌**署名公开方式** [] [] [] [] []
- 项目组内的公开交互通讯方式（电子邮件组） [] [] [] [] []
- 个别联系（一对一的电子邮件方式） [] [] [] [] []
- B5. 您认为 **RPIS** 的项目信息应该是
- 统一标准格式和固定栏目 [] [] [] [] []
- 统一标准格式和灵活可变的栏目 [] [] [] [] []
- 灵活可变的格式和栏目 [] [] [] [] []
- B6. 您认为在 **RPIS** 上公布的信息应该是
- 项目组内达成共识的信息 [] [] [] [] []
- 重要的控制项目信息 [] [] [] [] []
- 所有讨论过的信息 [] [] [] [] []
- B7. 您认为研究项目的以下哪些信息也可以向 **RPIS** 提供？
- 对社会和经济有**正面**影响的研究结果 [] [] [] [] []
- 对社会和经济有**负面**影响的研究结果 [] [] [] [] []
- 研究项目的**局限性** [] [] [] [] []
- 研究项目的**不足之处** [] [] [] [] []
- 研究项目的**经验** [] [] [] [] []
- 研究项目的**教训** [] [] [] [] []
- B8. 您同意 **RPIS** 应包括下列信息吗？
- 研究项目潜在的负面信息 [] [] [] [] []
- 研究项目潜在的不足方面 [] [] [] [] []
- 研究项目潜在的社会效益 [] [] [] [] []
- 研究项目潜在的成果 [] [] [] [] []
- B9. 您认为 **RPIS** 的下列信息很重要吗？
- 是
- 当前的研究项目 []
- 当前相关的研究信息 []
- 已结题的研究项目 []
- 下一年度的研究计划 []
- 今后 5~10 年的研究计划 []

其它补充:

B10.您认为 **RPIS 系统**应该何时更新(请选一项)?

是

任何时间，只要需要。

1~2 年

2~3 年

3 年以上

调查问卷 3: 人力资源信息系统 (HRIS)

人力资源信息涵盖用于学校行政部门和管理目的需要的全校教职员信息。其中某些信息通过校园网可供学校各级管理层领导、行政办公人员、学校教职员工、学生以及校外人员共享。除此之外，通过信息查询可以方便工作联系，以利于迅速、准确的联系正确的办公地点并找到正确的负责人。

C0. 您认为 **HRIS** 应该包含下列信息吗？

	是
学校基本方针政策	<input type="checkbox"/>
学校管理政策	<input type="checkbox"/>
人力资源策略	<input type="checkbox"/>
教职员工权益	<input type="checkbox"/>
教职员工信息	<input type="checkbox"/>
教职员工统计汇总信息	<input type="checkbox"/>
教职员工薪资级别信息	<input type="checkbox"/>
教职员工福利信息	<input type="checkbox"/>
学校管理规定	<input type="checkbox"/>
学校行政部门管理职责信息	<input type="checkbox"/>
教职员工个人网页信息	<input type="checkbox"/>
职位公开招聘信息	<input type="checkbox"/>
其它补充:	

C1. 您认为谁应负责为 **HRIS** 提供公开招聘职位的信息:

	-2	-1	0	1	2
学校人事管理部门	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
学院	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
系、研究所	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
教研室 (研究室)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C2. 您认为谁应负责审核批准 **HRIS** 上公布的职位招聘信息:

学校人事管理部门	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
学院	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
系、研究所	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
教研室 (研究室)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C3. 哪些信息可供访问查询:

各级领导干部	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
学术名人	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
全体教职员工	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
不公布任何员工信息，仅提供支持已知员工姓名的查询方式	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- C4. 根据您的观点，**HRIS** 应该面向：
- 2 -1 0 1 2
- 学校行政事务管理 [] [] [] [] []
- 校内信息联系通讯 [] [] [] [] []
- 展示学校师资实力的“窗口” [] [] [] [] []
- C5. 您同意设立匿名电子公告牌公开收集管理建议信息吗？ [] [] [] [] []
- C6. 如果具有上述匿名电子公告牌，哪些人可以读取信息？
- 仅管理层领导干部 [] [] [] [] []
- 管理层领导和指定人员 [] [] [] [] []
- 与信息相关的人员 [] [] [] [] []
- 校内教职员工 [] [] [] [] []
- 校外人员 [] [] [] [] []
- C7. 您同意 **HRIS** 应该包含下列个人信息吗？
- 个人私有信息（如员工本人乐意提供的家庭信息） [] [] [] [] []
- 个人兴趣 [] [] [] [] []
- 个人业余爱好 [] [] [] [] []
- 员工自己设计的个人简历 [] [] [] [] []
- C8. 您认为 **HRIS** 应该收集并提供如下信息吗？
- 业绩工资信息 [] [] [] [] []
- 教育培训设施及培训需求信息 [] [] [] [] []
- 空缺职位要求信息 [] [] [] [] []
- 员工参与决策信息(有关工作条件和岗位) [] [] [] [] []
- C9. 您同意 **HRIS** 征集对有关方面的满意度信息吗？
- 教职员对本职工作满意程度 [] [] [] [] []
- 有关 **HRIS** 信息的满意程度 [] [] [] [] []
- 有关 **HRIS** 功能的满意程度 [] [] [] [] []
- C10.您认为何时应更新 **HRIS 系统** (请选一项)？
- 是
- 任何时间，只要需要 []
- 1~2 年 []
- 2~3 年 []
- 3 年以上 []

一般问题

D1. 平均而言，您使用信息系统的频度是：(请选一项)

- 是
- 每天使用
- 每周使用
- 不常使用

D2. 若不考虑价格因素，您喜欢选择的 IT(信息技术)产品是：(请选一项)

- 最新产品
- 实际应用 1 年左右
- 实际应用 2~5 年

~~~~~

请用“√”标示出符合您个人情况的信息：

P1. 您的国籍？

- 是
- 中国
- 荷兰
- 其他: \_\_\_\_\_

P2. 您是否曾在国外学习或工作两年以上？

- 是
- 否

P3. 您的年龄在：

- 30 岁以下
- 31~45 岁之间
- 46~60 岁之间
- 60 岁以上

P4. 您现在的主要身份是：

- 学生
- 教学/科研
- 管理干部
- 信息与通讯技术专业人员

P5. 到目前为止，您在大学学习或工作的年限为：

少于 4 年

是

4 ~ 10 年

11 ~ 20 年

21 ~ 30 年

31 年以上

再次感谢您提供的宝贵意见。



## Summary

With the event of modern information technology, we are witnessing the globalisation of business processes and accompanying Information Systems (IS). Information Systems Management (ISM) is closely related to globalisation. Due to business requirements of the global environment, there is a need for new functions of IS to be provided, new applications to be developed, and new IS to be installed. Thus, the development and progress of IS have substantially contributed to the feasibility of globalisation. However, it is a great challenge to manage IS in a global environment since management has to deal with the differences of various countries. One of these differences is culture which has the possibility of profoundly influencing ISM. It is generally accepted that people react differently because of national cultural differences. Consequently, these different reactions are particularly relevant for ISM in practice. In order to manage IS properly, it is useful and valuable to study the impact of national culture on ISM. Motivated by such a practical background, this research concentrates on the study of different national cultural influences on ISM in general, and in particular, on the study of cultural impact on ISM between the Chinese and Dutch.

Some models from the research on ISM suggest that “Cross-cultural differences pose an emerging challenge to the global information management community” [Martinsons et al., 1997]. However, “This question is still a very open line of investigation, because other studies do not find a direct relationship between different national cultures and IS management issues” [Aguila et al., 2002]. “Despite the growing interest in cultural issues from IS and technology management scholars, the research outputs tend to be fragmented and ephemeral” [Davison et al., 2003]. Accordingly, this research is faced with many challenges, and needs to cope with many open questions.

Based on the literature study and existing models, an Information Systems Management Cube (ISM Cube) is created in this thesis. The main objective of this ISM Cube is to present a comprehensive approach for a global ISM concept. The ISM Cube appears also to be a valuable construct for identifying the relationships between national culture and ISM. Moreover, the ISM Cube provides a means to design a prescriptive mode for implementing ISM in practice, taking into account national cultural differences.

In order to assess the impact of national culture on ISM, a large survey was carried out in the Netherlands and China. University Information Systems were taken as reference material, due to the fact that these systems are assessable and due to the fact that these systems were the working domain of the researcher. Several target groups were selected such as students, teachers/researchers, ICT professionals and managers. All those target groups were answering questions related to cultural differences such as:

- what primary tasks are distinguished in The Netherlands versus China?
- to what extent culture will influence the access of IS and the corresponding security measures?
- what preferences are existing in both countries for the newest technologies?
- what tasks in the domain of information management, especially regarding the assessment of information, are distinguished and who will be in charge for these tasks?
- what performance aspects are the most dominant in both countries?
- who are the most important stakeholders in taking the initiative for the development of new information systems?
- etc.

The empirical study delivered some interesting conclusions. In general the same hypothesis were confirmed as in research about general cultural differences, namely:

1. Chinese culture accepts authority more than the Dutch;
2. Chinese is more risk avoiding than the Dutch;
3. China is a more masculine society than The Netherlands;
4. Chinese has a stronger long-term orientation than the Dutch.

A result deviating from the general culture research is concerning individualism versus collectivism. In general culture research The Netherlands are characterized as individual, China as collectivistic. In our research this conclusion is not always true.

At the end of this research, we presented, as a possible solution, a framework for designing an appropriate ISM for the culturally influenced ISM. Since the framework embedded national cultural attributes and constructing an ISM stakeholder structure, it makes clear the attention points that are the most relevant and the perspectives that should be taken as the prime perspectives.

Although this research focuses only on the national cultural impacts on ISM between the Chinese and Dutch, the findings and solutions could be highly valuable for designing and developing more flexible and compatible IS in a global IS world. Furthermore, the research results could also be advantageous to IS producers and providers when they are moving from their own domestic markets towards international markets.

Furthermore, the survey results show that national culture is dynamic in the long run because of certain circumstances. Consequently, it might be dangerous to use the classical national culture research theory as a 'formula' without taking into account the possible dynamics of culture in ISM practice. The research findings are meaningful not only for understanding the national cultural differences on ISM, but are also helpful and useful for setting up and implementing ISM appropriately.

## Samenvatting (Summary in Dutch)

Bedrijfsprocessen en bijbehorende Informatie Systemen (IS) zijn van een mondiale signatuur geworden, mede mogelijk gemaakt door de moderne informatietechnologie. Information Systems Management (ISM) is nauw gerelateerd aan deze mondialisering. Immers tengevolge van mondialisering worden nieuwe functionaliteiten van bestaande IS verwacht en geëist. Nieuwe systemen moeten worden ontwikkeld en worden ingevoerd. Kort samengevat: mede dank zij de enorme ontwikkeling van ICT is globalisering van organisaties, bedrijfsprocessen en bijbehorende informatiesystemen mogelijk geworden. Het is echter een hele opgave om wereldwijde informatiesystemen op een adequate manier te managen gegeven het feit dat men wordt geconfronteerd met verschillen per land. Een van deze verschillen betreft cultuur die Information Systems Management naar verwachting aanzienlijk zal en kan beïnvloeden. Het is algemeen bekend dat mensen verschillend reageren op situaties al naargelang hun cultuur. Dergelijke zaken kan men eveneens verwachten wanneer het gaat om ISM. Het is daarom zinvol en nuttig om de invloed van verschillende culturen op ISM te bestuderen. Deze studie concentreert zich daarom op deze vraagstelling en in het bijzonder op de invloed van cultuurverschillen tussen Nederland en China.

In de literatuur wordt in sommige studies gezegd ‘ Cross-cultural differences pose an emerging challenge to the global information management community’ (Martinsons et al., 1997). Echter ‘ This question is still a very open line of investigation, because other studies do not find a direct relationship between different national cultures and IS management issues’ (Aguila et al., 2002). ‘ Despite the growing interest in cultural issues from IS and technology management scholars, the research outputs tend to be fragmented and ephemeral’ (Davison et al., 2003). Gegeven deze stand van zaken, vormt het doen van research naar de invloed van cultuurverschillen een bijzondere uitdaging. Men wordt daarbij geconfronteerd met nog vele open vragen.

In dit onderzoek is een uitvoerige literatuurstudie gedaan en zijn verschillende bestaande modellen bestudeerd. Gebaseerd daarop is een zogenaamde ISM Management Kubus geconstrueerd. Belangrijkste doel van deze kubus is om een sterk gecombineerde aanpak te hebben voor ISM. De kubus heeft bewezen een waardevolle constructie te zijn om samenhangen te identificeren tussen nationale culturen en ISM. Daarnaast verschaft de kubus handvaten voor een prescriptieve benadering voor het implementeren van een ISM concept in de praktijk, rekening houdend met de invloed van cultuurverschillen.

Om empirisch na te gaan wat de invloeden zijn van cultuur op ISM, is een grootschalig enquête onderzoek uitgevoerd in Nederland en China. Daarbij werd als toepassingscontext een universitair informatiesysteem genomen, mede omdat dit een bekend werkterrein van de promovendus was en omdat dit het best toegankelijk bleek voor nadere studie. Aan verscheidene doelgroepen (studenten, docenten/onderzoekers, stafmedewerkers ICT, managers) werden velerlei vragen voorgelegd om antwoord te kunnen geven op zaken zoals:

- welke primaire taken van ISM onderkent men in Nederland versus China?
- in hoeverre beïnvloedt cultuur het toegankelijk maken van informatie en dienovereenkomstig de beveiliging van informatiesystemen?
- welke voorkeur hebben Nederland versus China voor de inzet van nieuwe technologie?
- welke taken op het gebied van evaluatie en beoordeling van informatie ziet men in beide landen en wie is gerechtigd deze taken uit te voeren?
- Wat zijn de belangrijkste prestatie eisen aan informatiesystemen in Nederland versus China?
- Wie zijn de belangrijkste ‘stakeholders’ en initiatiefnemers bij het ontwikkelen van een nieuw informatiesysteem?
- Etc.

Het empirisch onderzoek heeft interessante conclusies aan het licht gebracht. In het algemeen worden dezelfde hypothesen bevestigd die ook gelden in algemeen cultuuronderzoek te weten:

1. In de Chinese cultuur is men meer gewend om autoriteit te accepteren dan in de Nederlandse cultuur;
2. China is meer risicomijdend dan Nederland;
3. China kent een meer masculiene cultuur dan Nederland;
4. China oriënteert zich meer op de lange termijn in plaats van het najagen van korte termijn resultaten.

Een resultaat dat afwijkt van het algemene cultuuronderzoek betreft individualisme versus collectivisme. In het algemene cultuuronderzoek staat Nederland bekend als een individualistische cultuur, China als collectivistisch. In dit onderzoek naar cultuurinvloeden op ISM echter wordt deze algemene stellingname niet in alle gevallen bevestigd.

Aan het eind van deze studie is een raamwerk ontwikkeld voor het implementeren van een adequaat ISM concept in de praktijk, rekening houdend met de gevonden resultaten uit het enquête onderzoek. Dat raamwerk zou uitvoerig moeten worden getest en beproefd in de praktijk, iets dat echter in het kader van deze studie onmogelijk gevraagd kon worden.

Bij verdere toepassing van de resultaten van deze studie moet overigens mede betrokken worden dat cultuur niet een statisch gegeven is maar zich in de loop van de tijd dynamisch ontwikkelt. Dat was ook al zichtbaar in de grootschalige enquête waarin studenten vaak andere antwoorden gaven dan de meer gevestigde orde van managers en wetenschappelijke staf. Zo staan studenten veel vrijer ten opzichte van de vraag ‘Wie mag welke informatie hebben over een bepaald onderwerp’ dan managers en staf. In die zin zal men bij elke implementatie van ISM een aanvullende analyse moeten maken van de cultuurinvloeden van dat moment.



## Curriculum Vitae

Xiuzhen Feng was born in 1956 at Shaanxi, Xi'an in China. She graduated with a Master's degree in Management Science at Xi'an Jiaotong University and was promoted to senior engineer. She has been engaged in Information Systems Management for many years as the director of the Information Management Centre of Xi'an Jiaotong University. At the moment she is also the vice secretary-general of the Education Management Information Systems Association China. In her career, Information Systems Management has been her daily work. At the same time, she participated in and organized many information systems design projects, both for the university and for enterprises in China. In April 2000 she started her PhD research project on cultural influences on Information Systems Management at the Eindhoven University of Technology in The Netherlands.

# **Stellingen**

behorende bij het proefschrift

## **Information Systems Management and Culture**

**Experiences from a Chinese perspective**

Van

Xiuzhen Feng

Eindhoven, 18 maart 2004

1. Information Systems Management (ISM) entails the management, control and maintenance (MCM) of implemented information systems in accordance with the requirements and preconditions imposed by utilization, the situational factors and the characteristics of the information system components (hardware, software databases, procedures and people). ISM offers services in the most effective and efficient way and influences the goals of the organization in a positive way.

———— Looijen, 1998

2. Function Management (FM) is a part of ISM tasks and affects the management, control and maintenance of the functionality of Information Systems (IS). FM is like a coin with two sides, representing the requirements of the stakeholders as well as the limitations and rules at the same time. One has to accept both sides. No one can take only one side and ignore the other.

———— This thesis

3. Application Management (AM) provides the management, control and maintenance of the required applications and is an important interface or bridge between IS and all kinds of users. Therefore, AM is a substantial link between IS and users.

———— This thesis

4. Information Management (IM) addresses the management, control and maintenance of all information resources, providing information to users and collecting information from users as well. Without proper IM, IS loses its usefulness.

———— This thesis

5. Technology Management (TM) stands for the management, control and maintenance of all technical facilities and infrastructures. Without TM, any IS cannot work effectively.

———— This thesis

6. Developing, using and maintaining IS will only be successful in case the stakeholders involved have (direct) incentives to do their ISM tasks in an appropriate way.

———— Bemelmans, 2000

7. ISM invites people to align with duties and obligations for the benefit of every one. As Bernard Shaw has said: ‘The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself’ (Bernard Shaw (1856-1950)).
8. Culture is an important aspect of life, as Darwin has stated: ‘The highest possible stage in moral culture is when we recognize that we ought to control our thoughts’ (The Descent of Man, Darwin (1809-1882)).
9. Culture profoundly influences ISM, since it determines that people (the actors of the ISM) from different culture backgrounds have different norms, thinking, attitudes, and behaviour.  
———— This thesis
10. People are quite often working on the same thing, but in different ways, particularly if they have different cultural backgrounds. In this regard, one should be careful before concluding who is right and who is wrong.
11. Different cultures make people look at things differently because their cultural backgrounds enable them to view issues from different angles. Consequently, it is inevitable that we learn from, communicate with and understand each other when implementing an adequate ISM concept for global IS.
12. IS works as a magnifier. When input is rubbish, output will be so also, resulting in even more rubbish. Consequently, an appropriate ISM should be in place for preventing input rubbish.
13. Researchers could be compared to explorers. No matter how hard they have tried during their work, the lucky ones always find the treasure easily, the unlucky ones find nothing.
14. Reading makes one clever. The more one reads, the cleverer one becomes. However, only reading makes one a fool if the knowledge acquired from reading is not applied.