Management Of Information Technology
Issues In Enterprise Globalisation

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To My Family
Abstract

Domestic companies are increasingly trying to expand their enterprises to become globalised firms or multinational corporations (MNCs). They do this primarily in order to open up to new markets and minimise overall business operational costs. During the global transition, the existing business strategies, visions, and information systems are required to be re-analysed and perhaps re-constructed to fulfil the business goals, operations and characteristics of the global organisation. Information technology has been recognised as a critical element in enabling enterprises to transform themselves into global organisations. To ensure this transition, enterprises need to identify and consider certain information technology and system management issues. Depending on the structure of multinational organisations (multinational, international, global, and transitional) different emphases need to be placed on transition issues. These global transition issues refer to areas like business information systems management, information technology management, people management, end-user management, and culture. Hence, prioritisation of the transition issues is crucial for each type of multinational organisation structure.

In this thesis, a global transition issue priority model is constructed to support the following hypothesis: The global transition issue priority varies depending upon the type of MNC organisational structure. With the assistance of the global transition issue model, multinational companies are able to pinpoint the level of emphasis of global transition issues in preparing the globalisation process according to their organisational structures.

Two surveys were conducted to investigate the priority of global transition issues. The outcomes of both studies suggest that the emphasis of each global transition issue class, in association with an organisation’s globalisation process, is dependent on the type of MNC organisational structure. Furthermore, the results also indicated that there are differences between MNCs and non-MNCs in relation to the significant level of global transition issues. The main contribution of this research is to develop a global information systems management (GISM) priority model that will assist various types of MNCs in preparing the
strategic plan in the global transition process.

In addition to the identification and prioritisation of global transition issues, this research also tries to develop a global transition framework for enterprises, which will facilitate construction of their global information systems.

To achieve the above objectives, this thesis is constructed in four phases, which are:

1. Literature review of global organisations and global information technology.
2. Identification and categorisation of global information system transition issues.
3. Empirical data collection and analysis through surveys.
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Chapter 1

Introduction and Overview

Abstract

This chapter provides the background and the specific aim of the research. The research hypothesis is followed by the research questions. This is followed by the major contribution of this work, as well as directions identified for future work. A definition section is presented to provide detailed explanations of the terminology. As the structure of the thesis is considered important in presenting the ideas developed, this chapter concludes with a brief description of each of the subsequent chapters.
1. INTRODUCTION AND OVERVIEW

1.1 About This Research

1.1.1 The Conceptual Background

In today’s 21st century, almost all businesses face intense competition from competitors all around the globe. The rapid change of the global environment forces enterprises to seek suitable business strategies to sustain them in the competitive marketplace. This leads enterprises to change their existing ways of conducting and operating businesses, and transform themselves in a way that will enable them to cope with the global challenges, compete globally and eventually grow. The winners in this phenomenon are the companies that implement their business operations in the most creative and innovative manner possible. Needless to say, this is done through the incorporation of information technology (IT) into the business strategies and goals. In the past few years, IT has been recognised as an imperative factor that drives companies towards global operations (Palvia et al., 2002). Moreover, the former U.S. president Bill Clinton (2002) has also stated in his address at the University of California, Berkeley “A world characterized not just by a global economy, but by a global information society. When I took the oath of office as President on January the 20th, 1993, there were only 50 sites on the World Wide Web. In ’93. When I left office, there were over 350 million and rising. Today, they’re probably somewhere around 500 million. There’s never been anything like it.”.

It has evidently indicated that the globalisation process will not thrive without judicious exploitation of information technology. Consequently, the key words that emerge in performing innovative business operations are “globalisation” and “information technology”.

Globalisation is not merely conducting businesses outside of home regions or countries. It involves the coordination of business structure, functions, activities, units, and employees together with the incorporation of appropriate global strategies. There
are numerous factors required by enterprises to succeed in globalisation. Firstly, enterprises need to recognise and employ an appropriate organisational structure. The organisational structure needs to reflect and facilitate the company’s vision of globalisation. Secondly, as mentioned earlier, as information technology is the key enabler in global transition, its environmental issues need to be understood by senior executives and information officers. It is essential to do so prior to the application and incorporation of information technology in the globalisation process. Thirdly, companies need to obtain an accurate view of the global vision to develop a transformation strategy. This can be done through the mapping of information technology issues to the organisational structure.

The fact that businesses are speculating on the significance of globalisation is not so much an issue. However, the global challenge has presented enterprises with new types of economic opportunities and threats. Accommodating these opportunities and threats by means of information technology, and developing a global IT transition framework to guide companies through the globalisation process is crucial for successful globalisation and is at the heart of this study. This study underscores these important concerns faced by any enterprises moving towards becoming global organisations.

### 1.1.2 Value of this Research in Global Transformation

In reviewing the literature for this study, the author found little in the way of papers, articles or books that comprehensively discussed the management of information technology issues in enterprise globalisation. Although many researchers have addressed globalisation issues, they appeared to be restricted to very specific areas. Culture, information technology and business strategy are some prevalent areas that appear as examples of ‘narrow’ research. None of the literature provided organisations with
1. INTRODUCTION AND OVERVIEW

A suitable abstract or high-level view of issues for the entire transition of an organisation. Amalgamating the various global transition issues and constructing an abstract view of the globalisation process is the preliminary intention of this study. Additionally, there are no publications that stated the relationship between the organisational structures and IT issues in the globalisation process. Furthermore, there was also a lack of discussion on the probable impact of the organisational structure in global transformation. Without a clear understanding of this correlation between the organisational structure and the transformation vision, enterprises have no idea on how to even initialise the global transition process. Consequently, organisational structures and information technology issues and their interrelationship deserve detailed study in the context of global transition, as discussed in this thesis.

Furthermore, in the globalisation process, it is not only important for companies to recognise the IT impact on transition, but also crucial to recognise the priority of IT transition issues in order to apply them to their organisational structure. For this reason, a global information systems management (GISM) issue priority model is constructed in this thesis based on a thorough empirical study. This global IT transition framework will facilitate and direct enterprises in their global transformation endeavours.

1.1.3 Investigation Through Surveys

In order to create a robust transition framework, it was considered essential to gather information in the industry through surveys. As a result, two surveys were designed for this study. The first survey contains two questions and provides a preliminary investigation. It is targeted at the chief executive officers (CEOs) of the top 1,000 Australian companies (by annual revenue). The result provides a general understanding of the importance of GISM issues among multinational corporations (MNCs). The second survey is the main examination of this study. It contains twenty detailed
global transition issues questions. The participants are 1,000 random selected companies and they are divided into two groups - MNCs and non-MNCs. The result is compared with the preliminary survey result and is analysed to construct the GISM issues priority model.

1.1.4 A Single In-depth Case Study

From the second survey respondents, one company is selected to participate in a more elaborated and thorough case study. The purpose of the case study is to support the global IT transition framework by applying it in the company’s global transformation process. The case study is presented in chapter 7 together with the development of the global IT transition framework.

1.2 Formal Hypothesis and Research Questions

1.2.1 The Hypothesis

This research is meant to address the priority of IT transition issues in regard to the enterprise’s globalisation process in various types of multinational corporations (MNCs). The study starts with the investigation of IT transition issues, methodically followed by the empirical data analysis and development of a priority model and a global IT transition framework. It is conducted in a systematic way and is documented in detail so that the entire concept and framework can eventually be applied in practical transitional industry situations. Thus, the central objective of this study, in the form of a formal statement, is posed as follows:

Depending on the type of multinational corporation aimed at (multinational, international, global, and transnational) the issues of information
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*technology management, business information systems management, people management, end-user management, and culture are differently prioritised in the global transition process.*

This hypothesis has ‘purposefully’ not been developed in greater detail, but stated with an intention of providing the overall framework for the research. The objectives, the problem, and the method of research are generated by the research itself - making a detailed development of the hypothesis out of place.

1.2.2 The Research and Related Questions

The above hypothesis is converted into the following specific research and related questions which have been addressed during this study.

1. **What are MNCs?**

   The purpose of this question is to investigate the characteristics, business operations and organisational structures of multinational corporations. The question can be further subdivided into: what are the various types of MNCs? What are the differences between various types of MNCs?

2. **What are the enabling technologies for enterprises pursuing globalisation?**

   As is evident from the discussion in the first section (1.1.1), the world has become smaller due to the evolution of technology. In order to utilise the technology in the global transition of enterprises, the question intends to identify technologies that can be employed in the process of globalisation and the development of global information systems.

3. **What are the issues related to transition to MNC?**

   This question tries to discover the concerns of companies in the transformation to globalised organisations (or MNCs). In other words, what are the factors or hurdles companies encountered in the process of globalisation?
1. INTRODUCTION AND OVERVIEW

4. How to prioritise and schedule information technology management, business information systems management, people management, end-user management, and culture?

If different types of MNCs place a different emphasis on the globalisation issue categories, then how can this priority process be accomplished?

5. How to apply quality to the global IT transition framework?

Quality is imperative to assure high-level achievement of any processes. This question can be divided into two stages: 1) what quality assurance strategy is employed? 2) How does the quality scheme assimilate with every stage of the framework?

1.3 Definition of Terms

1. Company, enterprise, firm and organisation - all four terms are used interchangeably throughout the thesis. They are applied to any business entity formed by a group of people with a common commercial purpose to acquire profit by means of commercial enterprise.

2. Framework - it refers to a structure composed of stages that fit together.

3. GISM issues - global information systems management issues. Issues related to the global transition process in managing information systems.

4. Globalisation - a specific business strategy that considers the world as a single entity by using standardised products or services to approach the market.

5. MNC - Multinational Corporation. It refers to a company engaged in business operations through its own affiliates in a number of countries or regions, and it manages from a global perspective (Deresky, 2000).
6. *Organisational structure* - it focuses on the multinational corporation’s organisational structure in this study. It refers to a company’s organisational characteristics in terms of configuration of assets and capabilities, roles of overseas operations, and development and diffusion of knowledge (Bartlett & Ghoshal, 1998).

7. *Transition* - it refers to a passage from one position, state, or stage to another.

### 1.4 Research Contribution

This research makes both specific and general contributions to the field of Global Information Systems Management - especially in the area of transition issues in the enterprise globalisation process. The direct contribution is in terms of this research and its output. However, indirectly, it has had a positive influence on the company, where the application of the research was carried out (the in-depth case study). Finally, this research activity has created opportunities for further studies by interested researchers. These contributions are specifically discussed below.

#### 1.4.1 Specific Contribution of this Research

The specific contribution of this research to the field of GISM is as follows:

1. **Development of a comprehensive list of issues in relation to the global transition process.**
   
   This comprehensive list comprises issues in the areas of business information systems management, information technology management, people management, end-user management, and culture. It presents a systematic view of issues and factors that enterprises may need to consider to maintain quality in the process of global transition.
1. INTRODUCTION AND OVERVIEW

2. Development of a global transition issue priority model.

The model presents the priority of global transition issue category considered by four types of cross-border business organisational structures (multinational, international, global and transitional). It provides a valuable direction for enterprises in making strategic decisions in the preliminary stage of the global transition process. By referencing the model, firstly, enterprises are able to browse the global transition issue category priority for all four organisational types and contrast the difference of priorities. Secondly, in accordance with the current business structures, companies can quickly identify the most appropriate cross-border business organisational structure to pursue in globalisation. Thirdly, the strategic plan for global transition can be developed based on the associated priority of selected organisational structure.


As per any business development or transformation, companies require a methodical framework for the transition process towards globalisation. The global IT transition framework is developed to serve this purpose. The fundamental principle of the framework is based on the amalgamation of all studies presented in this thesis and the incorporation of a quality assurance scheme to ensure the excellence of construction. Organisations are suggested to go along with the framework for the successful globalisation transition.

1.4.2 Future Directions as a Result of this Research

As mentioned earlier, the global business environment is continuously changing and evolving; hence, enterprises need to maintain business activities and operations flexibly. More importantly, the strategic and executive decisions should be handled without time and geography limitations. Mobile technology, the emerging communication
1. INTRODUCTION AND OVERVIEW

technology, has the required characteristics to provide users with business informa-
tion systems with no restrictions on topography, devices, and movement. This reveals
interesting areas for further research in relation to mobile business strategies in the
global business environment and global organisations. Specifically, two areas are how
business processes can be automated via mobile technology in the global organisation,
and how mobile technology can change the global business operations.

Topics related to the transformation of small and medium-sized enterprises (SMEs)
into global organisations would also be considered as an interesting future research
area. As the Internet has become a prominent medium for SMEs to reach the global
market, they are able to move their business activities and operations swiftly from a
domestic focus to the global orientation. However, transforming SMEs into global-
oriented businesses is not just creating interactive websites and incorporating pay-
ments as part of the online functions. The real challenge for SMEs pursuing globalisa-
tion is to embrace the management of change before, during, and after the transition
in all aspects.
1.5 Structure of this Thesis

1.5.1 Road Map

Figure 1.1: Thesis structure
1.5.2 Chapter Descriptions

Chapter 1 Introduction and Overview
This is a discussion of the objectives of this research. It looks at the big picture of the current status of the globalisation field and builds the background for the research, followed by the goals, hypotheses and questions, and spells out the contribution this research aims to make. It also presents the structure of the thesis and the brief description of each chapter for ease of understanding and clarity of presentation.

Chapter 2 Literature Review - Global Organisations
This chapter provides the literature backdrop of the global business environment and organisations for this research work. First, the global business and technology challenges are introduced in conjunction with the global market evolution. Second, the opportunities and reasons for organisations going global are outlined. Then the environmental factors that influence globalisation are identified to assist enterprises in pursuit of globalisation. This is followed by an explicit description of the global strategic vision. Lastly, a comprehensive investigation of organisation structures and characteristics are presented.

Chapter 3 Literature Review - Global Information Systems
This chapter presents a comprehensive overview of global information systems through the literature. It begins with defining the term ”Global Information Systems” and identifying the components that are essentially required in the successful implementation of global information systems. These components are functional architecture, Internet technology, intranet and extranet infrastructures, middleware technology, groupware technology, and global information systems management. The rest of the chapter focuses on exploring each component through the investigation of current literature and the latest technologies.
Chapter 4 Research Methodology
This chapter deals with the identification and investigation of research methodologies. It begins with a discussion of quantitative and qualitative research approaches, and outlines the advantages and drawbacks of each. It is followed by the depiction of various research and data collection methods such as action research, case study, surveys, observations, and interviews. Subsequently, reasons and arguments of appropriateness for the selected research approach (quantitative research approach) and the selected data collection methods (survey and interview) are presented for the study. In addition to the quantitative approach, a single in-depth case study is presented to reinforce the priority model and apply the global IT transition framework.

Chapter 5 Global Transition Issues
This is the first theoretical chapter of the thesis. It starts with the discussion of issues that are critical to successful transition of an enterprise towards transborder business operations using information systems based upon the identification of global transition issues. The result of such a transition would be a globalised organisation that would not be limited to geographical and time barriers, nor restricted by cultural differences. Detailed examination of these issues is vital in understanding their impact on transition and how to minimise that impact. The second part of this phase deals with the exploration of organisational transition scopes. The components of intra- and inter-organisational scopes are identified here in order to provide organisations with guidelines in constructing global information systems. While this chapter builds the theory of such a transition, data and support of the model appears in the following chapter.

Chapter 6 Data Collection and Analysis
For any research to be robust, a good data collection design and analysis imperative.
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This chapter discusses the management issues related to object-orientation, particularly in the context of granularity-conscious designs.

Chapter 7 Global IT Transition Framework

Subsequent to the above investigation, this chapter is aimed at providing organisations with a step-by-step guide to pursuing global transition through a global IT transition framework. The framework contains six phases:

1. Planning for global IT transition
2. Investigating current business - technology, knowledge, processes and their status
3. Identifying global transition requirements
4. Enacting global transition process
5. Verifying global transition achievement
6. Developing a quality assurance scheme as applicable to the above five stages

Furthermore, an in-depth case study is presented in accordance with the suggested global IT transition framework. This case study is based on the evolution of a domestic company’s global transformation.

Chapter 8 Conclusion

This chapter finalises and summarises this research study and identifies the contribution of new concepts in the globalisation research field as follows:

- Detailed investigation and categorisation of global transition issues.
- A GISM priority model with validation through an empirical study.
- A global IT transition framework that can be adopted by enterprises as a guide in the globalisation process.
Chapter 2

Literature Review - Global Organisations

Abstract

This chapter provides the literature backdrop for the global business environment and global organisations for this research work. First, the global business and technology challenges are introduced in conjunction with the global market evolution. Second, the opportunities and reasons for organisations going global are outlined. Then, the environmental factors that influence globalisation are delineated to reveal the business globalisation tendency. Then it is followed by a description of the global strategic vision. To conclude the chapter comprehensive investigation of organisation structures and characteristics is presented.
2. LITERATURE REVIEW - GLOBAL ORGANISATIONS

2.1 Global Challenge

In accordance with the report released by the Intergovernmental Panel on Climate Change - IPCC (2002), a per capita GDP growth rate of 2.5% per annum was achieved after World War II. This could be attributed primarily to the closeness of the world community in terms of communication, interaction and dependency on each other. Subsequently, this closeness also drove many organisations to start expanding their business activities across borders with the aim of gaining more business opportunities and advantages. During that period in time, cross border business activities were only limited to traditional trading of goods (for example, export and import of materials). The organisations undertaking this trade were still individually located in their home countries. In the early 1980s, the world’s day-to-day business operations were transformed due to the invention of personal computers. The organisations’ information flows (various presentations such as text, image, and voice) can be exchanged just via an inconspicuous electronic cable (Blake, 1985). The rapid evolution in computing technology and the World Wide Web Internetworking leaves no doubt that organisations and countries have been brought together into a global village. Consequently, the development of computers and the Internet have forced many organisations to reorganise their structure that would be more suited to handle the challenge of globalisation.

In order to succeed in globalisation, organisations should have an executive working team and a number of skilled experts involved because the future success of the organisation will be dependent on it. However, it is not an easy job to determine the essential elements which are required to construct a globalised organisation. This chapter starts with identification and discussion of a number of elements and factors in the area of global market evolution: the nature of the global market, the influence of environmental factors on globalisation, global strategic vision and quality
challenge in globalised organisations. It is followed by a detailed investigation of various types of organisation structures and an inclusive analysis of the organisational characteristics in the global context.

2.2 Global Market Evolution

No matter how small the size of an enterprise or how specific the industry, no business is isolated from the competitive pressures from elsewhere in the world. In fact, almost all industries and companies apparently have felt the global competitive pressure. Enterprises must learn how to survive in the highly unstable and changeable global environment. Before going into detailed analysis of the global environment, the following briefly describes the evolution of global market progression in three stages (Moran & Riesenberger, 1996).

First stage: 1945 - 1975
The thirty years following World War II marked an era characterised by high demand and growth. Economics of the free world flourished and the standard of living improved in most developed societies. Corporations focused on economics of scale and mass production to meet an insatiable market demand. Emphasis was placed on quantity and the efficient use of raw materials, labour and capital.

Second stage: 1975 - 1985
A fundamental shift occurred between the early-1970s and the mid-1980s. Increased production capabilities led to equilibrium and an eventual surplus supply in many industries. This fundamental shift changed corporate competitive advantages to those of increased quality, low cost and technological advances. Economies whose corporations were geared for premium quality, superior technology and low cost production prospered. Governments began to provide incentives for global companies including lower tariffs, tax incentives and incentives to build new factories in their countries. Global economic growth began to slow.
Third stage: 1985 - 2000

The new political and economic development was unfolding rapidly. The emergence of regional trading blocs posed economic advantages for member states but will prove damaging for inter-bloc trade. The era of economic growth between 1945 and 1985 has been replaced by an era characterised by volatility and constant change. Those organisations that accept these changes as opportunities, and develop appropriate global strategic visions, organisational structures and core competencies to effectively capitalise on this new environment, will emerge as the victors. These political and economic developments include:

1. Governments are developing “regionalisation” alliances such as the EU (the European Union), NAFTA (the North American Free Trade Association), and AFTA (the Asian Free Trade Association).

2. Trends toward homogeneous technical standards will favour economics of scale.

3. Increased telecommunications options at lower costs encourage globalisation.

4. Lowered costs and increased speed of delivery have stimulated global commerce.

5. Global exposure to products through commerce, travel, advertising and TV has encouraged a more homogeneous demand for certain products.

6. Competition from non-domestic competitors is increasing.

7. There is increased exchange rate volatility due to global market demands.

8. 1. The increasing rate of technological change has encouraged firms to invest in R&D in multiple markets.
2.3 Arguments for Globalisation

There are a number of reasons why an organisation would want to go global. These reasons have been discussed by a number of authors in the past few years (Hartmann, 1997; McMullan, 1994).

2.3.1 Company Maturity

Getting into the global marketplace requires time, money and resources. If the enterprise does not have a good track record at home base and a history of stable performance, a global venture may strain its resources and complicate problems for its domestic operations and business activities (Hartmann, 1997). It is very important that the enterprise should be sure that it is meeting the demand for its products and services in the domestic market before branching out into the global arena.

2.3.2 Current Overseas Trade

Orders from overseas customers suggest a potential market and point to a market niche that closer suppliers are not filling. The enterprise should consider visiting their overseas customers, and find out why they are buying their products. Visiting overseas customers may give the enterprise an opportunity to demonstrate its strengths to customers as well as acquiring a clear view of the overseas market. If the result of visiting shows that the overseas competitors have insufficient ability in their own domestic marketplace, it may indicate a positive suggestion for going global.

2.3.3 Foreign Market Potential

Conducting simple market research or reviewing competitors’ financial statements would provide the enterprise with an overview of the market other firms are servicing abroad. Collecting information about product origins from the overseas customers is
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another way of determining the market share of global competitors.

2.3.4 Exceptional Overseas Demand for the Product

Some products draw the whole world’s attention. The enterprises producing these products probably cannot go wrong in their marketing plans. However, assessing which products fall into this category would probably be the most difficult and risky aspect for the enterprise.

2.3.5 Demand for Look-alike Products Abroad

A very important question the enterprise must ask itself is, “Do our products have the sort of appeal that will eventually tempt someone to copy them?” If the answer is positive, and the enterprise does not take these products overseas, they will eventually be made by some foreign manufacturers and sold in the market or even intrude into the enterprise’s domestic market. Although many developed and developing countries have adopted copyright and intellectual property regulations, there is no guarantee to prevent imitation activity. For this reason, the enterprise needs to investigate the overseas markets in regard to its products’ acceptance rate and the government’s regulations.

2.4 The Influence of Environmental Factors on Globalisation

Recently, many globalised organisations have demonstrated their successful business operations and improved overall efficiency over organisations, which still remain locally focussed. These global organisations extend across various industries such as IBM and Acer for the computer industry, Toyota and Ford for the automobile industry, McDonalds and Coca Cola for the food industry, Bayer and Dupont for the
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chemical industry and Citibank for the banking industry (Moran & Riesenberger, 1996). To determine why globalised organisations possess more competitive strength over local organisations, certain factors should be investigated. These factors are used to provide certain fundamental concepts for the transition of business operations. These environmental factors can be further classified under two headings: proactive and reactive (Moran & Riesenberger, 1996).

2.4.1 Proactive Environment Factors

In this class, organisations are proactive in determining the factors which will influence the transformation to globalisation. These factors are global sourcing, continuous development of new markets, scale of the economy, trends in product-service consistency, costs in global transportation, government regulations, telecommunications and equipment costs, and trends in technology standards. These are described in detail below.

Global Sources

In the competitive essence of the world trade activities, enterprises are searching for new sources of raw materials and components from everywhere and anywhere in the world. There are a number of elements, which would influence the enterprises’ decision makers to shift their procurement origins from domestic to international suppliers. They are:

1. Better quality
2. Lower costs
3. Better product technology
4. Distinction of technological services
5. Transportation speed
6. Demand satisfaction

7. Compelling competitive pressure to domestic suppliers

**New markets**

Continuously developed new markets provide opportunities to enterprise globalisation.

**Scale of economy**

Enterprises must find new competitive advantages in order to hold their market positions. Scale of economy is one of the ways to reduce the overall costs. When the production increases, the average production costs will be reduced.

**Trend in product-service consistency**

The whole world’s consumption trends have gradually changed from local or regional products to global products, such as McDonalds, Coca Cola, consumer electronic products and Nike sportswear. These trends are caused by the diffusion of telecommunication and transportation. When customers grasp more global information, and face more and more diversified markets, the demand for product consistency and standardisation is also increased. This kind of consistency demand will bring down the enterprises’ inventory, purchasing and production costs, and advance their competitive advantages.

**Lower costs in global transportation**

Costs of transportation in raw materials, components and finished products are some of the essential issues for the enterprise decision-maker in deciding whether overseas subsidiaries should exist. Some oversized or overweight components/finished products are required extremely costly to transport (sometimes the transportation costs may
higher than the actual cost of the goods). This is not an efficient way to transport products so they should be manufactured in the most appropriate global markets.

**Government regulation**

In the last few decades, governments have always acted as protectors of domestic industries, and set up many trade obstacles as they still do now. These trade obstacles include tariff and non-tariff barriers. The purpose of these obstacles is to protect domestic social, political and economical benefits.

*Tariff barrier*

Tariff refers to an additional tax charged on the product when it has arrived at or departed from a country’s borders. The purpose of tariffs is usually to protect domestic industries or gain profit.

Basically, most of governments agree that free trade would increase global competitiveness, and the result of this global competitiveness would assist in advancing a product’s quality and decreasing the costs. Thus, the General Agreement on Tariffs and Trade (GATT) was founded after the World War II, and it functions to bring down or eliminate trade obstacles between countries, and press forward in free trading.

*Non-tariff barrier*

Many governments have also developed some sort of non-tariff obstacles to restrict or encourage the enterprises to export/import products to/from their countries. These non-tariff obstacles include voluntary export restraints (VERs), regulations for domestic marketplaces, dumping, domestic technical standards, government policies and export subsidies.

**Lower costs in telecommunications and equipment**

Due to the rapid improvement in telecommunication equipment and the decrease of costs, many telephone companies provide low fees with high service standards. For
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this reason, enterprises are able to communicate with their foreign subsidiaries with almost real-time responses with limited overheads.

Trends in technology standards consistency

Technology standards consistency motivates suppliers to provide equal quality of products to consumers all over the world. For instance, ISO 9000\textsuperscript{1} series standard (The International Organisation for Standardisation) is responsible for establishing global product quality standards. It provides guidelines to help the enterprises in the development of uniform production quality specifications.

2.4.2 Reactive Environment Factors

In addition to the proactive environment factors which drive globalisation, there are some other threatening or reactive environment factors that could also influence enterprise to enter into globalisation. These reactive environment factors can be classified in four classes: foreign competitors, increase of risks caused by exchange rate variation, the trend of expansion of customers from domestic to global markets, and rapid global technology transformation.

Foreign competitors

Those enterprises that keep their business operations within their own country and do not intend to create foreign subsidiaries will suffer massive pressure from foreign competitors. The foreign competitors usually exist in three situations:

1. importing new products,

2. developing new competitive products by the alliance of foreign and domestic competitors, and

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3. foreign enterprises incorporating domestic competitors.

The above three situations will place the domestic enterprise in a highly disadvantaged position. These new competitors (foreign competitors) possess many more competitive advantages than domestic competitors. They are: having a pathway to gain the latest global technology, scope of economy, searching globally for raw materials and labour, forming alliances with domestic enterprises to decrease or even eliminate business obstacles, and sharing of development knowledge from global subsidiaries.

**Increasing of risks caused by exchange rate variation**

The variation of market exchange rates would seriously affect the enterprise’s profit. When the enterprise deals with foreign suppliers, the payment method and terms should be discussed before the order is completed, because the longer the term of payment, the higher risk the exchange rate variation. Purchasing staff in the enterprise should also have enough skills and understanding of the variation of exchange rates when they decide to deal with foreign suppliers.

**The trend of expansion of customers from domestic to global markets**

The strategy of business operations focuses on the domestic market to ensure the existing and potential customers only purchase domestically produced goods or services. When the customers are already in the globalisation processes or in the situation of global searching for sources, the domestic enterprises would probably lose these customers if they did not consider creating foreign subsidiaries to support the customer requirements.
Rapid global technology transformation

Since the early 1980s, new technology fast progress has had an influenced on enterprise profit and operations. Improvement of production procedure has caused the restructuring of the enterprise’s market share. More and more enterprises have invested in the research and development field, and have employed these latest technologies to develop better ideas and products that will make a fortune for the enterprise.

The influences and transformation degree of the above twelve environmental factors enforce the faster processes of enterprise globalisation. The enterprises with the majority of business activity in the domestic market are facing competitive pressure form overseas; however, global enterprises are also struggling in the extreme competitive environment for their survival.

In order to survive in the global business environment, the enterprises must carefully evaluate these environment factors and analyse current and future foreseeable influences and trends. This procedure also leads the enterprises in the development of global strategic vision.

2.5 Global Strategic Vision

2.5.1 What is “Strategic Vision”?

Strategic vision refers to what an enterprise expects to be its ideal image in the long-term future. This ideal image will be a primary principle for the enterprise’s future planning, employers and business activities. The guideline of this will be the planning of a strategic vision for the enterprise’s future position. In this regard, it is worth noting what Tregoe and Tobia (1990) have to say: “In the companies we know that are successfully making the transition to a more collaborative organisation, the key to success is developing and then living by a common strategic vision. When you agree on an overall direction, you can be flexible about the means to achieve it.
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...Really powerful visions are simply told. The Ten Commandments, the Declaration of Independence, a Winston Churchill World War II speech – all present messages that are so simple and direct you can almost touch them. Our corporate strategies should be equally compelling.”

Given the thoughts that existed with Winston Churchill’s speech, it is important to consider the factors that influence the strategic visions of the organisation. These are now discussed in greater detail.

2.5.2 Strategic Thinking Process

The strategic thinking process can be thought of as the procedure of strategic vision development. Senior managers are normally required to develop the best strategic vision of their enterprises, they must be very careful to evaluate the enterprises and the trends of the entire future business environment. Many enterprises can develop a long-term vision such as in 10 or 20-year plans, but they vary from industry to industry. For instance, the oil industry may have a 50 year strategic vision, however the fashion industry may have only one year.

Senior managers should consider how they wish their enterprises to be in the future, what sort of knowledge and skills they should have under control and what aspects should be developed; production, services, markets and consumers should also be stated implicitly. In addition, they should carry out a detailed analysis of the competitors’ current and future growth, and develop a desirable organisational structure in order to implement the strategic vision.

Based on Tregoe, Zimmerman, Smith and Tobia’s organisational strategic framework and driving forces (Tregoe et al, 1990), the procedures of strategic thinking process can be outlined as follows.

1. Understanding of current strategic vision Firstly, the enterprise should understand its current strategic plan. Before developing an ideal strategic vision,
everyone in the enterprise should agree on the current strategic vision. Conditions of a current strategic vision will be:

- list all present successful products and services
- list current major markets and customer service’s domain
- find out what are the driving forces that will exert an influence over products and services, and ensure the driving forces will support the strategic areas
- determine the organisational core values

2. Evaluating critical factors in global strategic vision Global Chief Executive Officers (CEOs) and senior managers should be careful of evaluating each individual factor and understanding these factors in both positive and negative influences. These critical factors are listed below.

- general characteristics of successful products or services, markets and consumer domains
- the enterprise’s core capability
- the enterprise’s weaknesses
- characteristics of future products or services, markets and consumer domains
- current and potential competitors

3. Developing preliminary global strategic vision After the critical factors have been determined, the enterprise’s CEOs and the senior managers can start developing a preliminary global strategic vision. The purpose of this part is to find the driving forces that will influence organisational performance. Thereupon, the management team can determine the driving force that best represents the
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enterprise’s advantage. Five essential processes should be carried out in this step:

- focus on future strategy and set up a reasonable time framework
- develop a future driving force
- create a market and territory for future products and services
- develop competitive advantage and its necessary capability
- develop the enterprise’s growth, scope and investment return objectives

4. Examining preliminary global strategic vision

During the strategic thinking process, the process variation and transformation obstacles should be determined by examining preliminary global strategic vision. The examination should include the following items:

- current strategy
- evaluation conditions
- core values
- the enterprise policy and the actual operations
- determine major competitors

Management level should compare the future possible global strategic vision with the current strategic vision, and some basic questions should include:

- What are the differences between both strategies?
- What sort of variations should the enterprises perform when they start new products, services, markets and consumer domains?
- Are there any differences in driving force? How are they going to effect the business operations?
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- Are they having the same capability? How are they going to effect the business operations?

5. Settling new global strategic vision and mission description The outcome of the examination step is the number of critical factors that will become the significant key factors in assisting new global strategic vision development. When these factors are finalised, the development of new global strategic vision can commence.

The organisational mission description focuses on the enterprise’s future idea, resource allocation, and the plan of long-term and actual business operations. The mission description is the epitome of the global strategic vision and it covers information of the enterprise’s core values, driving force, future products and services areas, future markets and consumer domains, and competitive advantages.

A successful mission description should include the enterprise’s objectives, products, markets and technology information, core values, business operation philosophy, public image and financial aim.

6. Discovering critical key issues Critical key issues can be discovered during the transition of the global strategic vision development. These issues usually cause the enterprises to modify the current systems, resources, expertise, skills, or structural frameworks.

7. Plan implementation After passing through the previous phases, the newly developed global strategic vision is now ready to implement. The strategic vision is transient, it should be maintained and modified in accordance with varying situations in the global business environment, market requirements and technology evolution.
2.5.3 Key Element of Strategic Thinking

There are always some driving forces in each enterprise that lead the company towards its next stage. The concept of a driving force is the component that gives the enterprise momentum and drives the enterprise toward its expected direction. Robert Michel (1998) determined that there are ten important strategic areas that exist in every enterprise. These are summarised in the table (Table 2.1) below: Although these ten strategic areas can be found in the enterprise, only one of them is strategically important to the enterprise and is the main imperative to drive the enterprise toward success. CEOs and senior managers should determine which area of driving force is the most appropriate one to represent the business nature of their enterprises, and develop their strategic planning process based on this specific driving force.

2.5.4 Strategic Thinking Process

The strategic thinking process refers to the procedure of "how" the enterprise achieves its future ideal strategic vision. It includes the strategic vision’s long-term implementation plan, usually 3-5 years, but it could be 20 years. Objectives of the plan include growth rate, investment return rate, market share rate, coverage of new products, distinction of new markets and earning capability. Without having a clear strategic thinking process and strategic planning process, enterprises will confront a survival crisis. The following table (Table 2.2) depicts key advantages for enterprises to implement a clear strategic thinking process indicated by Robert Michel (1988).

2.5.5 Enterprise’s Global Strategy

Development of global strategic thinking and global strategic vision is a challenge even for an organisation that operates its business only domestically. The senior managers also confront a difficulty in developing a global strategy. During the process of globalisation, senior managers should compare the global strategy development
### Table 2.1: Strategic areas for enterprises

<table>
<thead>
<tr>
<th>Strategic areas (driving forces)</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product/Service Concept</td>
<td>A product-driven company is one that has “tied” its business to a certain “product concept.” As a result, this company’s future products will greatly resemble its current and past products. Future products will be modifications, adaptations, or extensions of current products. Future products will be derivatives of existing products.</td>
</tr>
<tr>
<td>User/Customer Class</td>
<td>The company pursuing this strategy has decided to “anchor” its business to a class of users. It then communicates continuously with that user or customer to identify a variety of needs. Products are then made to satisfy those needs. A user-driven company places its destiny in the hands of that customer or user.</td>
</tr>
<tr>
<td>Market Type</td>
<td>This company is one that has &quot;anchored&quot; its business to a describable or circumscribable market type or category as opposed to a class of users.</td>
</tr>
<tr>
<td>Production Capacity/Capability</td>
<td>This company usually has a substantial investment in its production facility and the strategy is to &quot;keep it running&quot; or &quot;keep it full.&quot; Therefore, such a company will pursue any product, customer, or market that can optimise whatever the production facility can handle.</td>
</tr>
<tr>
<td>Technology</td>
<td>This organisation uses technology to gain competitive advantage. It fosters the ability to develop or acquire hard technology or soft technology, and then looks for applications for that technology. When an application is found, the organisation develops products and infuses into these products a portion of its technology, which brings differentiation to the product.</td>
</tr>
<tr>
<td>Sales/Marketing Method</td>
<td>This company has a unique way of getting an order from its customer. All products or services offered must make use of this selling technique. The company does not entertain products that cannot be sold through its sales method, nor will it solicit customers that cannot be reached through this selling or marketing method.</td>
</tr>
<tr>
<td>Distribution Method</td>
<td>Companies that have a unique way of getting their product or service from their place to their customer’s place are pursuing a distribution method-driven strategy.</td>
</tr>
<tr>
<td>Natural Resource</td>
<td>When access to or pursuit of natural resources is the key to a company’s survival, then that company is natural resource-driven.</td>
</tr>
<tr>
<td>Size/Growth</td>
<td>Companies that are interested in growth for growth’s sake or for economies of scale are usually pursuing a strategy of size/growth. All decisions are made to increase size or growth.</td>
</tr>
<tr>
<td>Profit/Return</td>
<td>Whenever a company’s only criterion for entering a marketplace or offering a product is profit, then that company is return/profit-driven.</td>
</tr>
</tbody>
</table>
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| Framework – |
| This process establishes a framework or profile against which ongoing decisions are tested. It reviews and questions the current direction and sets the future direction which may be different than today’s. |

| Top down – |
| Only one group of people has the right and the obligation to shape the company’s future direction and that is top management. |

| Realistic – |
| A framework or profile developed with the full participation of management and their knowledge and expertise becomes a better test-bed for the allocation of resources. |

| Guidelines for emphasis – |
| A good strategic thinking process will produce a profile for the company which can then be used to determine which areas of the business will receive more and which areas will receive less emphasis. The process, therefore, needs to be interactive between levels of management, so that managers whose areas will receive fewer resources in the future are still committed to the direction chosen by management. |

| Better balance – |
| This process produces a clear list of products and markets that need to be trimmed together with a clear rationale as to why this needs to be done. |

| Internal plus external data – |
| This process incorporates an assessment of both the internal and external environment. It is highly subjective since it involves the personal perceptions of each member of the management team. Most of the data required are simple and easy to retrieve since they are stored in each person’s head. The key is to tap that knowledge and bring these perceptions into an objective forum. This process is qualitative evaluation of the business and its environment and thus it is both introspective and extrospective (sic). |

Table 2.2: Characteristics of a clear strategic thinking process
with the company’s current strategy in terms of global environment factors, differences of global and domestic strategy, and the planning procedures provided by the subsidiaries and the entire enterprise.

**Global environment factors**

Consideration of global environment factors is a preliminary and an essential step when a domestic company intends to expand its business and market into the overseas environment. These global environment factors, discussed earlier in this chapter, are the following: global searching for sources, continuous development of new markets, scope of economy, trends in product-service consistency, lower costs in global transportation, government regulation, lower costs in telecommunications and equipment, trends in technology standards consistency, foreign competitors, increase of risks caused by exchange rate variation, the trend of expansion of customers from domestic to global markets, and rapid global technology transformation.

**Differences of global and domestic strategy**

Not all products are suitable in the global strategy. Some products must remain domestic due to the government regulations, local tastes and significant costs in transportation. For example, food, drink and concrete manufacturers are represented in this category.

However, those products have the same characteristic, components or raw material requirements are the most likely to apply to global resource searching to find out how they can be operated in the global environment. The examples are computer and electronic manufacturing industries.

**Global integration of planning procedures**

Developing a global strategy is more complex than developing a domestic strategy because global strategy development is required to travel across borders and integrate
the various subsidiaries and headquarters senior managers’ opinions. Senior managers are from various countries or regions, and their opinions and suggestions are critical in the process of global strategy development. Successful global strategy development must rely on the cooperation of each senior manager and the knowledge integration of subsidiaries and headquarters.

2.6 Investigation of a Global Organisation

Enterprises that operate their businesses outside of their own countries need to decide upon and construct an appropriate organisation structure in order to implement their global strategic visions. Each of the traditional organisation structures has its advantages and drawbacks in the context of globalisation. Global marketing demand forces the enterprise’s leader to fully understand these organisation structures, choose the most suitable structure for the enterprise’s competitive advantage, and eliminate the limitations of the chosen structure.

Twelve environmental factors are considered obstacles in implementing functions of the traditional organisation structure. The result of research conducted by Bartlett and Ghoshal (1987) determined that the key factors to a successful enterprise in the global market should achieve the following three elements concurrently, they are:

- satisfaction of domestic market demand
- central control and coordination
- transference capability of knowledge and learning experience, and the subsequent creation of global enterprise

Global integration development, domestic differences and the global creation of strategic advantages have become the enterprise’s major challenge, and have enforced the enterprise to develop its new organisation structure in order to confront the global competition. When the enterprise’s global strategic vision changes, the organisation
structure should be changed as well. The CEOs and senior managers should realise that the organisation structure is the tool to lead the successful achievement of global strategic vision. The global strategic vision conducts the enterprise’s future development direction, the enterprise’s strategic plan is the method to lead us to achieve the strategic vision, and the organisation structure will be the place that implements the strategic vision and plan.

2.6.1 Enterprise’s Core Organisational Characteristics

According to Bartlett and Ghoshal’s three elements mentioned earlier, enterprises are suggested to review and improve their core organisation characteristics in order to succeed in the global market. To further understand the global challenges faced by enterprises, Moran and Riesenberger (1996) have further expanded these three elements into a number of core organisation characteristics. These core organisation characteristics are outlined and discussed below.

**Strategic point of emphasis**

Each of the traditional organisation structures has its obstacles in nature, it cannot achieve central control, coordination and satisfy domestic market demand at the same time. The CEOs are required to develop a strategic plan in accordance with the current situation and demand in order to achieve the expected central control, coordination and the standard of satisfying domestic market demand.

**Global strategic vision**

In order to develop a suitable global strategic vision for an enterprise, firstly, the CEOs should analyse the trend of environment factors, and review and inspect the enterprise and the industry’s long term strategic plans. Discussion and revision should be brought to not only the CEO and the senior managers but also the overall employees.
in the enterprise. The developed global strategic vision should also be accepted and supported by all the employees in the enterprise.

**Control and coordination**

A successful enterprise should develop a method that allows the enterprise itself to look after both the global coordination and central control, and this method includes:

1. Productive scope economy
2. Development speed
3. Research and develop critical elements of centralisation
4. Support more and more uniform products to satisfy more and more concurrent characteristic demand
5. Searching for global resources in raw materials and components
6. Eliminate or reduce the tariff obstacles
7. Standardise technology concurrently
8. Lower global transportation costs
9. Lower costs in telecommunication and equipment

**Domestic autonomy**

A successful enterprise allows its subsidiaries to make crucial decisions in accordance with the local market demand. The capability of rapid reaction to the local requirements will be the enterprise’s key competitive advantage. Domestic autonomy should fully control the following points.

1. Local taste and requirement
2. Local government protection strategy and trade obstacles

3. Threats by the local competitors

4. Local regulations

5. Customised delivery specification

6. Difference in national standards

**Relationships between headquarters, subsidiaries and local markets**

In an ideal situation, these organisations should have closed relationships, sharing information, and assisting each other. However, the multinational, international and global organisation structures can not satisfy these requirements. The management staff in headquarters and subsidiaries should be aware of the level of sharing information and communications between headquarters and subsidiary, between subsidiary to subsidiary and between subsidiary and the local market.

**Enterprise culture**

Whether an enterprise will develop a uniform culture depends on the acceptance level of the global strategic vision by the employees overall. The development of enterprise culture is also influenced by the difference of the management level and the employee background, and culture experiences.

**Selection of senior manager**

The complexity of global business activity causes the enterprise to select an outstanding senior manager who possesses a different cultural background, has experiences in the domestic company, the headquarters as well as the foreign subsidiaries. The CEO should reassign the potential senior manager candidates to the position that will have more interactions with customers and domestic or foreign subsidiary’s personnel.
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In order to implement effective coordination between subsidiaries, it is necessary to develop a corporate business language. For instance, if the enterprise uses English as a standard communication language, then the senior level managers within the entire enterprise should be able to communicate in English. Thus, communication skills and language capability are the essential requirement for a senior manager.

Strategic decision process

Before making a strategic decision, the senior manager should have complete knowledge, information and clearly understand the enterprise’s global strategic vision.

Information flow

The management levels from the headquarters and subsidiaries should be aware of the information flow and knowledge control between organisations. A successful enterprise may implement an information integration plan that will integrate the entire enterprise’s information and knowledge flow, and will be maintained and managed by the enterprise’s information systems.

2.6.2 Traditional Organisational Structures

There are four types of traditional organisational structures defined by Bartlett and Ghoshal (1988). These organisational structures have been adopted by enterprises, which intend to conduct the worldwide business operations, and these are multinational, international, global, and transnational organisational structures. The following sections describe each of these organisation structures in the context of the enterprise’s core characteristics and the advantages/disadvantages of each structure respectively. The core characteristics are classified in three categories: strategy, structure, and cultural and process procedures.
2.6.3 Multinational Organisation Structure

The structure of a multinational organisation consists of the headquarters, as the top level of corporate management in the country of the enterprise’s origin and a number of national and foreign independent subsidiaries. These subsidiaries are always required to report to the top level of corporate management. This centralised organisation structure came originally from European countries. In the early stage of a traditional multinational organisation, the appointed subsidiaries’ general managers were always the senior managers at the top level of corporate management. The subsidiary’s general manager usually had some kind of informal relationship with the CEO, and always reported to him/her directly. As the top level of corporate management has less knowledge of the local market, the subsidiary’s general manager would be an extremely powerful autonomous authority over the subsidiaries. For this reason, headquarters and subsidiaries have almost absolute difference in strategic vision, culture, business procedures and leadership. However, the subsidiary can directly communicate to the CEO and it is not required to have a lot of support from headquarters. With the independent operations and controls, the subsidiary has flexibility to support the local market demand.

Three characteristics are defined in the multinational organisation structure, they are:

1. management of assets and responsibilities are in the format of a decentralised federation,

2. a simple financial information flow is used as a management method in between headquarters and subsidiaries, and

3. the global strategic vision defines the enterprise’s worldwide operations as a portfolio of national businesses. The following table (Table 2.3) shows the advantages and disadvantages of the traditional multinational organisation structure.
2. LITERATURE REVIEW - GLOBAL ORGANISATIONS

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower transportation costs (production within the market)</td>
<td>Lack of communication between subsidiaries</td>
</tr>
<tr>
<td>Easier to acquire the raw materials (production within the market)</td>
<td>Lack of uniform strategic vision through the entire enterprise</td>
</tr>
<tr>
<td>Lower tax (production within the market)</td>
<td>Subsidiaries contest each other for resources</td>
</tr>
<tr>
<td>Better control of local market demand (production within the market)</td>
<td>Lack of information sharing between subsidiaries</td>
</tr>
<tr>
<td>Reduced time spent on the product design adjustment (production within the market)</td>
<td>Less cooperation and information exchange between the headquarters and the subsidiaries</td>
</tr>
<tr>
<td>Subsidiary's general manager can communicate to the CEO directly</td>
<td>Reports are usually informal</td>
</tr>
<tr>
<td>Extremely high power in self-controlling</td>
<td>Less support required from the headquarters</td>
</tr>
</tbody>
</table>

Table 2.3: Advantages and disadvantages of multinational organisation structure

Enterprise’s core characteristics

*Strategic point of emphasis*

The major strategy in a traditional multinational enterprise is how to get benefits from the implementation of foreign autonomic subsidiaries. The advantage of this structure is that each foreign subsidiary can quickly respond to and can satisfy the local market demand, and they can be very flexible in order to control their consumers. The enterprise which adopts this structure will get bigger due to more foreign subsidiaries being set up. However, the enterprise will almost lose control of these subsidiaries’ business activities.

*Global strategic vision*

Although the global strategic vision is developed by the headquarters, the actual implementation is always different from subsidiary to subsidiary. This is because of the lack of control coordination and control and over-independence of the subsidiaries.

*Control and coordination*

In the three types of organisation structures, the multinational organisation structure
2. LITERATURE REVIEW - GLOBAL ORGANISATIONS

is the lowest level of central coordination and control and has the least communication between subsidiaries. Subsidiaries always compete with each other for the limited resources from the headquarters.

**Domestic autonomy**

The multinational organisation structure has the most power in domestic autonomy. The subsidiary’s general manager has supreme authority to decide and alter products to the market in accordance with experience of market demand.

**Relationship between headquarters and subsidiaries**

There are Simple and informal communications between the CEO and the subsidiary’s general managers. Due to the high autonomy, almost no information and knowledge flow is involved in the subsidiaries.

**Relationship between subsidiaries**

Under the traditional multinational organisation structure, each subsidiary faces its own business problems, language and culture differences. In addition, they compete with each other for limited resources from the headquarters and there is nearly no communication and information sharing activities between subsidiaries.

**Enterprise culture**

Due to the highly autonomous nature of subsidiaries and the lack of interaction in information, knowledge and employees, each subsidiary has developed its own specific culture.

**Selection of senior manager**

In the development stage of multinational organisations, the subsidiaries’ general managers are appointed by the headquarters. These general managers directly report to the CEO without any formal structure.

The headquarters’ employees are employed from the location where the headquarters is situated and the subsidiary’s employees are employed from where the subsidiary is situated.

**Strategic decision process**
There is a quite centralised strategic decision process. The headquarters has given the subsidiary quite flexible and autonomous operation authority.

**Information flow**

There is almost no information and knowledge interaction between subsidiaries.

### 2.6.4 International Organisation Structure

An international organisation structure enterprise contains a large national headquarters and a corresponding international department. These two bipolar departments report to the CEO directly. This kind of organisation structure increases the control of non-national companies and provides frequent knowledge sharing and communications between subsidiaries. The main function of this structure is to transfer knowledge and expertise to foreign markets, which are less advanced in the development of technology and business operations. On the other hand, the local subsidiaries are free to adopt the new product, technology and strategy. This structural dependency concept is normally called a coordinated federation. A traditional international organisation structure originated around the time after World War II, when the American companies expanded their business operations to overseas markets.

When an enterprise decides to transform its organisation structure from multinational to international, the enterprise’s global strategic vision and plan should be redefined accordingly. There are a number of advantages and disadvantages of an enterprise adopting the international organisation structure. The following table (Table 2.4) shows these advantages and disadvantages. The setup of international departments provides a way of integrating foreign subsidiaries’ requirements and submitting these requirements to headquarters. The advance of the enterprise headquarters depends on foreign business operations increasing the coordination between the foreign subsidiaries and the control of the foreign subsidiaries. It also provides a better implementation of the enterprise’s global strategic vision. This organisation structure gives
2. LITERATURE REVIEW - GLOBAL ORGANISATIONS

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>The enterprise headquarters attaches much importance to the strategy of</td>
<td>Causes potential competition in between the domestic headquarters and the</td>
</tr>
<tr>
<td>foreign business operations</td>
<td>international department</td>
</tr>
<tr>
<td>International business integration has a crucial influence on the entire</td>
<td>Culture differences cause conflict between the domestic headquarters and the</td>
</tr>
<tr>
<td>enterprise’s organisation structure</td>
<td>international department</td>
</tr>
<tr>
<td>Increasing central control and coordination while the foreign subsidiaries</td>
<td>Lack of training in across-border coordination due to the various countries</td>
</tr>
<tr>
<td>still have quite flexible autonomous power</td>
<td>of origin of subsidiaries’ employees</td>
</tr>
<tr>
<td>Provides a better development environment for managers of international</td>
<td>Prevents a meeting of the minds between the domestic and international</td>
</tr>
<tr>
<td>departments</td>
<td>managers</td>
</tr>
<tr>
<td>International departments can focus on developing new subsidiaries and</td>
<td>Two different leadership styles and enterprise culture’s semi-autonomous</td>
</tr>
<tr>
<td>support subsidiaries with uniform assistance</td>
<td>organisations (domestic headquarters and international department)</td>
</tr>
<tr>
<td>International departments have better control of manufacturing, raw</td>
<td>Research and development tasks still remain domestically-oriented</td>
</tr>
<tr>
<td>materials and capital information in various places in order to make a</td>
<td></td>
</tr>
<tr>
<td>better strategic decision</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.4: Advantages and disadvantages of international organisation structure

great autonomous power to the subsidiary and the general manager of the subsidiary still retains a medium level of autonomy and flexible decision-making authority. However, the development and growth of the international department could cause conflict with the domestic headquarters, because these two departments will start competing for the enterprise’s limited financial and human resources.

When an enterprise’s organisation structure has transformed from multinational to international, the role of the general manager changes accordingly. The subsidiary’s general manager does not follow the informal communication path (report to the CEO directly) anymore. The general manager now must report to the head of the international department in a formal presentation. This will cause some of the general manager’s autonomous authority to be stripped by the head of the international department.

In the initial stage of the international department development, most of the employees are from the domestic headquarters. Lack of knowledge in foreign markets, culture
differences and international business operations cause difficulty for the implementation at this stage. Therefore, many enterprises still maintain their main research and development activities in the domestic headquarters and product development is still focused on the domestic market demand. The international market demand is only considered when the domestic market demand has been satisfied. Another disadvantage of the traditional international organisation structure is that the design of the structure obstructs the employees’ communication between headquarters and subsidiaries because most of the information and decisions are delivered through the employees from the international department. The structured way that subsidiaries report to the head of the international department does not solve the communication problem between subsidiaries. However, subsidiaries still compete with each other in order to obtain the limited resources and sales achievement bonuses.

**Enterprise’s core characteristics**

*Strategic point of emphasis*

The setup of international departments can integrate the foreign business functions. The change of the global strategic vision is the major cause of structure transformation. The foreign subsidiary’s general manager and employees have less autonomy and they are required to follow the orders announced by the international department. Some centralised business functions such as marketing, finance, trading and education advance the competitive advantage, and will assist the development of the enterprise.

*Global strategic vision*

The traditional international organisation structure usually develops two sets of global strategic vision in order to satisfy different departments and market demand.

*Control and coordination*

The central control and coordination of the traditional international organisation
structure is normally at the average level. The communication frequency of the knowledge, control and coordination between the domestic headquarters and the international department is still very low and sometimes conflict between two organisations may occur.

**Domestic autonomy**

The foreign subsidiaries still retain their domestic autonomy, but the importance of strategic competitive advantage is far less than in the multinational organisation structure. The enterprise’s management level attaches much importance to control and coordination in the international department.

**Relationship between the international department and subsidiaries**

The communication between the domestic headquarters and the subsidiary must be formally relayed through the international department. This intermediate step may delay some crucial strategic decisions.

**Relationship between subsidiaries**

Through the common market and planned training and some standardised operating principles provided by the international department, subsidiaries have a higher level of communication and coordination than the multinational organisation structure.

**Enterprise culture**

The enterprise usually has two different kinds of business culture, the domestic culture and the various countries’ culture. The cause of two different cultures developing in the enterprise is due to the different background and method of business operations between the domestic headquarters and the international department.

**Selection of senior manager**

When the enterprise obtains the international organisation structure, the role and responsibility of the general manager of the subsidiary changes accordingly. The general manager of the subsidiary should be able to effectively communicate with the senior management level in the international department. When the enterprise has reached the mature stage, the general manager and employees of the subsidiary are
normally employed from the country or region where the subsidiary is located.

Strategic decision process
Subsidiaries under the international organisation structure have lesser autonomous authority than the multinational organisation structure. For this reason, the international department of the enterprise implements most of the strategic decisions.

Information flow
Due to the nature of the international organisation structure, organisations emphasises are on the central control and coordination, high communication frequency of knowledge and information between subsidiaries, the international department and headquarters.

2.6.5 Global Organisation Structure

Global organisation structure refers to a highly centralised world headquarters enterprise. Most of the strategic decisions are made by the world headquarters and it usually does not request any suggestions from any national or international subsidiaries. The structural configuration is based on the central assets, resources and responsibilities and the business operations of foreign subsidiaries are limited to only sales and services; the configuration can be described as a centralised hub. All subsidiaries are treated equally no matter whether they are regional, national or international. In the global organisation structure, the enterprise pursues maximum scope of economy efficiency and the fastest decision-making, and becomes a nationality-less corporation. The global strategic vision in a global organisation structure is developed and decided by the world headquarters. The consideration of the strategic vision decision is focused on the benefit of the entire enterprise, however, the individual subsidiary’s benefit is expelled. In other words, all the strategic decisions must be made based on the advantageousness of the entire business operation and implementation.
A global organisation structure can be classified into three types: global area structure, global product structure and global functional structure. There are many factors that should be considered before the enterprise decides to adopt one of these types. The factors are maturity of the production line, level of coordination required across borders, scope economic importance, specific technologies required, level of product flexibility in satisfying various local market demands, and level of expected centralisation.

**Global area structure**

In a global area structure, all the subsidiaries within the region are treated equally. The enterprise’s strategy is to ensure all regions focus on the same global strategic vision. The enterprise’s domestic market has no special treatment for other regional markets. Each regional department tries to acquire resources and to manufacture products within its own region in order to get the best competitive advantage in its local markets. In general, the enterprise adopts the global area structure that has narrow product scope within the mature market. The table (Table 2.5) below shows the advantages and disadvantages of the global area structure.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regionalisation provides better coordination between the scope of economy and domestic demand</td>
<td>Lack of communications between regions and the global headquarters</td>
</tr>
<tr>
<td>The decision of regional strategy is made by the regional leader</td>
<td>Regional oriented mode has less focus of uniform product</td>
</tr>
<tr>
<td>Provides an integrated, centralised and focused global strategic vision</td>
<td>Problems arise in the global product plan</td>
</tr>
<tr>
<td>All regions are treated equally</td>
<td>Average level of centralisation</td>
</tr>
<tr>
<td>Increases the communications between subsidiaries in the region</td>
<td>Difficulty in research and development activities</td>
</tr>
</tbody>
</table>

Table 2.5: Advantages and disadvantages of the global area structure
Global product structure

Global product departments are created when the enterprise has transformed its organisation structure from an internal to a global product. These departments have full responsibility for the global products in marketing activities, financial management and production. The senior manager in charge of the global product department has similar authority to the subsidiary’s general manager. Each global product department is a profit centre and has great flexibility in autonomous operation. An enterprise adopts this model when it is in an early development stage, and the main objective is to advance the level of global coordination. The enterprise that has better coordination can force the scope of economy, and increase the product knowledge and communication technology between countries. The global product structure provides an integrated and centralised global plan in order to advance each subsidiary’s product promotion efficiency. It also offers the product’s specification and characteristic adjustment to satisfy the various local market demands. The table (Table 2.6) below shows the advantages and disadvantages of the global product structure.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>All the support functions are based on the product, not the region</td>
<td>Duplicates support functions within each global product department</td>
</tr>
<tr>
<td>Manufacturing of products is based on the customer’s requirements</td>
<td>The senior manager of the global product department normally comes from the domestic marketing department</td>
</tr>
<tr>
<td>Research and development activity focuses on the global customer requirements</td>
<td></td>
</tr>
<tr>
<td>Emphasis on the global market and across border coordination</td>
<td></td>
</tr>
<tr>
<td>Provides an integrated, centralised and focused global strategic vision</td>
<td>Subsidiary management focuses on pursuing the maximum investment returns</td>
</tr>
</tbody>
</table>

Table 2.6: Advantages and disadvantages of the global product structure

Global functional structure

Business functions are the major concern of enterprises adopting this model. In this model, each function is organised by the global headquarters. This is an unusual
organisation structure found in general business enterprises, but it can be found in natural resource industries such as mining and oil industries. The following table (Table 2.7) shows the advantages and disadvantages of the global functional structure.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small number of staff in the global headquarters</td>
<td>Difficult coordination in the regional production and marketing operation</td>
</tr>
<tr>
<td>High level of centralisation and coordination</td>
<td>Managers and staff have no responsibility in business achievements except for the CEO</td>
</tr>
<tr>
<td>Provides an integrated, centralised and focused global strategic vision</td>
<td>Serious management problems due to the large number of production lines</td>
</tr>
<tr>
<td>High level of functional expertise</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.7: Advantages and disadvantages of the global functional structure

**Enterprise’s core characteristics**

*Strategic point of emphasis*

In a traditional global organisation structure, the global headquarters organises all business activities and pursues the global strategic vision as the only objective. The original domestic and international departments are dismissed and replaced by a global headquarters. All the regional markets are treated equally, and there will be no special treatment for the domestic market.

*Global strategic vision*

The global strategic vision is decided by the global headquarters and is consistent. In other words, the entire enterprise emphasises the development and implementation of a single global strategic vision.

*Control and coordination*

The strategy of the traditional global organisation structure emphasises centralisation and coordination as the key to competitive advantage. The formation of this competitive advantage is the result of the creation of the global headquarters.
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**Domestic autonomy**
The enterprise does not emphasise the subsidiary’s autonomous authority. Instead, it focuses on the scope of economy, global sourcing in raw materials, components, labour and capital.

**Relationship between the global headquarters and subsidiaries**
The global headquarters and the subsidiary’s management level has direct and frequent communication paths. As most decisions are made by the global headquarters, the strategy flow is top-down.

**Relationship between subsidiaries**
Under the global organisation structure, the regional leader is responsible of controlling and coordinating all subsidiaries within the region. However, subsidiaries within different regions have less communication with one another.

**Enterprise culture**
The entire enterprise has a uniform strategic vision as its objective, and the enterprise culture is developed through the global headquarters.

**Selection of senior manager**
The enterprise’s senior managers are selected from the general managers of the domestic or foreign subsidiaries even though they have less global business experience.

**Strategic decision process**
The strategic decision process in a global organisation structure is highly centralised. The advantage of this is that each regional market has uniform products and faster market promotion.

**Information flow**
Information flow is also highly centralised and the flow direction is normally from the global headquarters to subsidiaries.
2.6.6 Transnational Organisation Structure

The development environment of the previous three (multinational, international, and global) organisation structures was very different from today’s market environment. None of them correspond to the requirement of today’s global integration, domestic differences and global creation. Each organisation structure (multinational, international and global) has its strengths and weaknesses in facing today’s economic environment. When the CEOs and senior managers choose one of these organisation structures as their foundation, business operations and activities will encounter some obstacles or critical factors. Some critical questions include:

1. Where will the industry go in the future?
2. Where will the enterprise go in the future?
3. How can the enterprise achieve its objective?
4. Which organisation structure can assist the enterprise in achieving the global strategic vision and plan?
5. What are the advantages and drawbacks of the organisation structure chosen?
6. What issues will arise when the enterprise wishes to encompass the central control and coordination, satisfaction of domestic market demand, and transference capability of knowledge and learning experience?

In order to resolve the above critical questions, Bartlett and Ghoshal (1998) have devised the “transnational solution”.

A transnational model contains a combination of the advantages of the traditional models (multinational, international and global).

“The transnational company defines the problem in very different terms. It seeks efficiency not for its own sake, but as a means to achieve global competitiveness. It
acknowledges the importance of local responsiveness, but as a tool for achieving flexibility in international operations. Innovations are regarded as an outcome of a larger process of organisational learning that encompasses every member of the company. This redefinition of the issues allows managers of the transnational company to develop a broader perspective and leads to very different criteria for making choices.”

In the transnational model, the management of assets and resources are presented in both centralised and decentralised formats. Some of the assets and resources may need to be centralised in the enterprise’s home country in order to realise the scope of economies, protect certain competencies and provide essential administration of enterprise management. Financial and business development functions are the typical resources that remain centralised in the enterprise’s home country. In addition, some other assets may also be centralised in the transnational model, but it is not necessary to be in the enterprise’s home country. For instance, a worldwide manufacturing plan of labour-intensive products may be located in the country that supplies a large number of workers with low salary rates. On the other hand, some resources may be better decentralised on a local-to-local basis in order to create flexibility and to avoid exclusive dependence on a single facility. This may prevent some disruptions and unforeseen situations such as exchange rate fluctuation, strikes, and natural disasters. The selective decision of resources centralisation and decentralisation in the transnational organisation structure is described as an integrated network.

In the transnational model, the role of subsidiaries varies in the business operations. In some markets, national subsidiaries adopt standard global products from headquarters and the role of the subsidiaries is limited to implementing the central decisions effectively. Some other subsidiaries are encouraged to differentiate or to develop products that other subsidiaries adopt. In this case, headquarters will give up its leadership power and hand it over to the subsidiary. In addition to the global products, there are a number of factors that are considered in determining the role of subsidiaries in the transnational model. These factors are government regulations,
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the availability of technologies and the position of global competitors.

Flows of knowledge and information are in both directions between headquarters and
the subsidiary and from subsidiary to subsidiary in the transnational enterprise. Some
knowledge or business solutions may be created by the joint effort of subsidiaries for
the dispersed units. The competence of knowledge creation in subsidiaries balances
the central solution dependency and provides the worldwide learning opportunity.

2.7 Summary

Rapid changes in the global competitive market causes enterprises to transform their
current business strategies and develop new strategic visions in order to advance their
global competitive advantages. Before a company starts developing its global strat-

ey, the CEOs and senior managers need to investigate and analyse the reasons that
force the company to go global.

Investigation and analysis of environment factors provides a fundamental concept to
domestic companies for the transition of globalisation. These factors can be further
classified into proactive and reactive environment factors.

The strategic thinking process allows the CEOs and senior managers to realise their
enterprises, how they look in the future and what they should perform to achieve
their business objectives. The CEOs and senior managers should also comprehend
the obstacles that will prevent the enterprise from developing the global strategy and
avoid the potential traps that will lead the enterprises in unsuccessful directions. A
well-recognised global strategy by an enterprise is the foundation of the enterprise’s
ongoing development and leads the enterprise towards successful globalisation.

Enterprises which operate their business outside of their home country should consider
and acquire the best model of organisation structure in order to effectively and effi-
ciently implement the overall business operations. Traditionally, there are three types
of organisation structures that provide organisations with the fundamental structures
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to conduct worldwide business operations. They are labelled multinational, international and global organisation structures.

As a result of understanding and analysing these three traditional organisation structures, each of them is partially effective, but no single one of them fulfils the requirements of the modern global business environment. Thus, Bartlett and Ghoshal devised the "transnational solution". A transnational model contains the combination of advantages of the traditional models (multinational, international and global). This model redefines the business operations to correspond with the global requirements and allows the senior managers to develop a broader enterprise perspective.
Chapter 3

Literature Review - Global Information Systems

Abstract

This chapter defines the term "Global Information Systems" and then identifies the components that are required in the successful implementation of a global information system. These components are: functional architecture, Internet technology, intranet and extranet infrastructures, middleware technology, groupware technology, and global information systems management.
3. LITERATURE REVIEW - GLOBAL INFORMATION SYSTEMS

3.1 What is a Global Information System?

An information system can be defined as a set of interrelated components working together to collect, retrieve, process, store, and disseminate information for the purpose of facilitating planning, control, coordination, and decision making in businesses and other organisations (Laudon & Laudon, 1993). Therefore, a global information system is an expansion of an information system that operates across geographical and time boundaries. In addition, Palvia et al. have also defined the global information system as "a computerised system which supports the business strategy of a multinational organisation and deals with components of the international market as a single market and not as individual markets" (Palvia et al., 1992). In a traditional business information system, the set of interrelated components are usually referred to as hardware, software, data, processes, and people (Shelly, 2001). However, it is necessary to consider a few additional components that are significant to information systems in the global context. These specific components as shown in Figure 3.1 are functional architecture, Internet technology, intranet and extranet infrastructures, middleware technology, groupware technology and indeed the global information systems management. The subsequent sections discuss each in detail.

*Functional architecture* specifies all business functions covered in a global information system and defines important concepts and relationships among the components (Treese & Stewart, 1998). It is needed for the development of a global information system to allow the flexibility for future business processes reengineering, expansion of business functions and information technology evolution.

*Internet technology* has been rapidly evolving and adapting to the modern business environment. Moreover, organisations need to consider a diversity of aspects in the application of global information systems. These aspects are identified as the important features, the system architecture, software and applications, database and
Intranet and extranet network models are methods to provide a range of information communication fundamentals within and between organisations. It is necessary for organisations to identify the boundary and scope in the early stage of global information systems development.

Middleware technology. – In a global environment, computer systems no longer consist of a single large computer servicing an organisation’s information processing needs. Instead, multiple computers interconnected by networks are used to manage and process information. Ideally, the various computers should function and be managed as a single system and the processing is distributed across the computers. There are a number of well-known architectures and infrastructures that support computer applications to work together across networks. These architectures and infrastructures are CORBA (Common Object Request Broker Architecture), NET\textsuperscript{TM}, Enterprise JavaBeans\textsuperscript{TM}, iPlanet\textsuperscript{TM}, WebLogic\textsuperscript{TM}, and WebSphere\textsuperscript{TM}.
Groupware technology - is technology designed to facilitate the work of groups. This technology can be applied to communicate, cooperate, coordinate, solve problems, compete, or negotiate. In the information technology context, groupware refers to a specific class of technologies relying on modern computer networks, such as email, newsgroups, or videophones.

Global information systems management. Although management seems to be a political perspective, the organisation could be in a serious situation if there is no proper management scheme that oversees the operation of the global information systems. Global information system management can be seen as the bridge to closing the gaps between the global information system and the global business strategy. A detailed discussion and study of the global information systems management are elaborated in chapter 5.

3.2 Functional Architecture

3.2.1 What Is Functional Architecture?

Functional architecture deals with the architecture of the information system as viewed by the business. It deals with understanding, modelling and improving on the way information is captured, analysed and presented to the users. As functional architecture depends on the nature of the business, different types of business would have different architectures. For example, an architecture developed for a department store system might be very different from that for a travel and touring system.

3.2.2 Differentiating From Other Architectures

As mentioned in the previous section, functional architecture is considered as an abstract view of the organisation in terms of business processes. It could be interpreted as the senior executive’s vision of the business in the context of information systems.
To distinguish it from other architectures, here I am delineating two other important architectures in the information systems environment. They are network architecture and software architecture.

**Network architecture**

Network architecture deals with the technical communication components of the information systems. It provides the architecture of communications between computers. The two essential components of the network architecture are firstly compatible hardware, and secondly, compatible software. By analogy to the telephone system, for two households to communicate, they both must use telephone receivers that operate on the same electrical principles, connected to the same cabling system (hardware); and they both must use the same language when speaking (software).

The design of any network architecture is often based upon the OSI (Open Systems Interconnect) seven-layer network model (Day and Zimmermann, 1983) that was codified by the International Standards Organisation.

The OSI seven layers are briefly outlined as follows:

1. Physical - cable or media standards.

2. Data Link - format of data on the network and how it flows.

3. Network - provide routing and related functions that enable multiple physical network segments to be combined into an internetwork.

4. Transport - provide reliable process-to-process communication.

5. Session - is the concept of tying to bring multiple transport streams into a single ”session”.

6. Presentation - issues of data format conversion, compression, encryption, and so on.
7. Application - is the actual implementation of software applications by users.

**Software architecture**

Software architecture involves the description of components from which systems are built, interactions among those components, patterns that guide their composition, and constraints on these patterns (Shaw & Garlan, 1996). Components include things such as clients/servers, databases, filters, and layers in a hierarchical system. Ideally, each component is defined and designed independently, thus the component can be reused within different contexts.

The characteristics of software architecture are:

1. It is at a high-enough level of abstraction that the system can be viewed as a whole.

2. The structure must support the functionality required of the system. Therefore, the dynamic behaviour of the system must be taken into account when designing the architecture.

3. The architecture must conform to the system qualities (also known as non-functional requirements). These quality requirements include the software performance, security and reliability requirements associated with current functionality, as well as flexibility or extensibility requirements associated with accommodating future functionality at a reasonable cost of change. Some of these may conflict and require alternatives but it is essentially part of the software architecture design.

4. At the software architectural design level, all implementation details are hidden.

A variety of architectural styles exist that can be utilised to model, construct, and analyse a system. Each style has capabilities that are suitable for use in their specific areas. These range from pipe-and-filter descriptions to others that allow for more
complex interactions and reuse. Some common architectural styles with corresponding categories are listed in Table 3.1.

<table>
<thead>
<tr>
<th>Category</th>
<th>Architectural style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dataflow systems</td>
<td>Batch sequential</td>
</tr>
<tr>
<td></td>
<td>Pipes and filters</td>
</tr>
<tr>
<td>Call-and-return systems</td>
<td>Main program and subroutine</td>
</tr>
<tr>
<td></td>
<td>OO systems</td>
</tr>
<tr>
<td></td>
<td>Hierarchical layers</td>
</tr>
<tr>
<td>Independent components</td>
<td>Communicating processes</td>
</tr>
<tr>
<td></td>
<td>Event systems</td>
</tr>
<tr>
<td>Virtual machines</td>
<td>Interpreters</td>
</tr>
<tr>
<td></td>
<td>Rule-based systems</td>
</tr>
<tr>
<td>Data-centred systems (repositories)</td>
<td>Databases</td>
</tr>
<tr>
<td></td>
<td>Hypertext systems</td>
</tr>
<tr>
<td></td>
<td>Blackboards</td>
</tr>
</tbody>
</table>

Table 3.1: A list of common architectural styles (Shaw & Garlan, 1996)

**Comparison of architectures**

Although functional, network, and software architectures are all built for information systems, they are quite different in their features and objectives as well as the level and stage of information systems development. The following table (Table 3.2) summarises these architectures in terms of objectives, features, and the stage in the information systems development cycle.

**3.2.3 Importance of Functional Architecture in Global Information Systems**

It is very important to have a general functional architecture in the global information systems. The reason is that as the business refines and evolves its strategic vision and business operations, the information systems will need to evolve as well. This is even critical during the global transition process.

The core idea of the functional architecture is to develop the appropriate and flexible
global information systems that can be unreservedly operated within and across the organisation. To do this, the organisation must address issues related to the global transition process and identify possible solutions. In some cases, these issues are considered explicitly during the development phase; in other cases, these issues and their solutions are reflected in assumptions about various components in the architecture. The approach of developing a successful architecture involves two important ingredients: understanding of roles and decomposition of functions (Treese & Stewart, 1998).

**Understanding of roles**

Understanding various roles and users for the organisation’s information systems helps the organisation to ensure the developed information systems will meet the objectives of the business visions and facilitate users to accomplish daily business activities. It is crucial in the global business environment than organisations only operate locally. In global information systems, business units are dispersed everywhere over the world and users are from different backgrounds, cultures, and have quite distinct social expectations. In order to make sure each user carries out business tasks smoothly, understanding the potential roles and users is suggested as the essential primary stage.

<table>
<thead>
<tr>
<th>Level/stages</th>
<th>Functional architecture</th>
<th>Network architecture</th>
<th>Software architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>Business views of the information systems</td>
<td>Technical communications views of the information systems</td>
<td>Technical components views of the information systems</td>
</tr>
<tr>
<td>Features</td>
<td>Identifying and understanding roles of potential users, and decomposition of business processes into smaller functional units</td>
<td>Based on OSI seven layers network model</td>
<td>Variety of architectural styles in the categories as dataflow systems, call-and-return systems, independent components, virtual machines, and data-centred systems</td>
</tr>
<tr>
<td></td>
<td>Early analysis stage</td>
<td>Early design stage</td>
<td>Design stage</td>
</tr>
</tbody>
</table>

Table 3.2: Comparison of functional, network, and software architectures
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in the development of global information systems.

**Decomposition of functions**

The second important part of functional architecture is to decompose business processes into smaller function units. In global information systems development, a single business process may be operated through multiple business units (such as subsidiaries or branches). Applying the functional decomposition method to partition business processes into function units and identify the interface between function units could reduce the complexity and confusion in the system architecture design phase. Moreover, it also helps the organisation to identify any unnecessary functions that could be eliminated or reengineered as well as enhancing functions with information technology.

### 3.3 Internet Technology

#### 3.3.1 A Brief History of the Internet

The Internet started as an academic and research tool for government (Advanced Research Projects Agency Network - ARPANET) (Hauben, 2002), educational and non-profit organisations around 1960s.

In the 1970s, the first email program was created and the TCP/IP protocol was developed to allow diverse computer networks to interconnect and communicate with each other. Ethernet was also developed in this period, which allowed coaxial cable to carry fast travelling data between computers. This was a crucial component to the development of Local Area Networks (LANs).

In the early 1980s, the University of Wisconsin created Domain Name System (DNS). This allows packets to be directed to a domain name, which would be translated by the server database into the corresponding IP number. Thus, the Internet users could
access other servers by keying domain names rather than a 12-digit IP address. In 1985, The National Science Foundation (NSF) began deploying the new T1 backbone lines (1.544Mbps).

In 1991, the World Wide Web was released by the Corporation for Research and Educational Networking (CREN). A year after, the National Science Foundation Network (NSFNET) backbone upgraded to T3 (44.736Mbps) (Gromov, 1995).

After 1995, every business was at least thinking about getting a Web site. Online services exploded when they offered connections to the Internet and the World Wide Web. Traffic on the Internet was increasing at an exponential rate. Most Internet traffic is carried by backbones of independent ISPs, including Telstra, Optus, AT&T, UUunet, and many more. Currently the Internet Society is trying to envisage a new TCP/IP to be able to have billions of addresses, rather than the limited 12 digits of an IP address today.

### 3.3.2 Salient Features

The important features of the Internet ensured its rapid growth to prominence and popularity, and the potential application for global businesses.

1. Global coverage - the Internet reaches nearly everywhere in the world. Most developed and developing countries have full coverage in terms of the Internet population and the number of computers. The few small coverage countries are those nations with poor computing and telecommunication technology.

2. A large number of users - based on Nielsen NetRatings Internet users tracking service in February 2002, the worldwide Internet Population is around 445.9 million. Business and home users are the fastest growing user sectors in Australia as well as other nations. Over half of Australia’s 1.2 million small businesses used the Internet to find information and deal with customers during 2001. This is based on the latest figures released by the Australian Bureau of Statistics.
3. ACCESSIBILITY - it is extremely simple and straightforward to connect to any other computers through the Internet. Once connected to the Internet, the users can access, share and exchange information between other computers.

4. AVAILABILITY - things required to access the Internet (such as hardware, software, communication link, manuals and help) are broadly available in all later models of personal computers. Usually the Internet browser and connection software are included in new personal computer packages.

5. EASE OF USE - the installation of software packages and the setup of the initial connection may require a little bit of experimentation. However, embedded instruction is usually available to guide users through the installation and setup. Once the user is connected to the Internet, browsing is a convenient method of experiencing the Internet.

6. LOW USAGE COSTS, BIG BENEFITS - sending and obtaining information through the Internet is extremely economical in contrast to the international business telephone calls and fax transmission of business documents to the other side of the world. By using email to send and receive information, it reduces not only the transmission costs but also cuts down the usage of paper.

7. INFORMATIVE FOR USERS - users have opportunities to select and obtain fruitful information and knowledge published on the Internet by government organisations, educational institutions, and many others.

8. INTERACTIVITY - users are encouraged to communicate with websites interactively. For example, users may wish to requesting information, posting comments, obtaining feedback, responding to other people’s queries and so forth. Thus, users are in full control and enjoy this interactivity much more.
hand, organisations owning these websites have developed better relationships
with customers (the Internet users).

### 3.3.3 Important Concerns

In order to fully utilise the above Internet features, organisations need to be aware of
several issues that would detract from the Internet’s usefulness and pose disadvantages
to the businesses.

1. Information reliability - information found on the Internet is as reliable as in-
formation anywhere. It depends on the credibility of the source or organisation.
However, because the nature of the Internet enables anyone to publish whatever
they want and none of the parties are responsible to validate it, much of the
material tends be quite subjective and sometimes wrong.

2. Copyright - once the organisation puts the information onto the Internet, it is
available across the world. The information could include the organisation’s
general background in text, pictures, graphics or drawings of product specifica-
tions, and all the design ideas and constructs which go with them. By the time
that material is being accessed in far away countries, any problems of copyright
are greatly increased.

3. 1. Computer viruses - through transferring files from the Internet to local
computers it may be possible to catch computer viruses. This might be a web
page or a file from an ftp site. It is better to download files from reputable ftp
servers, and to use virus-checking software regularly.

4. Security - is one of the major issues that continue to raise concerns with all those
involved with the Internet. There is almost an uncountable number of ways
that an organisation’s e-business website could be attacked by hackers, crackers
and disgruntled insiders. Serious damage could be caused when the e-business website is connected with the organisation’s internal information systems.

3.3.4 Content Management System

A content management system (CMS) is a system that facilitates efficient and effective management of Website content (Lucid DataStreams, 2002). Website content is in essence, any type of digital information that is used to populate a Web page. It can be text, images, graphics, video, sound and so on. A CMS typically contains two primary elements: the content management application (CMA) and the content delivery application (CDA). The CMA is a Web interface that manages the creation, modification, and removal of content from a Website. The information entered in the CMA will be stored in a database suitable for the amount of content and traffic the Website will receive. The CDA compiles the page template and the dynamic content (the information entered through the CMS) and delivers it as a normal Web page. The transfer from CMA to the content database happens immediately upon the submission of new content. Thus, the users could obtain the latest information from the Website in almost real-time.

Some common features of a CMS include:

1. Web-based publishing - allows individuals to use a template or a set of templates approved by the organisation, as well as wizards and other tools to create or modify Web content.

2. Format management - allows documents, including legacy electronic documents and scanned paper documents, to be formatted into HTML or Portable Document Format (PDF) for the Web site.

3. Revision control - allows content to be updated to a newer version or restored to a previous version. It tracks any changes made to files by individuals.
4. Indexing and searching - indexes all data in the Website and provides key word search functions.

There are two important factors that an organisation might consider before investing in a CMS. Firstly, an organisation’s structure and geographic dispersion must be considered, especially if an organisation is spread out over several countries. For these organisations, it is better to keep the Website content database centralised. However, it might decrease the performance of the CMS and impact on the operations of backend applications in the global information systems. The second factor relates to the documentation standards. The diversity of the electronic data forms used within the organisation could become very difficult to manage in the CMS environment. The organisation might want to standardise its internal documentation formats to eliminate the overheads in the management of Website contents.

Two popular content management systems have been explored and are briefly described as follows.

Poet Catalogue Management System was designed by Poet Software Corporation (2002). Poet has a suite of supplier-centred catalogue management software including applications for suppliers, buyers, Internet market makers, and application service providers. The Poet catalogue management system is able to communicate with all major e-catalogue exchange formats used in the B2B e-commerce environment. It systematises data conversion, simplifies catalogue/content maintenance, and generates customised catalogues on demand.

Another popular content management system is Computer Associates’ (CA) CleverPath® Enterprise Content Manager (2002). It is designed to capture, store, manipulate and publish various types of enterprise content, including business documents, presentations, video, audio and many other forms. Its advanced content publishing capabilities and open standards architecture enable effective organisation of content and digital asset management.
3.3.5 Web Database Application Servers and Programming Solutions

Everyware Tango

Everyware Tango is a server-based Web database application development system designed by Pervasive Software Inc (2002). It is designed and aimed for customer-centred development products such as Web shopping basket, shopping cart, and other e-commerce applications. The core of Tango’s functionality is an integrated development environment. The drag-and-drop development interface facilitates an easy development environment for users. In addition, Tango system contains an extensive set of metatags to provide an extraordinary range of database and Web functionality. The main features of the Tango system include:

1. It provides a visual drag-and-drop Web database application development environment.
2. It can be implemented across multiple platforms such as Windows, Macintosh, and Unix.
3. It provides a comprehensive set of metatags for specific tasks for Web database applications.
4. The integrated SQL query tool provides a quick way to construct SQL statements for any database activities.

Active Server Pages

Microsoft® Active Server Pages (ASP) is an open, compile-free application environment in which developers can combine HTML, scripts, and reusable ActiveX server components to create dynamic and powerful Web-based business solutions (Microsoft, 2002e). Active Server Pages enables server-side scripting for IIS with native support for both VBScript and Jscript.
An Active Server Pages application can integrate with any ODBC-compliant database including Microsoft SQL Server\textsuperscript{TM}, Oracle, Sybase, Informix, and DB2 databases. Any OLE 2 application, such as Lotus Notes or Microsoft Excel, can also be scripted to access or process information.

Main features of the Active Server Pages are:

1. It provides native support for both Microsoft JScript and VBScript.
2. It can work with any Web browser. The output of an ASP file is plain HTML.
3. It allows developers to define application and session variables that can be carried across multiple pages in a Website. For example, it can provide a tracking product function for an online shopping application.
4. It provides an easy way to bring legacy database applications to the Web.
5. It supports ActiveX server components written in any language, including Java.

Cold Fusion

ColdFusion Server is a Web application server designed by Macromedia Inc (2002). It is the complete application server for deploying and managing enterprise and e-commerce web applications. ColdFusion uses its own tag-based scripting language - ColdFusion Markup Language (CFML) together with HTML and XML for Website development. Developers can create customised tags, user-defined functions and integrate with Java, C, C++, COM (Component Object Model), CORBA, and EJB (Enterprise JavaBeans). The ColdFusion environment can be applied to multiple levels of global information systems. For example, from the internal perspective, it can be deployed as a part of the enterprise’s intranet architecture where the business information and data are exchanged and operated. On the other hand, the external perspective, it can be used as the fundamental infrastructure of the organisation’s Website for the activities of information sharing and exchanging between customers.
and suppliers.

Features of ColdFusion in the context of global information systems include:

1. It supports database connections through ODBC drivers or OLE-DB.
2. It integrates with enterprise applications via COM, Enterprise JavaBeans, or CORBA through a tag-based interface.
3. It delivers the appropriate information quickly by enabling users to search up to 250,000 documents with the integrated Verity K2 search engine.
4. It allows applications to be deployed to systems running Windows, Solaris, Linux, or HP-UX.

**CGI**

The Common Gateway Interface (CGI) is a standard for interfacing external applications with information servers, such as HTTP or Web servers (Ashenfelter, 1999). A CGI program is executed in real-time to provide Web clients or Internet users with dynamic information.

For example, an organisation wants to connect a database to its Website and allow people from all over the world to query it. Basically, a CGI program needs to be created that the Web daemon will execute to transmit information to the database engine, and receive the results back and display them to the client. In many cases, CGI applications are designed to accept input from HTML forms, in the client environment and server environment. That is, the HTML forms can be seen as the front end for accessing a database application on the server.

An important feature of CGI is that CGI is a common denominator for running web applications. It is designed to provide a gateway between Web servers and other applications on the server. In addition, it is part of the HTTP standard and available on all commercial Web servers.

As the CGI and Web server are tightly linked together, the security concern becomes
a very important issue for CGI applications. The most common way of ensuring the security of CGI applications is that CGI programs are located in a special directory (/cgi-bin) with certain restriction rules. This directory is usually under direct control of the Webmaster and the general user is prohibited from creating or modifying CGI programs.

A CGI program can be written in any language that allows it to be executed on the system, such as C/C++, Fortran, PERL, TCL, Any Unix shell, Visual Basic, and AppleScript. However, PERL is the most popular language in the CGI programming world.

The CGI architecture is illustrated in Figure 3.2 and its characteristics are summarised in the following table (Table 3.3.).

<table>
<thead>
<tr>
<th>Platforms</th>
<th>Almost all Web servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>Applies to all Web servers</td>
</tr>
<tr>
<td></td>
<td>Allows any script or programming language for CGI programming</td>
</tr>
<tr>
<td>Drawbacks</td>
<td>Slow performance</td>
</tr>
<tr>
<td></td>
<td>Difficult to write programs for accessing databases</td>
</tr>
<tr>
<td>Costs</td>
<td>Included in all Web servers</td>
</tr>
</tbody>
</table>

Table 3.3: CGI characteristics

Java

Java technology has two main parts: the programming language and the platform. Java programming language is a high-level object-oriented language. It was designed to develop programmes that run in a distributed network background such as the Internet, intranet, and extranet environment. It is an ideal development language for Web-based applications. It also provides better performance than many other Web development tools.

A platform is the hardware or software environment on which a program runs. Most
platforms can be described as a combination of the operating system and hardware. However, the Java platform differs from most other platforms because it is a software-only platform that runs on top of other hardware-based platforms.

The Java platform has two components:

1. The Java Virtual Machine (Java VM) - is an independent run-time environment that provides the execution of a relevant JAVA package and underlying codes.

2. The Java Application Programming Interface (Java API) - is a large collection of ready-to-use software components that provide many useful capabilities, such as graphical user interface (GUI) widgets. The Java API is grouped into libraries of related classes and interfaces; these libraries are known as packages.

The JAVA Platform architecture is illustrated in Figure 3.3 and its characteristics are summarised in the following table (Table 3.4.).
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Table 3.4: JAVA platform characteristics

<table>
<thead>
<tr>
<th>Platforms</th>
<th>Windows, Solaris, Macintosh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>Platform-independent, object-orient programming language for network applications</td>
</tr>
<tr>
<td>Drawbacks</td>
<td>Compatibility problems</td>
</tr>
<tr>
<td>Costs</td>
<td>Free (from SUN JDK)</td>
</tr>
</tbody>
</table>

Figure 3.3: JAVA platform (Sun, 2002c)

3.3.6 Internet Access

Deciding the Internet access method is the initial point for organisations to put their e-business operations into implementation. To choose an appropriate access method organisations need to consider two important features. These two features are the bandwidth and the cost. The bandwidth depends upon the type of connection device, and generally the higher the bandwidth the more expensive the connection and access costs. As businesses continue to move to the Internet, high-speed access has become a significant strategic component. However, the competing claims of various providers often make it difficult to know which technology is best for the organisation. The rest of this section discusses several access methods that are available from most Internet Service Providers (ISPs).

Dial-Up

A Dial-Up connection uses a modem through the phone network to connect to the Internet. This is the most popular and inexpensive type of Internet access. Both organisations and individuals are able to use the dial-up connection to access the
Internet anywhere (home or office). However the limited speed is the main concern for organisational users. Typical dial-up connection speeds are 28.8K, 33.6K and 56.6Kbps. This type of connection is mainly aiming for the B2C (Business to Consumer) market.

**ADSL**

ADSL (Asymmetric Digital Subscriber Line) transmits an asymmetric data stream with more speed for downloading data and less speed for uploading data. It is oriented towards residential and home office users who generally download bigger files than they send. ADSL is based on the telephone infrastructure, however, it is not widely available everywhere. The cost of ADSL connection is more expensive than the dial-up connection due to the faster transmission speed. It is targeting at small and medium-sized enterprises and SOHOs (Small Offices Home Offices) for elementary B2B (Business to Business) markets. Transmission speed varies from 256Kbps to 1.5Mbps for downloads and from 64Kbps to 256Kbps for uploads (Telstra, 2002a).

**Cable**

Cable modems are used to connect to the Internet through a coaxial cable. Often the same line is used that carries the cable TV service. A cable Internet connection typically uses the bandwidth provided by an unused television channel. The cost of a cable connection is more or less the same as the ADSL, however it is not as widely available as the ADSL, especially in some rural areas where the cable infrastructure is considered to be an infeasible investment. The main customer domain is the individual home user who has already installed the cable TV facility. For this reason, it is mainly focused on the B2C market. The speed varies depending on how many subscribers are signed up in a particular area. The maximum is about 30Mbps, but more typical speeds are less than those of a 10Mbps Ethernet LAN (Telstra, 2002b).
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Satellite

Satellite Internet access is ideal for rural Internet users who want broadband access. It can be used to access the Internet virtually anywhere. For example, a mining company situated in Cooper Pedy\(^1\) (an opal mining town in South Australia) may require a satellite connection to facilitate daily mining data transmission to its head office through the company’s Website and to access the company’s Internet-based information systems. Satellite Internet does not use telephone lines or cable systems, but instead uses a satellite dish for two-way (upload and download) data communications. Upload speed is about one-tenth of the 500 kbps download speed. Two-way satellite Internet uses Internet Protocol (IP) multicasting technology, which means up to 5,000 channels of communication can simultaneously be served by a single satellite. IP multicasting sends data from one point to many points (at the same time) by sending data in compressed format.

ISDN

ISDN (Integrated Service Digital Network) was designed for digital data and voice transmission. ISDN can have two 64Kbps channels, one for voice and one for data. The two channels can be combined to provide up to 128Mbps. It is a traditional and expensive Internet connection method for enterprises that are medium to large-sized. ISDN provides a stable and constant connection to organisations that rely heavily on data transmission across the Internet. ISDN connection can be categorised as a part of the B2B market facilitators.

Fixed-point Wireless Internet Access

The last 2 years have seen a flurry of development in the wireless data communication equipment arena. Commodity equipment is suddenly fast enough for useful Internet

\(^1\)Cooper Pedy – Opal Capital of the World, details can be found from http://www.cpcouncil.sa.gov.au/
connections, and wireless is emerging as a mainstream technology for business Internet access. Wireless Internet Access is approximately 400 times faster than a dial-up (28.8Kbps) connection, about 2 times faster than the fastest DSL and several times faster than cable modems. It is an ideal of the mobile commerce market.

**T1 and T3 leased line**

A leased line (T1 or T3) is a dedicated, point-to-point, digital Internet connection capable of very high data transfer rates with extremely low latency. Full T1 service provides a 1.544 Mbps bi-directional high-speed connection to an ISP’s backbone. A T3 leased line provides a 45 Mbps connection, which is about 30 times faster than a T1 line. Both T1 and T3 are the ideal Internet access connection from large-scale corporate access needs to hosting e-commerce servers or deploying Intranets, Extranets, VPN (Virtual Private Network) and B2B solutions. These are the most expensive access types among the other methods mentioned above.

**Comparison of Internet access methods**

The following table (Table 3.5) summarises the available transmission speeds, costs, main user domains, and main Internet market domains of each Internet access method.

### 3.4 Intranet and Extranet Business Network Models

An intranet is a network within an organisation that uses Internet technologies to enable users to find, use, and share documents and Web contents (Bickerton et al., 1998). Intranets have some similarities to Internet-based Web sites, starting out as departmental or corporate email systems and evolving into a broadcast medium for
managing internal information, including Web-based documents as well as access to existing systems and data repositories. Intranets use traditional Internet protocols, TCP/IP and HTTP to transfer data. They usually reside behind firewalls, for security, and are not limited by physical location. In some large companies intranets are used as the primary way for employees to obtain and share work-related documents, share knowledge, collaborate on designs and access e-learning facilities.

Generally, an intranet has two fundamental functions:

1. Intranet provides secure, customised access to relevant, up-to-date information found in internal business transaction systems; and

2. Intranet lets users act on that information by managing how it flows through process systems.

These applications are used within and across workgroups to manage product development, human resources, inventory management, sales force automation and other internal business processes.

Extranet, then, refers to a private network that uses the Internet protocol and the public telecommunication system to securely share part of a business’s information.
or operations with suppliers, vendors, partners, customers, or other businesses (Bickerton et al., 1998). An extranet can be viewed as part of a company’s intranet that is extended to users outside the company. For example, in an extranet, a customer service system faces both inward towards the customer service personnel and management as well as outward towards the customers themselves, who enjoy a similar level of interactivity and security as an internal participant. As the extranet evolves, it extends not only data but also actual transactions to the Internet to conduct electronic commerce. Similarly, it lends itself to internal global organisational integration by sharing internal and external data with processes that span all existing systems.

3.4.1 New emerging business network model - Ultranet

In addition to the intranet and extranet, Matsumura described the new emerging network model - ultranet (Matsumura, 1997). The key elements of ultranet implementation are foreshadowed by the combined usage of the latest technologies including Java, IPv6 (Internet Protocol version six), SET (Secure Electronic Transaction), OODBMS (Object-Oriented Database Management System), and XML. The concept of IPv6 is that every connected device would be provided with a unique identity. Thus, it allows people and collections of databases to link through multiple remote servers and/or devices, instead of the traditional client/server model. The increase of the connectivity and the flexibility of delivering and receiving information seem to be the major benefits for organisations adopting the ultranet model.

3.5 Middleware Technology

Middleware is connectivity software that consists of a set of enabling services that allow multiple processes running on one or more machines to interact across a network. The relevance of middleware to Global Information Systems is immense. This
is because middleware provides the necessary glue that brings together disparate information systems. This glue becomes more important in the global context because information systems are themselves spread out.

As outlined in Figure 3.4, middleware services are sets of distributed software that exist between the application and the operating system and network services on a system node in the network.

![Diagram of middleware services](image)

Figure 3.4: Use of middleware (Bernstein, 1996)

Here, I am discussing some popular middleware technologies and standards, and some well-known products that enable information systems to be global.

### 3.5.1 CORBA\textsuperscript{TM}

CORBA\textsuperscript{TM} is the acronym for Common Object Request Broker Architecture, Object Management Group’s (OMG) open, vendor-independent architecture and infrastructure that computer applications use to work together over networks (OMG, 2002a).
Using the standard protocol IIOP (Internet Inter-ORB Protocol), a CORBA based program from any vendor, on almost any computer, operating system, programming language, and network, can interoperate with a CORBA based program from the same or another vendor, on almost any other computer, operating system, programming language, and network.

CORBA provides the mechanisms by which objects transparently make requests and receive responses, as defined by OMG’s ORB (Object Request Broker). A CORBA ORB provides a wide variety of distributed middleware services. The ORB lets objects discover each other at run time and invoke each other’s services. An ORB is much more sophisticated than alternative forms of client/server middleware including traditional Remote Procedure Calls (RPCs), Message-Oriented Middleware (MOM), database stored procedures, and peer-to-peer services. It is the foundation of OMG’s Object Management Architecture. Figure 3.5 illustrates the architecture of CORBA ORB framework.

CORBA ORB provides some of the following features (Orfali & Harkey, 1998):

![CORBA ORB framework architecture](image)
1. Static and Dynamic Method Invocations: CORBA ORB allows to either statically define the method invocations at compile time or it permits dynamically discover them at run time (referred to as Dynamic Invocation Interface))

2. High-Level Language Bindings: CORBA separates interface from implementation and provides language neutral types that make it possible to call objects across language and operating system boundaries.

3. Built-in Security and Transactions: The ORB includes context information in its messages to handle security and transactions across machine and ORB boundaries.

4. Coexistence with existing systems: Using CORBA IDL, it is possible to make existing code look like an object on the ORB, even if it is implemented in stored procedures, COBOL or C++. Basically the code can be written in any language and then can be connected through ORB.

5. Local/remote transparency: An ORB can run in standalone mode on a laptop, or it can be interconnected to every other ORB in the universe using CORBA’s IIOP services.

6. Polymorphic messaging: In comparison with other middleware, an ORB does not invoke a remote function, it invokes a function on a target object.

7. Self-describing system. CORBA provides run-time metadata for describing every server interface known to the system.

3.5.2 MDA

Model Driven Architecture (MDA) is the latest development in standardising architectural modelling and information systems integration solutions by OMG (Object Management Group, 2002b). This could be helpful to other architectures, even
for the functional architecture discussed earlier in this chapter. The MDA defines an approach to IT system specification that separates the specification of system functionality from the specification of the implementation of that functionality on a specific technology platform (OMG, 2000c). The MDA’s core architecture is based on the existing OMG’s modelling standards (see Figure 3.6): UML (Unified Modelling Language), MOF (Meta-Object Facility) and CWM (Common Warehouse Meta-model). The MDA provides the UML modelling standard, which is the mechanism that integrates and implements technologies such as Java, XML or the Web Application Servers such as WebLogic™ and WebSphere™.

The MDA provides the following features to its users:

1. Organisations are able to build new MDA-based applications with the flexibility of choosing the middleware. This provides a platform independent of the applications and allows any future needs to migrate to different middleware.

2. The MDA-based applications are inter-operatable with other MDA-based applications internally in the organisation as well as inter-connectably with suppliers, customers, and other business partners. This feature enables organisations to establish a consistent architecture in both internal and external operations.

3. The function of integration provided by MDA is important for the organisation’s existing information systems that has a large legacy heritage and needs to be integrated with the new global information system architecture. The MDA standards facilitate the development of new software applications while preserving the investment in the existing business processes and operations.

4. Developers are provided with the ultimate flexibility in code generation from a platform-independent model. The application module reusability and domain specific model provide organisations with a faster return on investment period and the applications are supported and maintained in a long-term cost-effective cycle.
5. Application models are developed, viewed, and manipulated via UML, transmitted via XMI, and stored in MOF repositories.

6. The development of MDA-based applications through the UML modelling will increase software quality and extend the useful lifetime of designs.

Figure 3.6: OMG’s Model Driven Architecture (OMG, 2002d)

3.5.3 Microsoft®.NET™

Microsoft®.NET is the Microsoft XML Web services platform. XML Web services allow applications to communicate and share data over the Internet, regardless of the operating system, device, or programming language (Microsoft, 2002b). Table 3.6 outlines the four elements (client, services, servers, and tools) of the Microsoft®.NET platform.
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<table>
<thead>
<tr>
<th>Platform elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart clients and devices</td>
<td>&quot;Smart&quot; client software applications enable PCs and other smart devices to act on XML Web services, allowing anywhere, anytime access to information.</td>
</tr>
<tr>
<td>XML Web services</td>
<td>XML Web services are small, reusable component applications that can be connected like building blocks to perform tasks on behalf of users.</td>
</tr>
<tr>
<td>.NET servers</td>
<td>The Microsoft .NET server infrastructure is the key to deploying, managing, and orchestrating XML Web services.</td>
</tr>
<tr>
<td>Developer tools</td>
<td>By using Microsoft Visual Studio®.NET and the Microsoft .NET Framework as the development tools, developers are able to build, deploy, and run XML Web services.</td>
</tr>
</tbody>
</table>

Table 3.6: Elements of the Microsoft®.NET platform

**The Microsoft®.NET Framework**

The goal of the Microsoft .NET Framework is to make it easy to build XML Web services and applications. In addition, it also has a dramatic effect on every kind of application such as simple client applications and distributed applications.

The .NET Framework consists of three main parts: the common language runtime, a hierarchical set of unified classes, and a component-based version of Microsoft Active Server Pages known as Microsoft ASP.NET. (see Figure 3.7)

*The common language runtime* is built on top of operating system services. It is responsible for actually executing the application. The runtime supplies many services that help simplify code development and application deployment while improving application reliability.

*The unified classes* provide a unified, object-oriented, hierarchical, and extensible set of class libraries, or APIs (Application Programming Interfaces), that developers can use from any programming language.

**ASP.NET** is a set of classes within the unified class library. ASP.NET provides a
Web application model in the form of a set of controls and infrastructure that make it simple to build Web applications.

Microsoft® also introduces an object-oriented programming language called "C#" (pronounced as “C sharp”). C# is a modern, object-oriented language that enables programmers to quickly build a wide range of applications for the Microsoft .NET platform (Microsoft, 2002a). C# is designed to architect a wide range of components from high-level business objects to system-level applications. These components can be converted into XML for deployment on any platforms.

As the Microsoft®.NET enables software applications to work together among and between organisations, global information sharing and exchanging tasks are easier to control and manage. It even creates greater opportunities to connect with suppliers, customers, and consumers. Further, by applying .NET technology, organisations will also realise the improvements of the time and cost associated with information systems development as well as benefiting from empowering employees with the ability to act on vital information anywhere, from any smart device.
.NET features in Global Information Systems

1. Corporate Web sites can be seen as one of the important elements for organisations pursuing globalisation. The Microsoft .NET facilitates the Web sites to interact with one another as well as with existing systems and applications.

2. XML Web services present the opportunity to bridge information and applications written in different programming languages and residing on differing platforms. In this manner, applications from departments in a New York office and a Sydney office can share information.

3. The Microsoft .NET allows dispersed employees to working together on a single project. It enhances the way of exchanging information, improves communications with customers, and provides the flexibility of accessing information without having to completely synchronise every user’s different IT tools.

4. The Microsoft .NET provides a real-time collaboration environment that helps organisations address any operational issues in real-time, anytime, and from anywhere. This results in faster problem resolution and improved capture of distributed enterprise knowledge, leading to shorter development cycles, accelerated time-to-market, higher product quality, and lower development and production costs.

5. The improvement of development times on the global information system applications is because the .NET Framework provides a single development platform and eliminates the integration and maintenance issues.

3.5.4 Enterprise JavaBeans™

The Enterprise JavaBeans architecture is component architecture for the development and deployment of component-based distributed business applications. Applications written in the Enterprise JavaBeans architecture are scalable, transactional,
and multi-user securable. These applications may be written once, and then deployed on any server platform that supports the Enterprise JavaBeans specification (Sun, 2002a).

The main features of Enterprise JavaBeans\textsuperscript{TM} over global information systems are:

1. It provides the standard for developing distributed business application components in global information systems under the Java\textsuperscript{TM} programming environment.

2. It supports multi-vendor components to be combined into applications. For example, cross-border development teams could apply different tools in building application components, and employ the Enterprise JavaBean architecture to integrate the built components into the applications that form parts of the global information systems.

3. It provides the ability to distribute the developed components in multiple platforms without the processes of rewriting and recompiling the programming sources.

### 3.5.5 IPlanet\textsuperscript{TM}

IPlanet\textsuperscript{TM} E-Commerce Solutions, a Sun-Netscape Alliance are built using the extensible open standards of the Sun\textsuperscript{TM} Open Net Environment (Sun ONE)(Sun, 2002b). It aims to provide the interoperability and reusability as the foundation of Web applications and services.

In the global business environment, most organisations began using portals to aggregate enterprise applications into a single interface. Organisations realised that dynamic, personalised Web content delivery is essential to achieve superior portal efficiency, workflow, and usability. IPlanet\textsuperscript{TM} Integration Services are suitable to be applied in the global information systems for complex enterprise application integration (EAI) and secure business-to-business (B2B) integration.
3. LITERATURE REVIEW - GLOBAL INFORMATION SYSTEMS

The key features of iPlant\textsuperscript{TM} Integration services are:

1. Providing a method for implementing business strategic alliances and partnerships by integrating key Web service standards such as XML (Extensible Markup Language), SOAP (Simple Object Access Protocol), WSDL (Web Services Description Language), and UDDI (Universal Description, Discovery, and Integration).

2. Assisting organisations in optimising information systems development time, business process management, resource aggregation, and partnering opportunity.

3. Providing the ability to update the organisation’s business practices without changing the fundamental technology architecture.

3.5.6 WebLogic\textsuperscript{TM}

WebLogic is a server application developed by BEA Systems, Inc. (2002a) an application infrastructure software company. It is a platform for developing and deploying multi-tier distributed enterprise applications. WebLogic Server centralises application services such as Web server functionality, business components, and access to backend enterprise systems.

WebLogic Server provides essential features for developing and deploying mission-critical e-business applications across distributed, heterogeneous computing environments. These features are:

1. Standardisation - supports comprehensive Enterprise Java to ease implementation and deployment of application components.

2. Rich client options - supports Web browsers and other clients that use HTTP; Java clients that use RMI (Remote Method Invocation) or IIOP (Internet Inter-ORB Protocol); and mobile devices that use WAP (Wireless Access Protocol).
3. Enterprise e-business scalability - critical resources are used efficiently and high availability is ensured through the use of Enterprise JavaBean business components and mechanisms such as WebLogic Server clustering for dynamic Web pages, backend resource pooling, and connection sharing.

4. Robust administration - offers a Web-based Administration Console for configuring and monitoring WebLogic Server services.

5. Internet payment security readiness - provides Secure Sockets Layer (SSL) support for encrypting data transmitted across WebLogic Server, clients, and other servers.

6. Maximum development and deployment flexibility - provides tight integration with and support for leading databases, development tools, and other environments.

WebLogic Server operates as the middle tier of a multi-tier architecture. A multi-tier architecture determines where the software components that make up a computing system are executed in relation to each other and to the hardware, network, and users.

WebLogic multi-tier architecture (see Figure 3.8) consists of three tiers:

1. The client tier contains programs executed by users, including Web browsers and network-capable application programs. These programs can be written in virtually any programming language.

2. The middle tier contains WebLogic Server and other servers that are addressed directly by clients, such as existing Web servers or proxy servers.

3. The backend tier contains enterprise resources, such as database systems, mainframe and legacy applications, and packaged enterprise resource planning (ERP) applications.
3.5.7 WebSphere

In a global organisation, daily business transactions flow and are exchanged across dispersed locations. Using the Web as the platform to carry out business transactions appears to be the most efficient and economic channel. However, without the implementation of an appropriate middleware, the internal core business processes cannot be linked with the front-end Web-based operations and further enhance the organisation’s information flows. WebSphere (IBM, 2002a) could be considered as the appropriate software to support these requirements. WebSphere is IBM’s brand of Internet infrastructure software or middleware (see Figure 3.9). It enables organisations to develop, deploy and integrate new e-business applications with their existing back office applications. At the same time, WebSphere supports business applications from simple Web publishing through to enterprise-scale transaction processing.
WebSphere enables organisations to advance their e-business strategy in three functional areas:

1. Provides access to information across a spectrum of users, devices, and customisation options.

2. Integrates and automates business processes including supply chain management and the integration of existing processes with the Web.

3. Builds, connects, and manages applications.

![Figure 3.9: WebSphere platform architecture (IBM, 2002c)](image)

### 3.6 Groupware Technology

Groupware technology enables people and teams, which are physically separate, to work together effectively. Reengineering business processes and organisational restructuring are the main trends for modern enterprises towards increasing productivity (Coleman, 1995). In other words, organisations are trying to reduce costs
3. LITERATURE REVIEW - GLOBAL INFORMATION SYSTEMS

(such as sales, labour and communications costs), increase quality, better customer services, have greater employee autonomy, and be more flexible and responsive in order to survive in the global competitive edge. Accordingly, efficient human and information communications seem to be the essential foundation to achieve these objectives. Groupware appears to be the appropriate technology to facilitate the human communications and control information flows as a component of an organisation’s information systems. Furthermore, it brings functionality into full play in the global information systems where dispersed employees are able to collaborate and accomplish corporate assignments.

Groupware technologies are typically categorised along two key dimensions (Bock & Marca, 1995) (see Figure 3.10):

1. whether users of the groupware are working together at the same time ("real-time" or "synchronous" groupware) or different times ("asynchronous" groupware), and

2. whether users are working together in the same place ("face-to-face") or in different places ("distance").

<table>
<thead>
<tr>
<th>Same Place</th>
<th>Different time &quot;asynchronous&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>- voting</td>
<td>- shared computers</td>
</tr>
<tr>
<td>- presentation support</td>
<td></td>
</tr>
<tr>
<td>- videophones</td>
<td>- email</td>
</tr>
<tr>
<td>- chat</td>
<td>- workflow</td>
</tr>
</tbody>
</table>

Figure 3.10: Four models of groupware

Based on the above categories, a number of typical groupware applications are email, newsgroups/mailing lists, workflow systems, group calendars, shared whiteboards,
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and decision support systems. For a more detailed list see Appendix A.

3.6.1 Lotus Notes®

Lotus Notes is a well-known groupware developed by Lotus Corporation and owned by IBM (2002b). It is a very popular groupware application for workgroups. Basically, Lotus Notes provides group communications for creation and access of document-oriented information over LANs (Local Area Networks), WANs (Wide Area Networks), and dial-up connections. It also has capabilities to combine documents, emails, and group calendars and conferences. Lotus Notes contains one or more Notes servers that are connected to the Notes clients over the organisation’s network. Key features of Lotus Notes are:

1. It integrates organisational information sources including e-mail, calendar, address book, action list, the Website and e-business applications, and allows users to access them seamlessly on-line or off-line.

2. It offers a single, integrated inbox for Notes mail and Internet mail, from Internet Service Providers (ISPs).

3. Integrated with Lotus Sametime, it allows users to see who is on-line, send instant messages and chat in real-time.

4. The group calendar function allows users in the workgroup or project team with the appropriate access permission to see all members’ schedules.

5. It fully supports X.509 certificates\(^2\) (public-key certificates) and S/MIME\(^3\) (Secure / Multipurpose Internet Mail Extensions) that enables its users to send and receive signed and/or encrypted messages via the Internet.

\(^2\)Data networks and open system communication, International Telecommunication Union.
\(^3\)S/MIME and OpenPGP, Internet mail consortium.
3.6.2 Microsoft® Exchange Server

Another popular groupware application is Microsoft® Exchange Server (2002). Exchange Server is a messaging platform that enables a range of solutions for the free exchange of e-mail, voice mail, streaming video, documents, and Web content, video conferencing, instant messaging, and chat sessions.

Core features of Exchange Server include:

1. It offers integrated management of the organisation’s networking and messaging infrastructure.

2. It supports instant messaging to overcome barriers of time, distance and technology in the global business environment.

3. It incorporates the latest digital technologies such as instant messaging and real-time conferencing in a communication platform for all organisation users.

4. It delivers built-in services such as calendaring, contact and task management, discussion groups, and document-centric workflow as well as support for Web-standard protocols, including XML and HTTP (Hypertext Transfer Protocol).

3.7 Summary

A global information system can be defined as a collection of interrelated components working together to accomplish the organisation’s strategic goals and carry out the daily business operations across geographical and time boundaries. In the early stage of global information systems development, these components must be investigated. The components are further explored in terms of the functionalities and characteristics, and the alternatives are outlined to provide comprehensive solutions for different business situations. Components of the global information systems are
identified as functional architecture, Internet technology, groupware technology, intranet and extranet network models, middleware technology, and global information systems management. The rest of this section summarises each global information system component explored in this chapter.

Functional architecture is the architecture designed from the business viewpoint of the information systems. It is quite different from the network architecture and software architecture in terms of their distinct objectives, features, and level of information systems development cycle. Functional architecture plays a significant role in the development of the global information systems. It needs to be flexible enough to provide the full operation of the global information systems within and across organisations. To approach this, the understanding of roles and users, and the decomposition of business processes into functional units are the two important tasks that must be fulfilled in the analysis level of the functional architecture construction.

The Internet is a worldwide system of computer networks in which users at any one computer can possibly access information from any other computer. It was conceived by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first known as the ARPANET. The original aim was to create a network that would allow users of a research computer at one university to be able to communicate with research computers at other universities.

Today, the Internet is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people worldwide. These invaluable features force organisations to start seeking the way of incorporating the Internet as part of their business strategy as well as the technological infrastructure. As a result, more and more organisations use the Internet for various purposes. To this end, a variety of solutions have been proposed to enhance the quality and productivity of organisations’ Internet strategies. These solutions can possibly involve content management, Web database applications, Web programming solutions, and a range of Internet access technology.
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Intranet and extranet are two different types of private network models within an organisation. An intranet can be defined as a collection of Web resources kept within a firewall for an organisation’s internal use, whereas an extranet has extended the usage boundary to the organisation’s customers, suppliers, vendors, or other related business partners. As the technology has matured, a new form of business network model - ultranet has emerged. Ultranet conquers the barriers of the traditional client/server model and supports multiple remote connections for flexible access of information within and between organisations.

In a global organisation, employees and business units are dispersed across boundaries. Incorporating middleware and groupware in the organisation’s global information systems, enables people and business processes in different parts of an organisation to work together. Middleware and groupware are different in their usage domains and applications. In short, middleware brings information systems together whereas groupware brings people together.
Chapter 4

Research Methodology

Abstract

This chapter deals with the methodology followed in conducting this research. It starts with the intention of applying research methodology in this study, followed by a comprehensive outline of some common research approaches and the associated methods and techniques used for the collection of relevant data. The appropriate research methodologies were then selected for this thesis.
4. RESEARCH METHODOLOGY

Research is a systematic investigation to find answers to a problem (Macionis & Plummer, 1998). It can also be seen as an act with an objective. The act necessitates the researcher seeking for, enquiring about, investigating, exploring, repetitively, carefully, closely, some specific topic or subject of the research (Higgins, 1996). In order to derive appropriate remedies for a problem, researchers are expected to employ suitable methodologies. Undoubtedly, this particular research also deserves a carefully selected methodology.

In order to select the most appropriate research methodology for this study, the first section of this chapter reviews available research methodologies and outlines the characteristics, advantages, and drawbacks of each. The second section identifies the most viable methods that should be adopted for this study and argues the appropriateness and possible caveats.

4.1 Review of Available Methodologies

As a general rule, research methodologies can be broadly classified into two distinct approaches. They are the scientific empirical tradition and the naturalistic phenomenological modes (Burns, 1997). These two approaches are also known as quantitative and qualitative research methods respectively. From the data presentation perspective, quantitative data is mainly numbers. For example, an experiment conducted to investigate the maximum tolerable air pressure of different brands of truck tyres. On the other hand, qualitative data is data that is mainly words, sounds or images. In addition, the qualitative approach is also supported by action research or the case study method. For example, the reasons people buy, or like, particular products (books, music CDs, or clothes) or services (restaurants, travel agents, or car dealers).

In this section the following methodologies have been discussed with the aim of selecting one, or a suitable combination for this research:
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1. Quantitative approach

2. Qualitative approach

3. Quantitative versus qualitative

4. Action research

5. Case studies

6. Data collection methods

4.1.1 Quantitative Approach

Quantitative research methods usually involve large randomised samples, more application of statistical inference, and few applications of cases demonstrating findings. Kumar describes the characteristics of quantitative research as “if information is gathered using predominantly quantitative variables, and if the analysis is geared to ascertain the magnitude of the variation” (Kumar, 1996). The objective of quantitative research is to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) in a population. Quantitative research designs are either descriptive or experimental. A descriptive study establishes only associations between variables. An experiment establishes causality.

Strengths of Quantitative Approach

The main strengths of this approach lie in precision and control (Burns, 1997). Precision is reached through quantitative and reliable measurement and control is achieved by the sampling and design. Furthermore, hypotheses are tested via a deductive method and the use of quantitative data to allow statistical analysis.
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Limitations of Quantitative Approach

The key limitation of quantitative approach is that the results provide less detail on human behaviour, attitudes and motivation. Although response of opinions and perceptions can be converted into digitised results, it mainly leaves no meaning to the researchers. Accordingly, many researchers are concerned that the quantitative approach denigrates human individuality and ability to think (Burns, 1997).

4.1.2 Qualitative Approach

Qualitative research is generally defined as research that utilises open-ended interviewing to explore and understand the attitudes, opinions, feelings, and behaviour of individuals or a group of individuals. Qualitative research can take many forms; typical are focus groups, in-depth interviews, mini-groups, dyads, and triads.

“Qualitative research designs strive for in-depth understanding of subjects through such techniques as participant observation or narrative analysis, or they may strive for in-depth understanding of texts through such methods as exegesis or deconstruction.” (Garson, 2002)

A variety of methods for conducting the qualitative research approach are participant observation, action research, interviewing, story-telling and narrative analysis.

Strengths of qualitative approach

Qualitative research is best used for depth, rather than breadth, of information. While quantitative surveys are an outstanding medium for gathering a breadth of information regarding ”How many?” or ”How much?,” qualitative research is the best research method for discovering underlying motivations, feelings, values, attitudes, and perceptions.
4. RESEARCH METHODOLOGY

Limitations of qualitative approach

The primary limitation is that, unlike quantitative research, the findings are not statistically projectable to the population under study. This limitation is created by two facts: recruiting is rarely completely representative; and, the very nature of qualitative research necessitates small sample sizes.

4.1.3 Quantitative versus Qualitative

Quantitative research is often contrasted with qualitative research. The distinct characteristics of both research approaches support researchers to make appropriate decisions on designing new research in the initial stage. Based on the discussion above Table 4.1 lists some common characteristics of both research approaches.

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>Subjective</td>
</tr>
<tr>
<td>Literature review must be done early in study</td>
<td>Literature review may be done as study progresses or afterward</td>
</tr>
<tr>
<td>Tests theory</td>
<td>Develops theory or tests the theory</td>
</tr>
<tr>
<td>One reality: focus is concise and narrow</td>
<td>Multiple realities: focus is complex and broad</td>
</tr>
<tr>
<td>Reduction, control, precision</td>
<td>Discovery, description, understanding, shared interpretation</td>
</tr>
<tr>
<td>Measurable</td>
<td>Interpretive</td>
</tr>
<tr>
<td>Basic element of analysis is numbers</td>
<td>Basic element of analysis is words/ideas.</td>
</tr>
<tr>
<td>Researcher is separate</td>
<td>Researcher is part of the process</td>
</tr>
<tr>
<td>Subjects</td>
<td>Participants</td>
</tr>
<tr>
<td>Context free</td>
<td>Context dependent</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>Research questions</td>
</tr>
<tr>
<td>Reasoning is logistic &amp; deductive</td>
<td>Reasoning is dialectic &amp; inductive</td>
</tr>
<tr>
<td>Establishes relationships, causation</td>
<td>Describes meaning, discovery</td>
</tr>
<tr>
<td>Uses instruments</td>
<td>Uses communication and observation</td>
</tr>
<tr>
<td>Strives for generalization</td>
<td>Strives for uniqueness</td>
</tr>
</tbody>
</table>

Table 4.1: Comparison of quantitative and qualitative research
4. RESEARCH METHODOLOGY

4.1.4 Action Research

Action research is a process by which change and understanding can be pursued at the same time. It is usually described as cyclic, with action and critical reflection taking place in turn. The reflection is used to review the previous action and plan the next one. As Dick describes it, “Action research consists of a family of research methodologies which pursue action and research outcomes at the same time” (Dick, 1997).

There are several varieties of action research (Masters, 1995). McKernan (1991), for example, identifies the three following types of action research:

Scientific-technical view of problem solving

The fundamental goal of the researcher in the scientific-technical approach is to test a particular intervention used by a practitioner in the field. The research is based on a pre-specified theoretical framework. The researcher identifies the problem and a specific intervention, then the practitioner is involved in implementing the intervention or treatment (Holter, & Schwartz-Barcott, 1993). The collaboration between the researcher and the practitioner is technical, in the sense that it is instrumental to the research goals. This approach to action research results in the accumulation of predictive knowledge, the major thrust is validation and refinement of existing theories.

Practical-deliberative action research

In the practical-deliberative type of action research the researcher and practitioners come together to identify potential problems, their underlying causes and possible interventions (Holter, & Schwartz-Barcott, 1993). The problem is defined in dialogue and mutual understanding between the researcher and the practitioner. "The goal of practical action researchers is understanding practice and solving immediate problems" (McKernan, 1991). Practical action research fosters the improvements in
professional practices by emphasising the part played by personal judgement in decisions to act for the good of the client.

**Critical-emancipatory action research**

Critical-emancipatory action research "promotes emancipatory praxis in the participating practitioners; that is, it promotes a critical consciousness which exhibits itself in political as well as practical action to promote change" (Grundy, 1987). There are two goals for the researcher using this approach, one is to increase the closeness between the actual problems encountered by practitioners in a specific setting and the theory used to explain and resolve the problem. The second goal, which goes beyond the other two approaches, is to assist practitioners in identifying and making explicit fundamental problems by raising their collective consciousness (Holter, & Schwartz-Barcott, 1993).

### 4.1.5 Case Studies

Case study refers to the collection and presentation of detailed information about a particular participant or small group. Case studies typically examine the interplay of all variables in order to provide as complete an understanding of an event or situation as possible. As per Robert K. Yin's definition (Yin, 1984), the case study research method is empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.

The case study can be either a form of quantitative statistical research or qualitative descriptive research, or even a combination of both (Burns, 1997). However, due to the limitations of a sample of one or a single unit being studied, with the restrictions that brings for statistical deduction, most case studies fall into the qualitative methodology domain. Unlike quantitative methods of research, like the survey, which focus on the questions of who, what, where, how much, and how many, and archival
4. RESEARCH METHODOLOGY

analysis, which often situates the participant in some form of historical context, case studies are the preferred strategy when how or why questions are asked. Likewise, they are the preferred method when the researcher has little control over the events, and when there is a contemporary focus within a real life context. In addition, unlike more specifically directed experiments, case studies require a problem that seeks a holistic understanding of the event or situation in question using inductive logic reasoning from specific to more general terms.

Six types of case study have been categorised by Burns (1997). The subsequent paragraphs label these types and provide a brief description of each.

**Historical case studies**

Historical case studies tend to trace the progress of an organisation or system over a period of time. This type of case study depends intensively upon historical records, documents, and interactive interviews. The research must ensure the essential documents or records are available at the time of investigation as well as the availability of interviewees.

**Observational case studies**

This type of case study is usually conducted in a group environment for a specific category of people (for example, a classroom environment with first year computing degree students). It often uses a variety of observation or interview methods as the major data collection tools. Crucial to the success of this type of case study is the specific definition of the group studied. The researcher must make sure that people in the group do not represent the same demographics but are actually identifiable as individuals, interact with each other closely, and share the organisational vision.

**Oral history**

This is usually extensive interviewing and collecting information from a single individual. Normally, the researcher does not have a particular individual in mind, but meets with a person at the first time while exploring the research topics. The researcher will decide the research topic based on the outcome of the initial conversations.
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Situational Analysis
In this approach, particular events are studied in terms of the views of all participants. All participants’ views are collated and analysed to provide a depth that can contribute significantly to the understanding of the event. Interviews, documents, and other records are the key sources of this type of case study.

Clinical case study
The main objective of this type is to understand a particular individual comprehensively. This type of case study typically applies detailed interviews, non-participant observation, documents, and records. In addition, it also tries to test with a view to understanding the problem and identifying possible treatments (Burns, 1997).

Multi-case studies
Multi-case studies refer to a collection of case studies. It is not based on the sampling logic of multiple subjects in one experiment. It is rather a form of replication, or multiple experiments. Furthermore, the arguments and variables of each case must be consistent in order to produce contrary results for predictable reasons or produce similar results. The outcome will demonstrate either support for the research propositions, or a need to revise the proposed suggestions with another set of case studies for retesting. Multi-case studies can be beneficial in that the results can be more forceful. However, conducting multi-case studies requires more time and effort than other approaches.

Data Collection Methods
There are many different ways of collecting data. Which method or combination of methods should be applied will depend upon the research topic. The subsequent paragraphs outline some common data collection methods in the business information systems and management context. Table 4.2 summarises the data collection methods reviewed for this study.
4. RESEARCH METHODOLOGY

<table>
<thead>
<tr>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written survey</td>
</tr>
<tr>
<td>Oral survey</td>
</tr>
<tr>
<td>Electronic survey</td>
</tr>
<tr>
<td>Observation</td>
</tr>
<tr>
<td>Interview</td>
</tr>
</tbody>
</table>

Table 4.2: Summary of data collection methods

Surveys

Surveys represent one of the most common types of quantitative, social science research. In survey research, the researcher selects a sample of respondents from a population and administers a standardised questionnaire to them. A questionnaire is a series of written questions a researcher supplies to subjects, requesting their response. Usually the questionnaire is self-administered in that it is posted to the subjects, asking them to complete it and post it back (Macionis & Plummer, 1998). The questionnaire, or survey, can be a written document that is completed by the person being surveyed, an online questionnaire, a face-to-face interview, or a telephone interview. Using surveys, it is possible to collect data from large or small populations. Survey research does not belong to any one field and it can be employed by almost any discipline. As stated by Campbell and Katona, "It is this capacity for wide application and broad coverage which gives the survey technique its great usefulness..." (Campbell & Katona, 1953).

Surveys come in a wide range of forms and can be distributed using a variety of media. In general, there are three categories of survey presentations: written surveys, oral surveys, and electronic surveys. Furthermore, there are several types for each of these categories. The subsequent paragraphs give details of these types, and provide strengths and weaknesses of each.

Written Surveys

*Mail Surveys*
4. RESEARCH METHODOLOGY

When your research requires large sample numbers, it would be quite difficult to interview every participant in your sample. Thus, choosing the mail-out survey as a data collection method would enable a large sample to be targeted for the study. The mail-out survey can be limited to a region, or might be extended to across countries.

Strengths:

- **Cost**: Mail surveys are low in cost compared to other methods of surveying. This type of survey can cost up to 50% less than the self-administered survey, and almost 75% less than a face-to-face survey (Bourque & Fiedler, 1995). Mail surveys are also substantially less expensive than drop-off and group-administered surveys.

- **Convenience**: Since many of these types of surveys are conducted through a mail-in process, the participants are able to work on the surveys in their leisure time.

- **Sampling-internal link**: It is possible to reach a greater population and have a larger sample of respondents with this type of survey because it does not require personal contact between the researcher and the respondents.

Weaknesses:

- **Low response rate**: One of the biggest drawbacks to a written survey, especially as it relates to the mail-in, self-administered method, is the low response rate. Compared to a telephone survey or a face-to-face survey, the mail-in written survey has a response rate of just over 20%.

- **Ability of respondent to answer survey**: Another problem with self-administered surveys is the literacy level and language ability of the respondents. Because the participants are collected from a random sample, it is impossible to control for such variables. Many of those who belong to a survey group have a different
primary language than that of the survey. They may interpret survey questions in different meanings, and therefore answer with inappropriate responses.

**Group Administered Questionnaires**

When the research is based on a very specific population, a mail-out survey would probably not be the best data collection option. Oral surveys may be introduced in this situation, but this might be too time consuming if only a few researchers are involved. The group-administered questionnaire would allow researchers to get the survey results at one time and would ensure a very high response rate. However, the challenge would be to get everyone together. Despite the challenges, this type of survey might be the most efficient for specific research purposes.

**Strengths:**

- **Response rates:** This second type of written survey is generally administered to a sample of respondents in a group setting, guaranteeing a high response rate.
- **Specificity:** This type of written survey can be very versatile, allowing for a spectrum of open and closed ended types of questions and can serve a variety of specific purposes, particularly for a specific group of people.

**Weaknesses:**

- **Sampling:** This method requires a small sample, and as a result is not the best method for surveys that would benefit from a large sample. This method is only useful in cases that call for very specific information from specific groups.
- **Scheduling:** Since this method requires a group of respondents to answer the survey together, this method requires a lot of time that is convenient for all respondents.

**Oral Surveys**

Oral surveys are considered a more personal form of survey than the written or
4. RESEARCH METHODOLOGY

electronic methods. Oral surveys are generally used to get thorough opinions and impressions from the respondents.

Oral surveys can be administered in several different ways. For instance, in a group interview, as opposed to a group administered written survey, each respondent is not given an instrument. Instead, the respondents work in groups to answer the questions together while one person takes notes for the whole group. Another more familiar form of oral survey is the phone survey. Phone surveys can be used to get short or yes/no type answers, as well as longer answers.

Strengths:

- Personal Contact: Oral surveys conducted either on the telephone or in person give the interviewer the ability to answer questions from the participant. If the participant, for example, does not understand a question or needs further explanation on a particular issue, it is possible to converse with the participant.

- Response Rates: Although obtaining a certain number of respondents who are willing to take the time to do an interview is difficult, the researcher has more control over the response rate in oral survey research than with other types of survey research. As opposed to mail surveys where the researcher must wait to see how many respondents actually answer and send back the survey, a researcher using oral surveys can, if the time and money are available, interview respondents until the required sample has been achieved.

Weaknesses:

- Cost: The most obvious disadvantage of face-to-face and telephone surveys is the cost. It takes time to collect enough data for a complete survey, and time translates into payroll costs and sometimes payment for the participants.

- Bias: Using a face-to-face interview for your survey may also introduce bias, from either the interviewer or the interviewee.
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- Types of questions possible: Certain types of questions are not convenient for this type of survey, particularly for phone surveys where the respondent does not have a chance to look at the questionnaire.

- Attitude: Anyone who has ever been interrupted during dinner by a phone interviewer is aware of the negative feelings many people have about answering a phone survey. Upon receiving these calls, many potential respondents will simply hang up.

**Electronic Surveys**

With the growth of the Internet and the expanded use of electronic mail for business communication, the electronic survey is becoming a more widely used survey method. Electronic surveys can take many forms. They can be distributed as electronic mail messages sent to potential respondents. They can be posted as Web page forms on the Internet. And they can be reached by nearly everyone who has Internet access anywhere.

**Strengths:**

- Cost-savings: It is less expensive to send questionnaires online than to pay for postage or for interviewers.

- Ease of editing/analysis: It is easier to make changes to the questionnaire, and to copy and sort data.

- Faster transmission time: Questionnaires can be delivered to recipients in seconds, rather than in days as with traditional mail.

- Easy use of pre-letters: You may send invitations and receive responses in a very short time.

- More candid responses: Research shows that respondents may answer more honestly with electronic surveys than with paper surveys or interviews.
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- Potentially quicker response time with wider magnitude of coverage: Due to the speed of online networks, participants can answer in minutes or hours, and coverage can be global.

Weaknesses:

- Sample demographic limitations: Population and sample limited to those with access to computers and online networks.

- Lower levels of confidentiality: Due to the open nature of most online networks, it may be difficult to guarantee anonymity and confidentiality.

- Layout and presentation issues: Constructing the format of a computer questionnaire can be more difficult the first few times, due to the researcher’s lack of experience.

- Additional orientation/instructions: More instruction and orientation to the computer online systems may be necessary for respondents to complete the questionnaire.

- Potential technical problems with hardware and software: The computer systems may malfunction due to unexpected incidences (for example, natural disasters and electric outage).

Observation

Apart from the survey data collection method mentioned above, sometimes it is possible to do research without asking questions, but simply by observing respondents. This is called observation. According to Cooper and Emory’s definition:

“Observation qualifies as scientific inquiry when it is specifically designated to answer a research question, is systematically planned and executed, uses proper controls, and provides a reliable and valid account of what happened.” (Cooper & Emory, 1995)
4. RESEARCH METHODOLOGY

As per the meaning of "observation", data is usually collected visually. However, observation also involves touching, listening, reading, and smelling.

There are two types of observation (Kumar, 1996):

1. Participant observation

2. Non-participant observation

Participant observation refers to a researcher participating in the activities of the group being observed in the same manner as its members, with or without their knowing that they are being observed. For example, the researcher may want to study the reactions of the general population when a blind person is trying to cross an intersection. The researcher may pretend to be a blind person in order to do the study.

Non-participant observation, however, refers to a researcher not getting involved in the group activities but remaining a passive observer. For example, the researcher may want to study a different level of student participation in a group discussion situation. The researcher as an observer will listen, watch and record the behaviour of each student. After a few observations, conclusions can be drawn about the students’ attitudes to participating in the group discussion.

Interview

An interview is a series of questions a researcher addresses personally to respondents (Macionis & Plummer, 1998). An interview may be structured (where the researcher asks clearly defined questions) or unstructured, to allow some of the questioning to be led by the responses of the interviewee. To be specific, structured data is organised and can be produced by closed questions, unstructured data is relatively disorganised and can be produced by open questions. Sometimes it is a better idea to use a videotape recorder to record the interview, if the interviewee has consented to do so. There are advantages and limitations to adopting the interview method. The greatest
value lies in the depth and detail of information that can be secured. It far exceeds the information obtained from telephone and mail surveys. During the interview, the interviewers have more control and opportunities to improve the quality of information acquired. However, such a data collection method has a certain level of limitations and drawbacks. The primary concern regarding the downside of this method would be the cost. The costs of a particular interview may range from a few dollars to a few hundred dollars. A huge amount of money could be spent if the research requires interviews that spread across regions or nations.

4.2 Selected Research Approach

4.2.1 Describing the Approach

After an in-depth analysis of the above research approaches and data collection methods, the quantitative approach and data collection by survey method, followed by a single in-depth case study were selected to be applied in this research. The following sub-sections describe the selected approaches for this study.

Quantitative approach through mail survey data collection method

Surveys are characterised by an organised or methodical set of data that is usually called a collection of variables. Collected data usually represents the same variables of multiple cases. For example, an individual can be treated as a single case, and height, weight and gender are variables of all cases. The most convenient way to collect data through survey method is to use questionnaires. Questionnaires should be designed to answer the research questions. In the quantitative data analysis approach, questionnaires should be constructed to collect answers from close or measurable types of questions. Hence, data can be analysed and presented to describe the characteristics
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of a set of cases. Moreover, causes of specific phenomenon can be indicated and understood by investigating the variation and correlation in variables across cases.

Based on the investigation earlier, survey presentations are generally categorised in three groups: written, oral, and electronic presentation. To choose an appropriate and feasible survey presentation for this study, a number of items have been taken into consideration. These items are considered as criteria to successfully carry out the survey studies. They are the sample size, sample distribution, target respondents, and costs. The following table (Table 4.3) illustrates the comparative analysis of these criteria for all survey presentations. Based on the measures of criteria, each survey presentation is evaluated and rated with a Likert scale (1 represents the most appropriate method, and 5 represents the most inappropriate method). Thus, the mail method has score 1 over the sample size, sample distribution, and target respondents, and 2 for the costs; on the other hand, the group administered questionnaire method has 5 for all criteria. In the oral method, the sample size is given 5, and the rest are scored 4. The electronic method is given 1 for sample size and sample distribution, 3 for target respondents, and 2 for costs. Hence, the results indicate that both written mail survey and electronic survey are considered the more appropriate presentations for this study. However, the written mail survey provides a better solution over electronic surveys in two ways. Firstly, there is a high probability of the surveys reaching the desired respondents. Electronic surveys provide no promise to reach the expected destinations while a mail survey ensures the delivery of questionnaires. Secondly, there is no guarantee that all target respondents (CEOs) have access to the electronic survey (or the Internet access). Hence, a written mail survey is the ultimate survey presentation to select for this study. The survey development, implementation, analysis, and discussion for this research are expressed in Chapter 6. To see the two surveys, please refer to Appendix B and Appendix C. Although the mail survey is the most suitable method for this study, there are some possible caveats. According to de Vaus (1996), possible limitations of surveys can be classified into three categories:
4. RESEARCH METHODOLOGY

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measure</th>
<th>Written</th>
<th>Oral</th>
<th>Electronic</th>
</tr>
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<tr>
<td></td>
<td></td>
<td>Mail</td>
<td>Group Administered Questionnaires</td>
<td>Oral</td>
</tr>
<tr>
<td>Sample size</td>
<td>1,000</td>
<td>1</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Sample distribution</td>
<td>Across Australia</td>
<td>1</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Target respondents</td>
<td>Chief Executive Officer (CEO)</td>
<td>1</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Costs</td>
<td>Within budget</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Score explanation: 1 - Most appropriate; 5: Most inappropriate

Table 4.3: Comparison of survey presentations

philosophical, technical, and political.

**Philosophical limitations** - surveys are inadequately establishing casual connections with correlational variables. For example, a survey result indicates that older people are generally more conservative than younger people, however, there is no certainty in showing that growing older causes conservatism.

**Technical limitations** - surveys are quite restricted due to the structured questions. The well-organised questions and pre-defined answers provide respondents with narrow and limited understanding of subjects.

**Political limitations** - survey studies can be manipulative. This leads to ideological manipulation and does not produce reliable data.

**Qualitative approach through a single in-depth case study**

One of the research aims is a global IT transition framework that can be adopted by enterprises pursuing globalisation. In order to validate the viability of the framework, an in-depth case study research method (qualitative approach) is chosen as a follow up to the survey method (quantitative approach). The case study is described after the description of the global IT transition framework in Chapter 7.
4. RESEARCH METHODOLOGY

4.3 Justification of Selected Research Methodologies

Based on the discussion in the previous section, the mail-out survey is considered the most appropriate method to collect empirical data for this study. Applying the mail-out survey method, survey instruments could be distributed to a large sample in a wide geographical region. It is also easier to reach the intended audiences (e.g., Chief Executive Officers or senior managers). However, the costs for handling the survey distribution process may be higher than other methods such as electronic surveys that are disseminated through the Internet channel. Moreover, a case study method is employed to obtain detailed information of an enterprise’s globalisation process and instantiate the proposed model and framework in the practical environment.

The above selection of the methodologies is substantiated by Palvia’s investigation into MIS research methodologies (1999). Palvia found that most researchers do not commit to any single methodology, but instead consider alternative or a combination of methodologies for a particular research topic. Likewise, this study applies two methodologies (survey method and case study) to guide the entire research project and to derive the research results from different approaches. In order to acquire the generic organisational view of the global transition process, the survey technique is applied as the main research method for this study. Moreover, to examine the specific approach of globalisation process in the organisational and cultural context, an in-depth case study is employed as the secondary research method.

Further, through Palvia’s review of methodologies, more than half of the publications in seven leading MIS journals (MIS Quarterly, Information & Management, Journal of MIS, Decision Sciences, Information Systems Research, Communication of ACM, and Management Science) employed a quantitative approach. Of those publications, the survey methodology led at 24%. Additionally, the use of the case study methodology has increased from 6% in 1993 to approximately 12% in 1997.
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4.4 Summary

Identifying the appropriate research methodology is crucial to conduct any research. Unquestionably this study needs suitable research methodologies. First of all, this chapter begins with reviewing possible research approaches such as qualitative and quantitative techniques, and data collection methods. Strengths and drawbacks of each research approach and data collection method are investigated and documented. After the examination of available research methods, the remaining chapter concentrates on the selected methods for this study. The main research methodology chosen for this study is the quantitative approach using a written mail survey for data collection. The supporting research methodology for this study is the qualitative approach using a single in-depth case study based on the company participating in the survey.
Chapter 5

Global Transition Issues

Abstract

This chapter starts with a detailed examination of the issues critical to the successful transition of an enterprise towards transborder business operations. The end result of such a transition would be a globalised organisation not limited by geographical, time and cultural differences. The second part of this chapter deals with the exploration of organisational transition issues. The components of intra- and inter-organisational issues are identified to guide organisations in constructing global information systems. This chapter essentially builds a theoretical framework for global transition.
5. GLOBAL TRANSITION ISSUES

Following the comprehensive investigation of literature on global organisations and global information systems, four key questions have been identified. First, although many researchers have put significant effort into identifying the global transition issues, there is a lack of taxonomy for categorising these issues. Second, issues related to the transition of the information systems of an organisation to global information systems have no relationship with the type of organisational structures. Third, there is no supporting data to validate the prioritisation of issues for organisations in the global transition process. Last, development of a global information systems transition framework is required to provide guidelines for organisations pursuing globalisation. This chapter and the subsequent chapters are the heart of this study as they present an investigation of situations and discover the answers for the aforementioned questions.

5.1 Global Information Systems Management Issues

During global transition, organisations often face many explicit as well as implicit factors that could delay or, in the worst cases, even destroy the globalisation process. In order to eliminate these unnecessary incidents, enterprises need to identify the possible issues that will impede the process of globalisation before they take place. In the past decade, researchers have made significant efforts to identify the global information systems management (GISM) issues. Most notable are Senn’s six key information technology issues (Senn, 1992), and the eight multinational categories of global information technology issues by Palvia and Saraswat (1992). In addition, a number of issues have been identified in various areas including culture (Burn et al, 1993; Ein-Dor et al, 1993; Sauter, 1992; Yellen, 1997), human resource management (Agocs & Suttie, 1994; Boudreau et al, 1994; Harrison & Deans, 1994; Niederman,
5. GLOBAL TRANSITION ISSUES


Based on the implication of issues on the process of globalisation, five categories are identified to facilitate classification and collation of the GISM issues. The core concept of categorisation intends to provide the organisations with an abstract overview of concerns in relation to the transition to globalisation. These categories are labelled as:

1. Business information systems management
2. People management
3. Information technology management
4. End user management
5. Culture

The first four categories are derived from the IT issue categories developed by Khandelwal and Warrington (1999). Culture, the fifth category, is identified to ensure the completeness of focus of cross-border and global information systems distribution and management. Figure 5.1 shows the global information systems and transition issues. Each of the categories and associated issues are summarised in the GISM issues and category matrixes through Table 5.1 to Table 5.5. The following sessions provide a detailed study and explanation of each global information system management issue category and its underlying issues in relation to the global transition process.
## 5. GLOBAL TRANSITION ISSUES

<table>
<thead>
<tr>
<th>Issues</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Using IS for competitive advantage</td>
<td>Burn et. al, 1993</td>
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<td></td>
<td>Watson et. al, 1997</td>
</tr>
<tr>
<td></td>
<td>Palvia et. al, 1992</td>
</tr>
<tr>
<td>Identification of business opportunities in a global marketplace</td>
<td>Passino &amp; Severance, 1990</td>
</tr>
<tr>
<td>IS and organisation alignment</td>
<td>Burn et. al, 1993</td>
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<td></td>
<td>Watson et. al, 1992</td>
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<td></td>
<td>Palvia et. al, 1997</td>
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<td>IS planning</td>
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<td></td>
<td>Palvia et. al, 1992</td>
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<td></td>
<td>Watson et. al, 1997</td>
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<td>Increasing understanding of IS role and contribution</td>
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<td>Justification of information systems investments</td>
<td>Passino &amp; Severance, 1990</td>
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<td>Reengineering business processes through IT</td>
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<td>Managing organisational changes caused by IS</td>
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<tr>
<td>Quality of organisation management</td>
<td>Nelson, 1996</td>
</tr>
<tr>
<td>Making IS professionals more business-oriented</td>
<td>Palvia et. al, 1992</td>
</tr>
<tr>
<td>Systems reliability and availability</td>
<td>Burn et. al, 1993</td>
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<td>Information quality: information system output</td>
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<tr>
<td>Data quality: information systems input</td>
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<td>Software quality assurance standards</td>
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<td>Software transferability</td>
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<tr>
<td>Measuring and improving IS productivity</td>
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</tr>
<tr>
<td>Utilisation of data resources</td>
<td>Burn et. al, 1993</td>
</tr>
<tr>
<td></td>
<td>Palvia et. al, 1992</td>
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<tr>
<td>Delivery of the new global systems</td>
<td>Passino &amp; Severance, 1990</td>
</tr>
<tr>
<td>Applications software development</td>
<td>Burn et. al, 1993</td>
</tr>
<tr>
<td>Implementing and managing office automation</td>
<td>Watson et. al, 1997</td>
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Table 5.1: Business Information Systems Issues
5. GLOBAL TRANSITION ISSUES

Figure 5.1: Global information systems and transition issue categories

<table>
<thead>
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<th>Issues</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Education of senior management</td>
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<td>Educating senior management on IS potential and role</td>
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<td>Developing cross-cultural skills and attitudes among senior managers</td>
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</tr>
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<td>Quality of people management</td>
<td>Nelson, 1996</td>
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<tr>
<td>Retaining, recruiting and training MIS/IT/DP personnel</td>
<td>Burn et. al, 1993</td>
</tr>
<tr>
<td></td>
<td>Watson et. al, 1997</td>
</tr>
<tr>
<td>Availability of technical staff</td>
<td>Edberg et. al, 2001</td>
</tr>
<tr>
<td>Expatriate employee assignments</td>
<td>Niederman, 1994</td>
</tr>
<tr>
<td>Differences in compensation</td>
<td>Edberg et. al, 2001</td>
</tr>
<tr>
<td>Travel costs</td>
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Table 5.2: People Management Issues
### 5. GLOBAL TRANSITION ISSUES

<table>
<thead>
<tr>
<th>Issues</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Building a responsive IT infrastructure</td>
<td>Watson et. al, 1997</td>
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<td>Changing technology platforms</td>
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<tr>
<td>Developing and implementing information architecture</td>
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</tr>
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<td>Global information systems equipment</td>
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</tr>
<tr>
<td>Hardware and software support</td>
<td>Edberg et. al, 2001</td>
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<td>Determining appropriate IS funding level</td>
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</tr>
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<td>Managing the existing applications portfolio</td>
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<tr>
<td>Using IS to integrate across business functions</td>
<td>Palvia et. al, 1992</td>
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<td>Instituting cross-functional IS</td>
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<tr>
<td>Software availability</td>
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<td>Implementing decision and executive support systems</td>
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<td>Improving software development</td>
<td>Palvia et. al, 1992</td>
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<tr>
<td>Systems development standards</td>
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</tr>
<tr>
<td>Developing and managing distributed systems</td>
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<td>Configuration of user interfaces</td>
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<td>Network standards/protocols</td>
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<td>Telecommunication technology</td>
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<td>Transmission networks</td>
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<td>Information technology quality</td>
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<td>Knowledge of technology</td>
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<td>Improving disaster recovery capabilities</td>
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**Table 5.3: Information Technology Issues**
5. GLOBAL TRANSITION ISSUES

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<td>Facilitating organisational learning and use of IT</td>
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<tr>
<td>Facilitating and managing end user computing</td>
<td>Watson et. al, 1997</td>
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<tr>
<td>Managing end user computing</td>
<td>Burn et. al, 1993</td>
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<tr>
<td>Staff absorption of the new global systems</td>
<td>Passino &amp; Severance, 1990</td>
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<tr>
<td>Help desk support</td>
<td>Edberg et. al, 2001</td>
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Table 5.4: End User Issues

<table>
<thead>
<tr>
<th>Issues</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Average education level</td>
<td>Ein-Dor et. al, 1993</td>
</tr>
<tr>
<td>Computer science education</td>
<td>Ein-Dor et. al, 1993</td>
</tr>
<tr>
<td>Gender perspective</td>
<td>Yellen, 1997</td>
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<td>Age distribution</td>
<td>Yellen, 1997</td>
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<td>Religion</td>
<td>Yellen, 1997</td>
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<td>Preference for leadership style</td>
<td>Yellen, 1997</td>
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<td>Individual versus group goals</td>
<td>Yellen, 1997</td>
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<td>Values of the individual</td>
<td>Yellen, 1997</td>
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<tr>
<td>Interpersonal communications</td>
<td>Yellen, 1997</td>
</tr>
<tr>
<td>Currency and formatting</td>
<td>Edberg et. al, 2001</td>
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<tr>
<td>Time orientation</td>
<td>Yellen, 1997</td>
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Table 5.5: Cultural Issues

5.1.1 Information Technology Issues

The implementation of global information systems is based on the coordination and inter-communication of software applications, hardware components, telecommunications, network infrastructure, and network management in a cross-border business environment (Sankar & Prabhakar, 1992). Rapid evolution of technologies causes efficient and effective performance of global information systems as a result of real-time and accurate transborder data flows. Organisations need to realise and understand the technological issues involved in order to adopt the most suitable technologies for global information systems. The essential technological issues and implications of the global transition that need to be considered are telecommunication availability, network infrastructure, security, systems equipment, data resources utilisation, systems standards, software applications availability, systems integration, and systems recovery.
Furthermore, the review of the global IT literature and issues suggests that an organisation’s IT architecture is generally divided into four classes. This is based on the fundamental properties of an organisation’s IT environment, and they are global IT infrastructure (refers to hardware and operation systems), global business applications (refers to software), global telecommunication network (refers to communication), and data/information systems improvement (refers to data and applications). Knowles (1996) and Passmore (1997) have described the IT architecture as the underlying technology platform that supports all data and applications, including hardware, systems software and communication. Accordingly, the fundamental properties of an organisation’s IT architecture are essentially related to hardware, software, network, and data/information. Figure 5.2 illustrates these four classes.

![Figure 5.2: IT management classes](image)

Four global IT management classes are labelled as global IT infrastructure, global business applications, global telecommunication network, and data and information improvement. The criteria of correlated issues of each class are outlined as follows.

1. Global IT infrastructure - this class covers the development, implementation and maintenance of global information architecture components such as hardware, equipment, technology platform, and support.
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2. Global business applications - this refers to all the development, management, implementation, maintenance, integration, and improvement of global business application software.

3. Global telecommunication network - this class includes all the network communication structures, facilities, support, and management to ensure the business data flows within and between organisations.

4. Data and information systems improvement - this applies to the enhancement of data, or information in terms of quality assurance, integration, security, contingency plan, and effective utilisation.

In order to obtain an in-depth understanding of the global IT management issues, the following sections investigate each of these classes and explore the corresponding issues for the conceptual direction of global IT transition.

Global information technology infrastructure

Global information technology infrastructure is made up of the equipment and facilities that support the global information systems. It can be classified in four categories:

1. Computer hardware - includes workstations (desktop computers, terminals), mainframes, servers, digital cameras, printers, and scanners.

2. Network related facilities - includes cables, modems, gateways, routers, adapters, bridges, converters, hubs, concentrators, repeaters, switches, transceivers, and multiplexors.

3. Backup equipment - includes storage facilities such as tape and disk, and uninterruptible power supply (UPS) devices.

4. Mobile equipment - includes notebook computers, personal digital assistants (PDAs), mobile phones and wireless facilities.
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Global business applications

Global business applications refer to the agents, or instruments that make the business operation. These agents are principally functional business and personal software applications in the global business environment. Hence, effective management and utilisation of these applications is critical to the construction and operation of global information systems. Furthermore, issues such as handling systems integration, maintaining software application availability, and applying systems standards are imperative to the successful implementation and management of global information systems. Thus they are further explored in the following sections.

Systems integration

Systems do not operate in isolation. They are always interconnected to each other. When developing new global information systems, the organisation must ensure that the designs and structures of the new systems are flexible enough to connect and integrate with the existing systems. The compelling reason to integrate the systems is that organisations need to continue to flourish in the constantly changing competitive business environment. The need for systems integration is also driven by new forms of businesses, such as transition of the organisation’s business from the domestic context to the global perspective. Systems integration allows organisations to expand their business operations and services.

In planning for systems integration, the scope and objectives should be clearly identified to ensure that new systems and equipment are able to work with the existing components. This can be achieved by applying Mische’s (1998) four states of systems integration strategy.

1. Interconnectivity - is the initial and the fundamental state in the systems integration. It requires all new and existing information system components and
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equipment to connect and work together. This includes the sharing of peripherals such as printers, scanners, and backup devices through network communications, the creation of gateways that allow different components to interact with each other, and the development of interfaces that permit separate applications to communicate and even integrate into a single system.

2. Interoperability - means that all interconnected information system components and equipment should be able to function and interact with each other. For example, a newly deployed global inventory system should be designed to function and interoperate with the current regional or domestic inventory systems. The implementation of interoperability is carried out through the interconnected information technology facilities that are the information infrastructure of the organisation. For most organisations, interoperability is considered as the main feature of systems integration.

3. Semantic consistency - refers to the concern of consistency at data level. Once the information system components and equipment are interconnected and operational, organisational users are able to access systems and manipulate data (create, retrieve, modify, and delete) across business units around the world. For this reason, the implementation of global database management is essential to prevent data duplication, redundancy, and instability.

4. Convergent integration - systems integration involves a lot more than the integration of the information system components, technology, and global database management. Convergent integration involves the amalgamation of components and technology with business processes, people, skills, and knowledge. In Ginige et al. (2001) "e-business transformation roadmap", convergence is also an imperative stage which involves the integration of information technology with both internal and external business processes. In addition to the above requirements in the convergent integration state, the convergence in global organisation
also incorporates the organisational structure and other business factors (Mische, 1998). Thus, the proposed convergence model for information systems in a global organisation involves the consideration of eight components, namely organisational structure, information system components, data and database management, knowledge, skills, people, external business processes, and internal business processes. This is illustrated in Figure 5.3 and described below.

Figure 5.3: Convergence model for information systems in the global organisation

The proposed convergence model aims to provide global organisations with an overview of the integration of planning systems during the development of global information systems. Development of global information systems does not merely involve design and construction of software applications; it requires consideration of business factors and operations from a global perspective. The factors are business components that need to be identified and linked through a process towards the convergence state. To succeed in the development of integrated global information systems, it is imperative to recognise how these components are related and incorporated into information systems. By adopting the model, organisations are expected to develop an effective
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global information system that would carry out the global business operations as well as enhance the interconnection of dispersed business units around the world. The following points provide a detailed description of each component in the convergence model.

- **Organisational structure** - refers to the management and strategic hierarchy of the business. Four types of multinational corporations include multinational, international, global, and transnational organisational structures (Bartlett & Ghoshal, 1998).

- **Information system components a)** - include parts, modules, and components that are involved in the enterprise’s global information systems such as IT infrastructure, business applications, and telecommunication networks mentioned in the earlier section.

- **Data and database management** - data can be seen as one of the most valuable assets in any firm, and it is even more critical in global enterprises. By applying appropriate database management systems, enterprises are able to be effective by manipulating and managing data from diverse business units globally.

- **Knowledge** - through effective management of global database systems, the collection of information from various sources can be transformed into invaluable knowledge that would provide senior executives with rigorous support in decision-making situations.

- **Skills** - refer to the competence and capability that employees are required to have to accomplish daily business operations.

- **People** - refer to staff members regardless of location.
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- **External business processes** - contains business functions linking different enterprises. For example, supply chain management, customer relationship management, and supplier relationship management.

- **Internal business processes** - comprise high level business functions within the enterprise such as management, finance, accounting, inventory, production, sales, and marketing and so forth.

**Software applications availability**

Software applications can either be purchased off-the-shelf, or can be written in-house. Many enterprises have adopted off-the-shelf software applications as the business tools that enable employees to carry out their business operations. For example, some of these applications include general office automation software such as word processors, spreadsheets, and project planning software; and special purpose applications like engineering and designing software. In a global organisation, the availability of software applications in each business unit and subsidiary has a direct influence on the effectiveness of cross-border information sharing and communication, efficient performance of business operations and collaborative teamwork. For instance, if the organisation has decided to use AutoCAD as the designing tool for their products, then it should be made available for all business units and subsidiaries that are required to view, modify, and create designs.

Additionally, an alternative is provided by "component-based" technologies, wherein ready-made components are put together to form an application. These applications, when made available on the Internet, are able to provide information to employees, enabling them to become knowledge workers. Under certain conditions, and for some functionality, even potential clients can use software applications (for example, calculators for home loans or home content insurance).

**Systems standards**

Systems standards is an important issue when dealing with the global information
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systems in terms of the development, operation, communication, and maintenance. Three levels of systems standards should be considered at the project level, organisational level, and industrial level.

1. **Project level standards** - are mainly dealing with the analysis, design and development of the new global information systems. In the analysis and design stage, business functions and operations are often presented in models. These models should be standardised to provide the convenience of communications between development teams, users, and managers. The solution is to introduce a unique modelling technique that is well presented and accepted by most developers, businesses and industrial users. For example, the Unified Modelling Language (UML) is a modelling technique that fulfils the requirement. In the development phase as well, the development teams should focus on few standard programming languages. This would facilitate the tasks for the purposes of future integration and maintenance.

2. **Organisational level** - the focus of standards at organisational level is the business process. For a global organisation to be efficient one would expect that multiple dispersed business units carry out business processes in a similar manner. It would be very difficult to develop global information systems when a business process is implemented in different ways by different business units. Consequently, the organisation must make sure each business process has a unique and standard procedure for any required business unit. In addition to the business processes, the systems operation and maintenance procedures should be standardised throughout the organisation. These standards then apply to all projects within the organisation.

3. **Industrial level** - this is based on quality evaluation of the organisation’s products and services. The implementation of global information systems should be incorporated into the organisation’s quality assurance policy and procedures to
ensure the products and services maintain a constant quality level. The ISO (International Organization for Standardization) assurance system, for instance, is one of the well-known standards to enable organisations to produce consistently products and services that will meet the customer and regulatory requirements, and address customer satisfaction.

Global telecommunication network

The current telecommunication and networking infrastructure serves as the global organisation’s nervous system that interconnects the information systems of dispersed business units through the telecommunication and internetworking protocol called TCP/IP (see Figure 5.4). To maintain continuous and quality networking system services, the global organisation should be concerned about the availability of network bandwidth, national telecommunication services, and networking facilities and equipment, as well as essential security strategies for both collection and distribution of business information.

![Figure 5.4: Internetworking through TCP/IP protocol](image)

Network bandwidth

The network bandwidth continues to be an issue for global organisations because of its limitations and delay of transmitting large-sized high-volume files across business
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units. Although the speed of data transmission has reached a certain degree of efficiency through functions such as instant email delivery, the capability of delivering large-sized files in real-time mode is still unreliable.

Furthermore, the network bandwidth may also rely on the telecommunication services of individual nations. Depending on the level of ICT (information and communication technology) adoption, some nations have advanced telecommunication infrastructure and services (such as the availability of cable, ADSL or mobile communications) while others may provide elementary support only (dial-up connection). For this reason, the network bandwidth issue should be taken into account when planning the global information systems development strategy.

Telecommunication availability
Due to the need to make the use of information technology effective, the availability of connections between business units in a global organisation seems to be more prominent than for other domestic companies. Hence, all types of connection methods should be considered to provide the best performance of a global organisation’s information systems. Furthermore, availability of connections in today’s world is imperative to the success of global business operations, particularly in electronic business. Although most of the developed and developing countries have cutting edge technology, organisations still have to realise the available telecommunication services provided by each proposed country in terms of the availability, flexibility and feasibility.

Network infrastructure
Network infrastructure is the communication backbone for flow of data and information in any enterprise. As business units are required to interconnect with one another, the network infrastructure is also imperative for the global organisations. An appropriate network infrastructure is crucial as it enhances the intra-organisational communication services for global business operations from a number of perspectives. These include real-time communications within or across regional borders, ability to
extend each end-node within the organisation, to be used as fundamental architecture for an organisation-wide application deployment base, and full utilisation in terms of bandwidth and costs.

In addition to the network infrastructure itself, network maintenance is also an important task that requires a well-defined strategy. A well-defined network maintenance strategy will include the control of users on the network, implementation of various security levels on accessing facilities and applications, maintenance of the software license agreements across the network, agreement of standard application set up and upgrade procedures to a single source, implementation of efficient backup procedures, maintenance of virus protection strategies, and implementation of constant network transmission speed (bandwidth) to meet certain business requirements.

**Data and information systems improvement**

In the modern digital world, it is believed that data and information is the imperative asset of any organisation and it should be made available whenever it is needed. Furthermore, efficient organisation and utilisation of data and information would result in the creation of new knowledge that may provide organisations with critical information in decision making. On the other hand, the sensitivity of data and information requires carefully planned maintenance, security and recovery strategies. Issues in relation to data and information improvement include data resource utilisation, security, and systems recovery, as described below.

**Data resources utilisation**

In the global business environment, more data resources are available than in the local business environment. Data can be collected from a variety of sources such as customers, suppliers, employees, managers, as well as for business processes, business units, and subsidiaries and so forth. One way of utilising business data is through the creation of data warehouses with the ability to drill down deep inside the data
and ascertain new and innovative co-relationships between various data items. Therefore, understanding and utilising data is not merely creation of information systems, but creation and sharing of knowledge. Good utilisation of data deals with capturing, storing and retrieving unique relationships between pieces of information that are known as "knowledge". Usually, this knowledge remains in the minds of people. Good data utilisation means good "electronification" of knowledge. Examples of data utilisation include sales forecasting, prediction of market demands, support of decision making, allocation of human resources, and business negotiation.

In addition to the way in which we use data, it is also important to "manage" this data. Effective data management is crucial as it facilitates the transformation of data into information and knowledge for maximum use in the organisation. This requires regular backups, offsite storage of databases, as well as regular cleanups of databases so that they are not riddled with redundant and archaic data items. Finally, in addition to backing up data, respective versions of software that specifically deal with the data should also be backed up to facilitate retrieval.

Security

As more and more business operations are transferred into the global arena and cyberspace, organisations have to face more security-related threats than before. It is crucial that the organisation constructs a realistic security strategy early in the global transition process. Various elements should be considered in the development of the security strategy including the connection with business strategy, the organisation’s security and privacy policy, authentication, authorisation, administration, recovery, and enabling technology and issues. These are discussed in detail below.

1. Connection with business strategy - The security plan must be linked with the organisation business strategy. All decisions must be passed through the filter of the organisational structure and business models. In global organisation structure, the security plan should cover the headquarters as well as foreign business units and subsidiaries.
2. Policy - All of the organisation’s security and privacy policies and procedures must be codified, communicated, and updated on a regular basis. The security policy needs to be specific enough to reduce ambiguity. All levels of employees should be aware of the policy and the training programmes may be conducted where needed. Some essential items that may be included in the organisation’s security are data access, applications access, network access, software, privacy, business resumption planning, systems design and development, and risk assessments.

3. 1. Authentication - Authentication is commonly done through the use of logon passwords. In the networked global information systems, password policies should be well developed to efficiently control the use of applications or systems, and minimise complicated administrative tasks. A firewall is another import component an organisation should focus on when planning its authentication strategy.

4. Authorisation - Once users are authenticated, they need to be monitored according to a pre-defined authorisation schema. Access to networks, applications, and databases need to be defined, and individuals and classes of users need to know where they can go and what they can do once they get there.

5. Administration - All security and privacy policies, authentication, authorisation, and recovery requires administration. Organisations need to ensure the consideration of methods, tools, techniques, and processes as essential components of administrative procedures.

6. 1. Recovery - It is as essential to security as authentication. Organisations need to make sure the investment in systems recovery are equal in value to any prevention tasks.
7. Enabling technology - Technologies enable the implementation of security strategies including firewall technology, anti-virus technology, certificate authority technology, biometric technology, encryption technology, and privacy compliance technology.

After the September 11 tragedy, many organisations realised a complete backup strategy should also include a multi-backup plan at various remote sites. A single backup plan in one location (either remote or local site) does not guarantee the security of the organisations’ data and information. Global organisations have the advantage of planning multiple backups at transborder sites. Ideally, each business unit in the global organisation should have a multi-backup plan of its own data locally as well as remotely. A number of factors should be taken into account when deciding upon a remote backup site. They are technological capability, level of data sensitivity, and level of national security. When a system failure occurs in a business unit, the data can be easily restored through the remote backup site; and if the business unit is also a remote backup site of another, it will request the original site to replicate the data for remote backup purposes. As illustrated in Figure 5.5, business unit 1 backups its own data as well as data from business unit 2 (remote site). Business unit 1’s data is also transferred to business unit 3 for remote backup. Thus if business unit 1 is destroyed, it can easily reinstate its own data through the restoring request from business unit 3. In the meantime, business unit 1 can also request data from business unit 2 for remote backup.

Systems recovery

A systems recovery plan is a culmination of the details regarding how to recover an organisation’s entire operations, especially the mission critical processes. The recovery plan also identifies the recovery resource to affect recovery operations. The main
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Figure 5.5: Multi-backup model for global organisations

Objective of the recovery plan is to prepare the emergency business operations strategy for the situations caused by disasters resulting in inoperability and inaccessibility of any information systems. As global information systems require more complex and sophisticated procedures in system recovery, global organisations need to pay more attention to developing the system recovery plan.

The impact of a disaster can be tremendous. It includes temporary and permanent loss of revenue (customers, business opportunities, market share, competitive edge, customer confidence, and so on), violation of regulatory requirements, legal liabilities, personnel safety, damage to personnel morale, expense of personnel downtime, embarrassment of not being prepared, and so forth. There are numerous events, which can cause a disaster, such as fire, floods, earthquakes, power outages, and terrorism.

Due to the high level of complication in recovering global business operations, the business continuity and disaster recovery planning is essential to every global organisation. As multiple business units operate all over the world, many business rules such as the auditing compliance, insurance requirements, and legislation and regulatory requirements are varying from country to country. Hence, global organisations should have multiple business recovery plans that cover all business operations across
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the world.

5.1.2 Business Information Systems Issues

In the process of globalisation, business and information system strategies are often the senior executives’ major concern. The alignment of global information strategies and the new business visions are crucial to the success of global business operations. Areas in this category and the transition implications contain: information systems planning, information systems organisation alignment, information systems effectiveness, productivity measurement, business reengineering, competitive advantage, information quality, office automation, identification of global business opportunities, systems reliability, availability, and transferability (Lan, 2002). The following subsections investigate and explore these issues in detail.

Information systems planning

A global information system is a scheme that facilitates cross-border business operations by integrating both social and technical elements. Introducing a new global information system involves not only the hardware and software, but also changes in job specifications, skills requirements, management, and organisation structure. All these changes should not be any surprise to all parties involved in the development and implementation of the new systems. In fact, the anticipated changes related to the new systems should be documented and the business plan should be drawn up to reflect all of the stages. Before the global transition process commences, the organisation needs to develop an information systems plan to state precisely the specifications and requirements of each phase and ensure the plan matches the organisation’s strategic vision. As per Laudon & Laudon (2002), the information systems plan refers to:

“A roadmap indicating the direction of systems development: the rationale, the current situation, the management strategy, the implementation
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“plan, and the budget.”

To develop an effective global information systems plan, the organisation should first understand the current business status in terms of its strengths and weaknesses, recognise all issues faced in the global transition process, and clearly outline both short-term and long-term business strategies. The global information systems plan is a precursor for the development of a global transition framework, which is elaborated in Chapter 7.

Information systems organisation alignment

As mentioned earlier, it is imperative for the information system function to align itself with the business processes, strategies and goals of the organisation. Information systems are developed based on the requirements, behaviours and activities of all business parties who have intercommunicated with the organisation’s core business functions and objectives. These parties include suppliers, customers, government agencies, and even competitors. The goals and strategic vision of these business entities must be incorporated in the development of information systems. In addition, the alignment of information systems with business functions in a global organisation must also take into account the organisational type or structure. As I have reported in Chapter 3, each of the four multinational organisation types has quite distinct structures in terms of operational and managerial strategies. Information systems organisation alignment in the global organisation is not just following business processes and conducting analysis and design, it also requires understanding of the abstract level of business strategic vision and cooperation with all business entities.

Information systems effectiveness

Developing effective global information systems requires more than an understanding of business processes and applying the latest information technology. It requires the participation of people who will be using the information systems from all areas through the entire development life cycle. These users include senior managers,
operational staff, salespeople, customers, suppliers, and many other general employees. All these users should be invited to participate in different development phases in accordance with the job-related processes or tasks. Thus, ascertaining the user involvement through the development phases is crucial for an effective global information system.

Productivity measurement

An efficient and productive enterprise is built upon matured business processes. Accordingly, the measurement of productivity in the global organisation should focus on benchmarking of business processes and information systems that facilitate these processes. The measurement of process maturity as set by the ISO (International Organisation for Standardization), and the CMM (Capability Maturity Model) can be used as software quality measurement. The ISO 9000:2000 standard is the latest version of the quality assurance system. It concerns quality systems that are assessed by outside auditors, and it applies to many kinds of production and manufacturing organisations. It covers documentation, design, development, production, testing, installation, servicing, and many other general business processes.

The Capability Maturity Model is developed by the SEI (Software Engineering Institute). It is a model of five levels of organisational maturity that determine effectiveness in delivering quality information system software.

Business reengineering

As organisations pursue globalisation, changes are foreseeable in four areas:

1. Fundamental organisation structure

2. Business processes

3. Management concepts

4. People and skills
Of the above four, changes in business processes are tightly coupled with the design of global information systems. Organisations have to understand and recognise that business processes in the global context are significantly different from the traditional or existing ones. In order to design the appropriate information systems to facilitate business operations in the global environment, organisations should rethink and redesign the business processes to align with the global business strategic vision, in accordance with Hammer and Stanton’s (1995) "official definition" of reengineering which is,

"the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in performance".

Four key words (fundamental, radical, dramatic, and processes) contained in the definition are identified to further explore its significance in the globalisation perspective.

1. Fundamental - in preparing for business process reengineering, organisations must ask themselves questions in relation to the current and future business operations and strategic vision. These questions can be as simple as "what are the current business processes?", "what are the new business processes that would emerge after the global transition?", and "what are the activities involved in the processes (both current and future)?" and so forth. By asking these questions, organisations are forced to map an overall picture of ways they are expecting to conduct their global businesses.

2. Radical - refers to the design of business process from its conception. Which means not just redesigning the business processes by making modifications or improvements to the existing ones. Instead, the key concept of reengineering is to remove the old ones and rebuild the new processes to cope with the global operations.
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3. Dramatic - refers to the deepness of changes to the existing business processes. Dramatic improvement differs from marginal improvement, as the former requires giving up the old ones and replacing them with something totally new, while the latter requires only fine-tuning of the existing processes.

4. Processes - are the objects of the reengineering concept. A business process refers to a collection of activities that carry out operations to achieve business routines and satisfy customer requirements. In a global business environment, many business processes are accomplished through collaborative teams across borders. Hence, the view of transborder business processes is crucial to success in the business reengineering process for global organisations.

In addition to Hammer and Champy’s reengineering, Bill Gates (1999) has introduced the concept of a digital nervous system as the basis of the business communication network to facilitate the transformation or reengineering of business processes into new digital business processes. Most of the business enterprises focus on a few essential elements such as customers, suppliers, products and services, costs, employees, and skills. Each of these areas contains a collection of business data. Through human intelligence, the data is interpreted and transformed into meaningful information to assist people at all levels to make decisions. However, if the interpretation and transformation are performed significantly by the use of information technology, then the organisation has a digital nervous system. Gates describes a digital nervous system as, "the digital processes that closely link every aspect of a company’s thoughts and actions. . . . . . . . The immediate availability of accurate information changes strategic thinking from a separate, stand-alone activity to an ongoing process integrated with regular business activities.”

In thinking of business reengineering, Gates suggests organisations should consider three imperative concepts. At first organisations should review their current business processes periodically; second, they should try to have the least number of people
involved in decision-making of each business process; and third, they should consolidate procedures and activities to decrease the failure rates.

Multinational corporations often find that some similar or even identical processes are implemented in various transborder business units. This would result in the duplication of jobs, inappropriate allocation of human resources, and ambiguous global management responsibilities. Although creating a new business process or reengineering an existing one is a complex and sophisticated project in a global business organisation, the process owners in all transborder business units should define a unique global process that can be adopted throughout the organisation. Furthermore, the globalised business processes streamline the transition in outsourcing situations.

**Competitive advantage**

Attaining global competitive advantage, organisations require competence in changes in areas such as organisational structure, skills, and resources. These competences are crucial to attaining competitive advantage but perhaps even more important is making sure that the competitive advantage is always through value adding to the customer. Ford Motor Company is a good example to illustrate how the changes have taken place (Leontiades, 2001). In order to reach the global competitive advantage Ford transformed its organisational structure through five stages of changes in its competence.

In the first stage, competence of overseas business units was based on products, designs and methods provided by the home country (the headquarters). In stage 2, competence of the overseas business unit was based on its own production with the designs and methods provided by the home country. When the overseas business unit had the capability of production and designing products locally, then it had reached the third stage. In the forth and fifth stages, the capability of production and design were based regionally and globally respectively. In accordance with the above stages, the competence of changes became the driver for the organisation towards globalisation, while customer requirements became the trigger of transformation from stage to
stage. Furthermore, to maintain the global competitive edge, the organisation needs to ensure the reorganisation of the organisational structure and its business strategy have met with customer satisfaction in the global transformation process.

Besides the changes in competence, Porter (1998) also introduced the diamond theory of competitive advantage. The diamond constitutes four attributes that determine the environment, the inputs of production, the availability of resources, the requirement of necessary skills, the business strategy, and structure of the organisation. These attributes are labelled as factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry. Using the diamond of competitive advantage (Porter, 1998) in the globalisation context (see Figure 5.6), the four determinants of the competitive advantage can be described as follows.

![Figure 5.6: Diamond of competitive advantage in the global organisation (based on Porter, 1998)](image)

1. **Factor conditions** - factors of production are the fundamental input to competition. The advantage arises from the high quality inputs such as global market and product knowledge, diverse acquisition of technology and infrastructure and variety of human and capital resources.
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2. Demand conditions - advantages arise from the characteristic of global market and products. In a global market customers demand products from anywhere in the world. Redesigning products or services is essential to fulfil the global conditions and satisfy the global customer requirements. Thus, the global products can be manufactured anywhere and distributed to the nearest market.

3. Related and supporting industries - advantages in increasing productivity arise from the availability of global resources (specialised suppliers and related industries). Through the global supplier channel, organisations are able to find required supporting materials and services at reduced costs. The presence of global resources also works better with the global production strategy. That is, the selected global suppliers provide the required materials or services directly to the closest global production sites. This results in the reduction of time required for transportation and thus shortens the production cycle.

4. Firm strategy, structure, and rivalry - the diverse and multicultural conditions in the global business environment present advantages to enterprises in organising, structuring, and managing the business strategy and structures to survive the global rivalry.

**Information quality**

Information is a direct product of processes that capture knowledge about the persons, places, things and events discovered while conducting business transactions (English, 2001). In a global organisation, the sources of information are enormous. Information is produced by virtually everyone from any level in the organisation. As a result, enterprises often face situations such as missing or inaccurate information. This would cause business processes to fail and increase costs in reproducing information. Hence, organisations must apply quality principles to effectively manage information. However, managing and controlling information and its quality seem to be a complex and challenging task. Clikeman (1999) defines a number of dimensions that are critical...
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to maintaining the information quality in the global organisation; they are relevance, accuracy, timeliness, completeness, coherence, format, accessibility, compatibility, security, and validity.

**Office automation**

Office automation involves the planned application of integrated information handling of tools and methods to improve the productivity of people in office operations. Although managing information by office people is the focus of office automation, other aspects of the office are also affected. These include factors such as the structure of business functions and lines of reporting, training for new methods, work space design, locations of subsidiaries or business units, home versus office work, hours of work, employee morale, and job classifications. Organisations that harness office automation products will need to deal with much more than just technological issues.

Three major roles of an office identified by Laudon & Laudon (2002) are

1. Coordinate and manage the work of local professional and information workers within the organisation.

2. Link the work being performed across all levels and functions throughout the organisation.

3. Couple the organisation with the external environment.

Generally, there are five major office activities that can be identified, including managing documents, scheduling individuals and groups, communicating with individuals and groups, managing data on individuals and groups, and managing projects. The computing and information technologies that support each activity should be identified and made available for all business units in planning for globalisation.

1. Managing Documents - it involves tasks such as creation, storage, retrieval, and dissemination. The technologies supporting these tasks include word processing, desktop publishing, document imaging, Web publishing, and work flow manager applications.
2. Scheduling individuals and groups - the technologies that facilitate this activity include electronic calendars, groupware, and intranet.

3. Communicating with individuals and groups - the tasks include initiating, receiving, and managing data in the format of voice, image, digital, and text. The supporting technologies may consist of e-mail, voice mail, digital answering systems, groupware, and intranets.

4. Managing data on individuals and groups - this activity mainly focuses on the management of data and information of employees, customers, vendors, suppliers, or even competitors. The enabling technologies include database systems and spreadsheet applications.

5. Managing projects - it refers to the management of collaborative work and projects in both local and global environments. The technologies that can be applied to this activity may include groupware, teamware, and project management applications.

Identification of global business opportunities

With rapidly advancing technology the business and information technology community are encouraged to consider many more innovative business models. These emerging innovative business models can be defined in a number of forms such as mergers and alliances, differentiation of products and services, e-business (electronic business), economic value added focus, productivity process, order fulfilment and customer demand management, and globalisation of markets.

1. Mergers and alliances - this refers to the need for individual organisations to increase in size either by internal growth or alliances with external parties (other organisations).

2. Differentiation of products and services - refers to the need to provide products and services to customers that are, at the same time, unique, value efficient,
and reasonably priced.

3. E-business - refers to development, acceptance, and usage of the Internet business tools in overall or partial company operations (such as virtual organisation), sourcing and supply strategies.

4. Economic value added focus - refers to the increasing financial pressure on organisations to achieve high process performance as they affect or are affected by sourcing and supply, and increasing focus on economic value added.

5. Productivity process - refers to the growing emphasis by top management on cost control, reduced cycle time, increasing flexibility, the profit picture and process economics.

6. Order fulfilment and customer demand management - refers to the fundamental changes in distribution, and the need to change the methods used in customer order fulfilment and customer demand management.

7. Globalisation of markets - refers to the need to adopt standard processes for producing, selling and distributing products and services.

Systems reliability, availability, and transferability

Information systems should be reliable in terms of withstanding use by various types of users through a variety of platforms or environments. This refers to the capability of incorporating diverse error handling strategies to react to any possible and unforeseeable situations in information systems. Moreover, the availability and transferability of information systems are considered as important as the systems reliability in the global organisation. Due to the multinational business units in the global organisation, each business unit may need to access the information in different time periods. The maintenance strategy needs to cope with this multinational characteristic to eliminate the consequences of the system’s downtime. If the implementation of
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Global information systems is through the Internet, users expect the systems to operate in a 24/7 manner. The components and modules of global information systems should also be designed flexibly enough to transfer and adapt from one business unit to another without further technical modifications. This portable and transferable concept should be built into the development architecture to enhance the reusability and to reduce the development and maintenance costs.

5.1.3 People Issues

People are major players in designing, implementing and utilising information systems. When investigating the human resources management in the global business environment, a number of areas need to be considered as crucial to the success of globalisation. These areas are recruiting, training, organisational learning, cross-cultural skills development, and global team development (Lan, 2002).

Recruiting

Hiring employees for a global organisation is not as easy as for domestic companies. The recruitment process requires careful planning to provide the best strategy for the global organisation in obtaining suitable employees for appropriate positions and locations. For example, Unhelkar (2002) has suggested the importance of a "best fit" approach to recruitment. In preparation of the global recruitment plan, the organisation’s human resources department firstly needs to transform itself into a global operation. Traditionally, human resources is a quite independent and unique system for each subsidiary in multinational corporations (MNCs). For example, the human resources department in the Sydney subsidiary may have no relationships or connections with the human resources department in Tokyo of the same MNC. In addition, each subsidiary’s human resources department may maintain its own operations that may be enough to fulfil the local requirements but certainly would not have the flexibility to facilitate the management of employees in the global scale. This uniqueness
of the human resources function in the traditional organisation leaves the organisation with no centralised control and standardised operations in regard to people management. By implementing a global human resources system, MNCs would benefit in efficiently managing geographically dispersed employees as well as standardising the organisations’ employment policies.

In the global recruitment aspect, the Internet seems to be the appropriate operating platform. The implementation of a corporation’s careers Website is considered to be the key success factor in improving the speed, efficiency and effectiveness of the overall recruiting process. Further, the careers Website has a profound impact on the organisation’s global recruitment strategy in the following areas (Jones, 2001):

1. Branding and sourcing - it provides the potential candidates with a comprehensive and concentrated source of information and branding experience regarding the organisation as an employer.

2. Response management - it provides a standardised application for candidates from various sources and maintains a centralised database for the ongoing relationships.

3. Assessment - to reduce the organisation’s costs and time, extra features can be incorporated into the careers Website for pre-screening and filtering the candidates.

4. Processing - it streamlines the processes of people/employee management by connecting the careers Website to the organisation’s back-end systems.

Training

Training is a critical agenda for organisations to continuously improve the quality perspective in products, services and management aspects, and strengthens organisations in the global competitive edge. In designing and developing the training programmes,
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A number of factors are identified to ensure appropriateness and effectiveness. These factors include:

1. Stage in the global transition process - as there are various stages in the global transition process, the training development needs to reflect the various skills required by employees carrying out tasks at different stages.

2. Target employee domains - different levels and types of employees would play different roles in the organisation’s global transition process. Considering the types of employees and their respective situations, the suitable training programmes could be developed to enhance the employee skills and serve the requirements of globalisation.

3. Methods of training - implementing training programmes across national borders has a significant level of complexity and budget requirements. By applying technology (such as computer based training programmes, or online training) to develop and deliver the training programmes would allow the employees to participate in learning anywhere and anytime. However, the standardised training programmes may require some variations, for example in languages and cultural aspects, to suit the foreign subsidiary contexts.

Organisational learning

In today’s challenging business marketplace, organisational learning seems to become one of the prominent aspects that enterprises would like to focus on and incorporate in their business strategies. As the enterprise evolves, many changes have transpired and are demanded for resolutions. These changes are often associated with leadership and management styles, implication of technology, and the business environment. As a result of swift technological development, enterprises are capable of applying knowledge management, and through the online learning environment to promote organisational learning. Laudon & Laudon (2002) define knowledge management as ”the process of
systematically and actively managing and leveraging the stores of knowledge in the organisation”. The key information systems that support knowledge management include office automation systems (OAS), knowledge work systems (KWS), group collaboration systems, and artificial intelligence systems (AI).

Cross-cultural skills development

In multinational corporations, business units and subsidiaries are often spread across nations and have quite distinct cultural attitudes and characteristics. Hence, employees in global companies are more likely to have greater chances of dealing with foreign colleagues than non-multinational companies. In order to smoothen the communications and information flows between employees from different cultural backgrounds, global corporations should consider the introduction of multi-cultural skills development programmes. These programmes may consist of language and communication learning, and recognising and understanding of culture differences.

Global team development and leadership styles

Collaboration and coordination are the two imperative ingredients of successfully conducting teamwork in the global organisation. Coordination refers to the extra tasks required for amalgamating tasks performed to accomplish the final goal, while collaboration deals with multiple teams working jointly toward the same objective. In global projects, teams or even members of the team come from different countries or regions. In order to succeed in global coordination and collaboration, there is a need to establish common standards in terms of communication method, language, management rules, and information technologies (as well as hardware platforms and software applications).

Four possible team organisational models (see Figure 5.7) can be applied in the global projects, namely pyramid, breakthrough, open architects, and synchronous paradigm (Thomsett, 1994).
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1. **Pyramid** - has its roots in the industrial age. Projects are decomposed into functions, similar to how a business is decomposed into business functions, such as R&D, engineering, manufacturing, marketing, sales, distribution, accounting, and finance, with all the functions reporting to the same executive. A single person, the project manager, is responsible for the project and has the authority to make decisions. All team members are directly accountable to the project manager.

2. **Breakthrough** - involves teams of random creatively independent staff. Team members do not wait for guidelines or directions, and have clear objectives in mind. For better performance, the breakthrough model requires freedom from interference, and freedom to investigate problems. This model is suggested for small-sized, short-term, and simple projects that do not require intensive coordination of interdependent units.

3. **Open architects** - Members of this team model work collaboratively toward the project objectives. Functional roles are well defined in the team and rotated among team members. Software development teams are suggested to adopt the open architects model for making collaboration and consensus engineering more efficient and controllable (Constantine, 1995).

4. **Synchronous paradigm** - Team members share a common vision with the leader. The level of alignment with the common value and vision is the key to eliminate tight control of any kind and increase the efforts made by each individual. Hence
the leader of this team model has less workload in supervising and guiding the
team members to carry out their responsibilities.

5.1.4 End User Issues

The end users are the ultimate group of people using the global information sys-
tems on a regular basis. The task of managing and supporting end user groups is
not only in maintaining business information operations but is the key to evaluating
and improving the global information systems. The fundamental concerns of the end
user management category in the globalisation context (Lan, 2002) include managing
end user computing facilities, end user computing education, introducing and learn-
ing new global information systems, help desk support, and end user involvement in
global information systems development as mentioned in the "Information systems
effectiveness" section.

Managing end user computing facilities

Controlling the end user computing equipment and facilities is a complex assignment,
especially in the global organisation where business units are dispersed across nations.
Managing end user computing facilities should be taken into account when planning
and designing the global information systems. Tasks involved in the end user facilities
management may include the identification of facilities in each of the business units
and subsidiaries, verification of facilities availability, development of standard main-
tenance procedures, and the development of standard facility purchasing, logistic and
distribution procedures.

End user computing education

In the modern business environment, employees’ capabilities to use computers to per-
form business tasks seems to be part of the job requirements. The basic computing
skills such as producing documents, sending emails, and browsing the Internet are
required in most office environments. However, the level of employees’ computing
education in the global organisation varies from subsidiary to subsidiary. Thus, there is a need to incorporate an end user computing education plan in the global transition process. The main objective of the plan is to ensure that the employees’ have obtained the required computing skills in all business units. It may consist of the identification of the employees’ current computing skills and levels, identification of essential computing skills development of training programmes, and implementation of training programmes.

Introducing and learning new global information systems

When the development of global information systems reaches a certain level (such as the testing and deploying stages), the training programmes should be introduced. The training programmes should be developed through the systems development teams and the human resources department collaboratively. In order to develop the appropriate training programmes for the respective end users, the initial stage is the mapping of the organisational hierarchy in terms of the end user types and their responsibilities to the system’s functionality.

Help desk support

As per many other business information systems, the help desk plays an important role in keeping the users satisfied when performing business tasks through the global information systems. To provide an effective help desk service, two fundamental concepts may be incorporated into the help desk function - a clear understanding of what are the services the users anticipate, and accurately and timelessly responding to problems reported by users. Figure 5.8 illustrates a proposed help desk structure to accommodate the global information systems help services. It includes a centralised global end user support centre and various regional or local end user support centres. The global end user support centre takes care of problems and requests dealing with transborder activities in the global context and also manages the regional/local end user support centres. In the regional/local centres, the main services are to firstly define the scope of request (global or regional/local) and secondly provide help on
issues relating to local or regional activities. If the problem relates to the transborder activities, the regional/local centre will divert the request to the global end user support centre for resolution.

End user involvement in global information systems development

Users’ perception and information requirements drive the entire development of the global information systems effort (Laudon & Laudon, 2002). Users must have sufficient control over the design and development of global information systems to ensure that business functions and operations are accurately incorporated. Moreover, the design of global information systems should be based on all stakeholders. In other words, the lack of users involvement in the design of global information systems is the major cause of systems failure.

There are always benefits associated with involving users as part of any information system development teams. However, it is even more important to engage users in the global information systems development. As mentioned above, users are people who understand the business functions and operations. Involving various types of users
through the entire global information system analysis and design phases is crucial as it helps in making sure the global information system would appropriately implement business processes and bring extra value to the business. It is also believed that users who have been involved in the design and development phases would become change agents for the introduction of new systems. The change agents play the role of disseminating the concept of new systems to members in their local business unit and they may also be involved in developing training programmes.

5.1.5 Culture Issues

When addressing information systems and technology globally, culture is an important aspect to be considered as it influences the success or failure of global transformation. In the new challenge of globalisation the reality of cultural diversity is unavoidable. Organisations should be encouraged to embrace diversity and turn the multicultural characteristics into strategic advantages. Understanding this diversity is crucial to conducting any global business. As Kincaid correctly points out (Kincaide, 1999) doing business “requires a deep respect of the country’s culture, religions and institutions”. Furthermore, understanding the cultural issues and variables will provide organisations with a certain level of competitive edge in the global business environment. O’Hara-Devereaux and Johansen (1994) introduced a multifaceted lens concept - a way of peering through the fog of cultural diversity. The multifaceted lens concept is based on the identification and understanding of various cultural dimensions including:

1. Language - refers to the vocabulary, structure, and meanings of oral and written communication. For example, a standardised global customer relationship management (CRM) application may require multiple interfaces designed in different language characters (such as English, Chinese, or Japanese) for subsidiaries in different countries. However, in a global organisation it is very difficult for the
internal communications to take place without an agreed common language.

2. Context - refers to the entire array of incentives surrounding every communication event. The measurement of context can be assigned either high or low. High-context cultures assign meaning to many of the incentives surrounding an unambiguous message. On the other hand, low-context cultures leave out many of those incentives and focus on the objective communication event (O’Hara-Devereaux and Johansen, 1994). For example, a high-context culture refers to an individual’s ‘context’ or their relationship with other people (e.g. families and friends) as more important (that is the ‘context’ in which the individual relates to people/families) than the individuals themselves. Low-context culture means it is less important to whom an individual is related (i.e. the context in which the person operates), but more important what the individual does.

3. Time - the concept of time and time management differ widely from culture to culture. As Hall, E and Hall, M (1990) described, cultural time differences can be thought of in either monochronic or polychronic categories. In the monochronic time category, people tend to do one single thing at a time, however, in the polychronic time category, people can perform multiple tasks at once. Another aspect in relation to the time is the orientation. The time orientations are generally partitioned as past, present and future. According to O’Hara-Devereaux and Johansen (1994), cultures are either future-oriented or past-oriented. Which means the current operations of business activities are designed to influence the future events or to be influenced by past events. Different cultures would have different emphasise on time orientation. For instance, Asian cultures are inclined to be oriented toward a more distant future. On the other hand, many Latin cultures are heavily influenced by the past. When planning for cross-culture collaborative works, for example the global information systems development teams with members across different nations
and cultural backgrounds, organisations need to consider the employees’ attitudes toward time categories and orientations and derive a balanced “Time” solution for maximising the performance in the global collaborative situation.

4. Power equality - refers to the degree of power and authority distribution and understanding of equality from different cultural perspectives. Organisational units in various cultures may have a diverse perception of power, authority, and equality among employees. For example, some cultures might demonstrate higher respect for professional skilled employees than general unskilled workers and thus skilled professionals would derive more power than unskilled workers. In this dimension, organisations ought to carefully adjust the power, authority, and equality given to employees in diverse cultural backgrounds while maintaining an equivalent level of distribution (power, authority, and equality) amongst business units.

5. Information flow - refers to the methods and paths of transferring information and data between people across levels and regions within the organisation. Information flow is critical in productively carrying out business operations and achieving business objectives in a cross-cultural business environment. Global organisations need to realise the cultural impact on the information flow and ensure that information travels from one part of the organisation to another within expected time, sequence, and format.

Additionally, many recent research publications have reported that the knowledge of culture and cultural environments is crucial for the success of the globalisation process. In addition, a number of global information systems management issues related to culture and culture differences have been outlined by researchers (Burns, J. et. al, 1993; Ein-Dor, Segev and Orgad, 1993; Sauter, 1992; Yellen, 1997). These issues aim to draw the attention of organisations’ intending to pursue globalisation.
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There are several aspects pertaining to culture that need to be heeded by an organisation planning to globalise its information systems management. These include education levels, geographical zones and time zones, religion, demographics, individual significance and objectives, communication, and leadership style. To recognise the importance of these, each aspect is further explored and discussed in the following sections.

Education levels

The education level in relation to information technology and globalisation depends upon various aspects of a country’s vision. In some developing countries such as China and India, information technology seems to be the main agenda in the national education strategy as the rationale of competing with developed countries. However, some other countries have much less emphasis on information technology education. A company’s transition to globalisation can be impacted significantly based on the level of education in the regions it operates.

Geographical and time zones

Geographically dispersed business units with a range of time zones are characteristic of any organisations that operate business globally. This can be both helpful and detrimental. It can be helpful because of the round-the-clock information systems development scenario. On the other hand, the geographical and time zone differences could be detrimental. In videoconference and telephone conference situations, for instance, inter-organisational meetings scheduled at 2 o’clock in the afternoon in Sydney would cause difficulty for people to participate in New York (as it would be the middle of the night there).

Religion

Sometimes religion has a major influence on the daily schedule of business operations. For example, in the Islamic world, Friday is considered as the holy day and is part of the weekend instead of Sunday. Business units or subsidiaries in Islamic areas must align their business hours to the religious activities. Religious events also affect
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the organisation’s non-working (holiday) periods. For instance, most of the Western world have one week Christmas holiday; India is in holiday season during Diwali, somewhere in between the end October and early November; and the Arab countries and China will have different holiday periods. Organisations with business units or subsidiaries operating in different countries need to ensure that there are no scheduled business activities during the times and days for religious activities and festivals.

Demographic perspective

The focus of the demographic aspect in the global culture category is specifically associated with the age and gender perspective. Age distribution can be quite different in every social culture. The general perceptions and values of age groups are also different from culture to culture. For example, many Western cultures value young people over their elders whereas elders are revered in most Asian cultures. In the gender perspective, masculinity and femininity are the two key categories to be considered. In masculine cultures, gender roles are strictly delineated and conventional male values such as competitiveness and strength tend to be appreciated in organisations. In feminine cultures, stereotypical female values such as cooperation, caring and nurturing are valued and there is less demarcation between gender roles.

Although there is no perfect and standard solution to overcome the various cultural differences in age and gender aspects, organisations are strongly recommended to comprehend the meaning of these aspects in each culture and fine-tune the appropriateness to their working environment.

Significance and objectives of the individual

No matter where the employee is located, nor the position of the employee as a human being, an individual has his/her own objectives and outlook on life. These objectives can be identified in three aspects: personal, social, and professional. From time to time, the emphasis of these aspects changes, or conflicts with each other. For instance, an individual’s personal objective is to spend more time with the family, but a promotion opportunity is given to the individual with the condition of working several
months overseas. Hence, the individual has to decide whether to take the promotion opportunity and sacrifice the family commitment. Similarly each organisation has its own objectives and these objectives may conflict with employees’ personal objectives. To overcome this conflict, the organisations must realise their employees’ objectives, and negotiate with a realignment strategy to achieve a win-win situation.

**Communication**

As in the earlier discussion of O’Hara-Devereaux and Johansen’s cultural lenses, communication primarily refers to languages in either verbal or written forms. Although English is the common language for business communication around the world in both written and verbal formats, there are other languages prominent in specific regions. For example, Chinese is the widespread language in the greater China region (including mainland China, Taiwan, Hong Kong, and Singapore); Spanish is the common language used in most Latin American countries. Adopting a language to be used across a multinational organisation is a challenging task in the global transition process. In addition to language itself, methods used to send messages also play an important role in global business communication. The traditional ways of transferring messages amongst organisations are telephone conversations, faxes and telexes. On the other hand, emails, Web cam, and mobile SMS (Short Message Service) are the technological ways of transferring messages between companies.

Communication is always a major concern in most global organisations. Enterprises should ensure a standard communication typology is embedded in the policy and implemented in daily operations. The latest technologies relating to global business communication are discussed later in this chapter.

## 5.2 Organisational Transition Scope

When organisations are deciding their future business plans on pursuing a globalisation strategy, they mainly focus on how the information systems can be transformed
and aligned with the new global business strategy within the organisations. However, this one-dimension only assumption would prevent further expansion of business and information systems beyond the global transition.

In accordance with Michael Porter’s (1998) competitive forces model, to sustain a competitive edge in the global business environment, organisations must be aware of five basic competitive forces. The approach of aligning these forces to the organisation’s strategic plan determines the ultimate profit potential of the global transition process and beyond. These forces are namely, the threat of new entrants, the threat of existing competitors, the threat of substitute products or services, the bargaining power of suppliers, and the bargaining power of customers. Each of these forces is delineated in the global business context in the following sections and the amended competitive forces model is illustrated in Figure 5.9 to emphasise that the intra-organisational scope has the same level of importance as the inter-organisational scope.

1. Threat of new entrants - these players are the potential competitors. They are not currently in the market, however, if the situation changes, they might decide to jump in. If so, they may be bigger, stronger, and gaining more market shares than other existing competitors.

2. Threat of existing competitors - there are always competitors existing in any market. The current competitors can be seen as the key factor to force organisations in improving product quality, material costs, better customer services and so forth.

3. Threat of substitute products or services - new technologies, new methodologies, and new approaches force the traditional products or services into retirement mode. The replacements are better in quality, have effective costing, and are demanded by more customers. The threat compels organisations to keep updating their products and services through the incorporation of the latest technologies,
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methodologies, and approaches.

4. Bargaining power of suppliers - the initial force comes from the availability of suppliers. If there are many suppliers available, the organisation has the bargaining power to select the qualified suppliers. On the other hand, if there are only a few available, they will have businesses by the throat. Another force regards the relationships between suppliers and the organisation. It mainly considers the relationship of sharing business vision and having common business goals. The closer their strategy and objectives, the tighter their relationships.

5. Bargaining power of customers - similar to the bargaining power of suppliers. The force depends upon two main factors, the number of existing customers, and the relationships between customers and the organisation.

Figure 5.9: Amended five competitive forces model (based on Porter)

Furthermore, Andrew Grove (1999) and Bill Gates (1999) have also indicated the importance of organisational scopes (both inter- and intra-) regarding the business
strategy and the organisation’s information systems. In relation to Bill Gates’ digital nervous system (Figure 5.10), it helps and facilitates an organisation to manage its internal business operations as well as interact with the external parties such as customers, suppliers, and competitors. The digital nervous system supported by data warehouses, provides the strategic thinking for the organisation as they exploit the data and elicit information and knowledge. A reflexive response refers to the organisation responding rapidly to dynamic changes of external stimuli such as a sudden drop in market shares.

![Diagram](image)

**Figure 5.10: A Digital Nervous System (based on Gates, 1999)**

Based on Michael Porter’s five competitive forces model, an additional force (the sixth force) - the force of complementors, was included to form Andres Grove’s six competitive forces diagram (see Figure 5.11). The complementors are other businesses from whom customers purchase complementary products. Sometimes products or services only work with other products or services. For example, in the computer software and hardware situation, both support each other to demonstrate their functionalities.
Consequently, the force of complementors can be seen as the mutual business strategy where organisations’ products are aligned to maximise the business benefits.

Figure 5.11: Six competitive forces diagram (Grove, 1999)

When a business is in transition, the beginning and the end points are often identified while the transition in between remains as the unclear puzzle. Organisations should incorporate these competitive forces in order to derive an unambiguous roadmap towards the objective (see Figure 5.12).

Figure 5.12: Transition between two states of an organisation

Thus, to assure the developed global information system is entirely supporting the business operations as well as providing the flexibility for future enhancement, organisations need to consider both intra-organisational and inter-organisational dimensions.
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5.2.1 Intra-organisational Scope

When talking about intra-organisational operations, people are predominantly referring to internal business functions. Most of these business functions are generic to any and every enterprise, while some of them are quite unique and dependent upon industry types. From this research point of view, I would like to focus on the generic business functions that apply to global organisations as well as non-multinational corporations or small and medium-sized enterprises. These functions work together to lead the enterprise to survive and prosper. In general, five business functions exist in any of the above-mentioned organisation types. These functions are management and administration, human resources, finance and accounts, purchase and procurement, and sales and marketing.

Management and administration

The main tasks of the management and administration function comprise management of organisation, corporate resources, corporate image, quality in all aspects, industrial relations, stakeholder relations, productivity, promotion of achievements, effective working relationships with external parties; liaising with political heads of sections or departments and administering services.

Human resources

Human resources refers management of all the employees. This function includes job analysis, position classification, employee training, employee selection, employee auditing and promotion, employee welfare, employee relations, work safety and sanitation, documentation and filing. The important tasks involved in human resources’ function are development of a human resources plan and strategy; providing a workforce; management of industrial relations, employee compensation and benefits, internal communications, employees’ amenities, and personnel statutory obligations.

Finance and accounts

The finance and accounts function includes all the capital operations required by
the entire enterprise activities. The major mission of financial activities is to deal with all the funds required by management, administration, sales, marketing, human resources, purchasing, procurement, and research and development; and to appropriately arrange the entire enterprise’s financial resources.

**Purchase and procurement**

The purchase and procurement function consists of all activities in relation to obtaining and managing materials, services or products required to be involved in the production processes from suppliers or vendors. The key tasks may include the management of stores, inventory controls, procurement management, receipts management, investigation and analysis of purchases and procurement sources, and shipping and clearing management.

**Sales and marketing**

Sales and marketing refers to any transferring activities of products or services from producers to consumers. Sales activities are not only the traditional selling behaviours but also include the marketing mix or generally called "4P’s" - production decision, pricing decision, promotion decision and place decision. Due to the rapid change in production techniques, many products have been supplied to the market efficiently. Many organisations have changed their operation philosophy from traditional production orientation to the modern marketing orientation. In other words, enterprises are now paying much attention to all the sales techniques and methods, focusing on the consumers’ requirements, designing acceptable products for consumers and reducing product costs in order to arrange reasonable and competitive prices. Some key activities of sales and marketing can be identified as surveying the market, selling products, managing products, managing sales outlets, promoting products, and providing sales support and after sales services.

To ensure the development of global information systems has deliberated the global transition issues, the Waterman et al. 7-S model (1980) is applied to validate the completeness of global transition issues.
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The fundamental concept of the 7-S model is that "structure" is not the only element representing an organisation; there are six other elements to form a complete organisation (see Figure 5.13). These seven elements can be classified into two groups - tangible and intangible. The tangible elements are feasible and easy to identify. They can be found in the organisation’s strategic plan, mission statement, organisational chart, and other corporate documentations. These tangible elements are strategy, structure, and systems. The intangible factors include skills, staff, style, and shared values.

![7S model (Waterman et al., 1980)]

Tangible elements

1. Structure - is the foundation for specialisation and coordination influenced principally by strategy, organisation type and size, and diversity.

2. Strategy - refers to actions an organisation plans in response to or in anticipation of changes in its external environment.
3. Systems - can be seen as formal and informal procedures and processes that support the strategy and structure.

Intangible elements

1. Skills - are the organisation’s distinctive competences.

2. Staff - refers to the human resource management. It includes processes used to develop managers, socialisation processes, methods of recruiting appropriate employees, and approaches of helping to manage and develop the careers of employees.

3. Style - refers to the culture of the organisation and the management style. Organisational culture is the dominant values and beliefs, and norms, which develop over time and become relatively enduring features of organisational life. Management style is more a matter of what managers do than what they say, such as how an organisation’s managers spend their time and what they are focusing attention on.

4. Shared values - are superordinate goals, guiding concepts and fundamental ideas around which a business is built.

By mapping the global transition issues with the 7S model, the following tables (Table 5.6 - Table 5.12) intend to act as a diagnostic model for the complete preparation of global information systems development. The results of mapping verified that all global transition issues have been covered under the 7S model.

5.2.2 Inter-organisational Scope

Inter-organisational transition scope focuses on the business activities and operations that are external to the organisation. These external business activities and operations can be seen as the communication channels between the organisation and
5. GLOBAL TRANSITION ISSUES

<table>
<thead>
<tr>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building a responsive IT infrastructure</td>
</tr>
<tr>
<td>Changing technology platforms</td>
</tr>
<tr>
<td>Developing and implementing information architecture</td>
</tr>
<tr>
<td>National communication infrastructure</td>
</tr>
<tr>
<td>Currency and formatting</td>
</tr>
<tr>
<td>Time orientation</td>
</tr>
</tbody>
</table>

Table 5.6: Mapping of global transition issues with "Structure"

<table>
<thead>
<tr>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using IS for competitive advantage</td>
</tr>
<tr>
<td>Identification of business opportunities in a global marketplace</td>
</tr>
<tr>
<td>IS and organisation alignment</td>
</tr>
<tr>
<td>IS planning</td>
</tr>
<tr>
<td>Increasing understanding of the IS role and contribution</td>
</tr>
<tr>
<td>Reengineering business processes through IT</td>
</tr>
<tr>
<td>Determining an appropriate IS funding level</td>
</tr>
<tr>
<td>Instituting cross-functional IS</td>
</tr>
</tbody>
</table>

Table 5.7: Mapping of global transition issues with "Strategy"

other enterprises such as customers, suppliers, and competitors. By incorporating the external communication channels in the global transition strategy, a number of new business processes start emerging as part of the core business functions. As a result, these new processes extend the enterprise’s organisational scope and change the organisation’s structure. The new emerging business processes include customer relationship management (CRM), supplier relationship management (SRM), supply and chain management (SCM).

Customer relationship management

Swift (2001) defines CRM as "an enterprise approach to understanding and influencing customer behaviour through meaningful communications in order to improve customer acquisition, customer retention, customer loyalty, and customer profitability". The fundamentals of CRM function in an organisation can be designed to fulfil the global customer satisfaction through a number of categories. These categories
5. GLOBAL TRANSITION ISSUES

<table>
<thead>
<tr>
<th>Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems reliability and availability</td>
</tr>
<tr>
<td>Software quality assurance standards</td>
</tr>
<tr>
<td>Software transferability</td>
</tr>
<tr>
<td>Measuring IS effectiveness and productivity</td>
</tr>
<tr>
<td>Measuring and improving IS productivity</td>
</tr>
<tr>
<td>Delivery of the new global systems</td>
</tr>
<tr>
<td>Applications software development</td>
</tr>
<tr>
<td>Implementing and managing office automation</td>
</tr>
<tr>
<td>Global information systems equipment</td>
</tr>
<tr>
<td>Software availability</td>
</tr>
<tr>
<td>Configuration of user interfaces</td>
</tr>
<tr>
<td>Implementing decision and executive support systems</td>
</tr>
<tr>
<td>Developing and managing distributed systems</td>
</tr>
<tr>
<td>Systems development standards</td>
</tr>
<tr>
<td>Network standards/protocols</td>
</tr>
<tr>
<td>Network management systems</td>
</tr>
<tr>
<td>Telecommunications and utilities availability</td>
</tr>
<tr>
<td>Transmission networks</td>
</tr>
<tr>
<td>General security</td>
</tr>
<tr>
<td>Improving information security and control</td>
</tr>
<tr>
<td>Improving data integrity and quality assurance</td>
</tr>
<tr>
<td>Improving disaster recovery capabilities</td>
</tr>
<tr>
<td>Moving to open systems/standards</td>
</tr>
</tbody>
</table>

Table 5.8: Mapping of global transition issues with "Systems"

<table>
<thead>
<tr>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing cross-cultural skills and attitudes among senior managers</td>
</tr>
<tr>
<td>Hardware and software support</td>
</tr>
<tr>
<td>Development methodology</td>
</tr>
<tr>
<td>Improving the effectiveness of software development</td>
</tr>
<tr>
<td>Improving software development</td>
</tr>
<tr>
<td>Telecommunications technology</td>
</tr>
<tr>
<td>Support for telecommunications</td>
</tr>
<tr>
<td>Facilitating organisational learning and use of IT</td>
</tr>
<tr>
<td>Facilitating and managing end user computing</td>
</tr>
<tr>
<td>Managing end user computing</td>
</tr>
<tr>
<td>Staff absorption of the new global systems</td>
</tr>
<tr>
<td>Help desk support</td>
</tr>
</tbody>
</table>

Table 5.9: Mapping of global transition issues with "Skills"
5. GLOBAL TRANSITION ISSUES

<table>
<thead>
<tr>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making IS professionals more business-oriented</td>
</tr>
<tr>
<td>Education of senior management</td>
</tr>
<tr>
<td>Educating senior management on the IS potential and role</td>
</tr>
<tr>
<td>Quality of people management</td>
</tr>
<tr>
<td>Retaining, recruiting and training MIS/IT/DP personnel</td>
</tr>
<tr>
<td>Availability of technical staff</td>
</tr>
<tr>
<td>Expatriate employee assignments</td>
</tr>
<tr>
<td>Differences in compensation</td>
</tr>
<tr>
<td>Travel costs</td>
</tr>
<tr>
<td>Average education level</td>
</tr>
<tr>
<td>Computer science education</td>
</tr>
<tr>
<td>Gender perspective</td>
</tr>
<tr>
<td>Age distribution</td>
</tr>
<tr>
<td>Religion</td>
</tr>
</tbody>
</table>

Table 5.10: Mapping of global transition issues with "Staff"

<table>
<thead>
<tr>
<th>Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing organisational changes caused by IS</td>
</tr>
<tr>
<td>Managing the existing applications portfolio</td>
</tr>
<tr>
<td>Planning and managing telecommunications</td>
</tr>
<tr>
<td>Preference for leadership style</td>
</tr>
<tr>
<td>Individual versus group goals</td>
</tr>
<tr>
<td>Values of the individual</td>
</tr>
<tr>
<td>Interpersonal communications</td>
</tr>
</tbody>
</table>

Table 5.11: Mapping of global transition issues with "Style"

<table>
<thead>
<tr>
<th>Shared values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Justification of information systems investments</td>
</tr>
<tr>
<td>Quality of organisation management</td>
</tr>
<tr>
<td>Information quality: information system output</td>
</tr>
<tr>
<td>Data quality: information systems input</td>
</tr>
<tr>
<td>Utilisation of data resources</td>
</tr>
<tr>
<td>Using IS to integrate across business functions</td>
</tr>
<tr>
<td>Information technology quality</td>
</tr>
<tr>
<td>Knowledge of technology</td>
</tr>
<tr>
<td>Integration of DP, OA and telecommunications</td>
</tr>
<tr>
<td>Making effective use of the data resource</td>
</tr>
</tbody>
</table>

Table 5.12: Mapping of global transition issues with "Shared values"
5. GLOBAL TRANSITION ISSUES

comprise the CRM strategy, sales force automation, marketing automation, customer support centre, e-enabled CRM, and the supporting technology and infrastructure for CRM implementation.

1. CRM strategy - should align with or be part of the global business strategy. It refers to the plan for developing comprehensive customer related functions by integrating people, process and technology to maximise relationships with all customers. The basic principles of CRM strategy may involve aligning the organisation around customers, sharing information across the entire business, leveraging data from disparate sources to better understand the customers and anticipate their needs, and maximising customer profitability.

2. Sales automation - involves the use of a multi-channel selling system that might include the direct/automatic delivery of products or services to the customers. The objective is to make the customer the focus of sales efforts by integrating customer needs into service channels and product strategies through the use of network sensors, microprocessor intelligence, and wireless communication.

3. Marketing automation - refers to the utilisation of technologies to an organisation’s marketing process. The modern marketing strategy involves the combination of traditional offline and online media channels, and taking the advantage of the Internet and technology to drive the B2C (business-to-customer) and B2B (business-to-business) processes. The marketing initiatives involved in the organisation’s CRM function including personalisation, profiling and segmentation, telemarketing, e-mail marketing, and campaign management. These projects are designed to fulfil customers’ requirements by providing the right products and services at the right time.

4. Customer support centre - refers to a single multi-channel gateway that integrates all customer contact points and provides necessary services. No matter
5. GLOBAL TRANSITION ISSUES

what the presentation of the customer support centre, whether it is a help desk, a call centre, or an online support via email or chat, the key concept is to provide the services and support to customers at any possible point and to present the customer with a positive impression and experience of the organisation.

5. E-enabled CRM - refers to the customer management tasks for business activities and operations through the Internet. The e-commerce capabilities such as online shopping, marketplace (online auction sites), process of online transaction and payment, and e-commerce security need to be addressed. These capabilities can be essential to successful e-CRM depending upon the organisation’s readiness of handling Internet trading and transactions through various methods.

6. Supporting technology and infrastructure from CRM - in order to implement a thriving CRM system, the organisation needs to apply the flexible information architecture and applications that will cope with the implementation of new business tasks as well as the resolution of technological issues. The new business tasks may include migration management, change management, and comprehending organisational culture and behaviour change. The technological resolutions comprise the utilisation of knowledge-based systems, data warehousing and mining, introduction of software applications outsourcing concepts or Application Service Providers (ASPs), the fundamental information systems connectivity, integration with back-end systems, and maintenance and upgrading plans.
Supplier relationship management

Managing suppliers is as important as managing customers. In today’s competitive marketplace, many companies depend on suppliers to deliver materials, goods, or services that can be transformed into valuable products to provide to customers. Supplier relationships have become increasingly important to assure companies reaming in the competitive edge. Supplier relationship management can be seen as a subset of supply chain management, which pertains to understanding the important suppliers and maintaining strategic relationships. The Gartner Research group defines supplier relationship management as “the practices needed to establish the business rules, and the understanding needed for interacting with suppliers of products and services of varied criticality to the profitability of the enterprise” (2001). Furthermore, it is even more critical for global organisations to manage suppliers all over the world. Thus, effective global supplier relationship management is part of global information systems. It provides supplier intelligence through the integration of the internal enterprise’s information systems and data obtained from the external suppliers.

Supply chain management

Supplier chain management has become the most influential practice in improving business operations and increasing commercial profits today (Poirier, 1999). The components of supply chain management embrace a large portion of entire enterprise operations and involve numerous business processes such as procurement, logistics, production, transportation, warehousing, delivery, and distribution. In order to construct and maintain an effective supply chain management system, these business processes are required to connect together with the integration of suppliers, retailers, distributors, and consumers to form a supply chain network (see Figure 5.14). In the global business environment, the supply chain network strategy is often the
5. GLOBAL TRANSITION ISSUES

essential factor to reduce costs in material purchases, storage and logistics requirements, and product transportation and distribution processes. In other words, a successful global supply chain strategy requires the collaboration of global suppliers, transporters, distributors, consumers, and business units. To achieve this goal, enterprises need to introduce the concept of information sharing in the global supply chain network. Information sharing amongst all parties in the global supply chain network can be implemented through the traditional electronic data interchange (EDI) technology, or through the contemporary Internet platform (see Figure 5.15). However, the major barrier to performing the information sharing concept is the trust between the enterprise and other supply chain participants. It is believed that many enterprises treat their business information as top secret and would never share it with outsiders, including their trading partners. Thus, when developing the global supply chain management process, enterprises need to consider not only all contributors and business processes involved in the network, but realising the problems may occur in establishing information sharing linkages amongst supply chain participants.

![Figure 5.14: Supply chain network](image)

In addition to the new emerging processes, the inter-organisational communication also enables organisations to gain benefits from the connection of "value chains".
5. GLOBAL TRANSITION ISSUES

An organisation’s value chain is an interdependent or network system of business activities that is connected by linkages (Porter, 1990). In a global organisation, the headquarters, and various business units and subsidiaries are acting individually but mutually to contribute value over the entire organisation’s interests. As a result, each business unit forms its own value chain, and therefore the entire organisation contains a number of value chains (or multi-layer value chains) that are interconnected to produce the global business profits (see Figure 5.16).

Figure 5.15: Internet Information sharing model for global supply chain network

Figure 5.16: Global organisation’s multi-layer value chain (based on Porter, 1979)
Furthermore, the interconnection of value chains between the organisation and its customers and suppliers create the maximum business benefits that would only be possible in the inter-organisational scope (see Figure 5.17).

![Inter-organisational value chain](image)

**Figure 5.17:** Inter-organisational value chain

### 5.3 Summary

Enterprise globalisation requires detailed planning, preparation, and investigation of issues before the implementation of global transition processes can take place. In order to provide a clear understanding of concerns in global transition, five categories of transition issues are identified. These are information technology management, business information systems management, people management, end user management, and culture. Each of these categories and their corresponding issues are further explored and discussed. Some suggestions and recommendations are proposed to manage these issues.

In examining the global transition issues, the second part of this chapter concentrates on the organisational scope for transition. Generally, the organisational transition
scopescomprise twodimensions: intra-organisational scope and inter-organisational scope. Intra-organisational scope deals with the business functions within companies and how the global transition issues affect the processes. To validate the complete coverage of issues in the internal business processes, the 7S model is applied. The mapping result has confirmed that all issues identified fall into the 7S model. The second dimension of transition scope is the inter-organisational scope. It involves the new emerging processes that interact with external business parties such as customers, suppliers, distributors, transporters, and retailers. Such new emerging business processes are customer relationship management, supplier relationship management, and supply chain management. Last, these new business processes are discussed in terms of enterprise strategic planning and developing global information systems.
Chapter 6

Data Collections and Analysis

Abstract

This chapter deals with the empirical data collection and analysis used in this thesis. Two surveys have been conducted leading to the development of the global transition issue priority model and its validation as per the defined hypothesis. The chapter is divided into two main sections - preliminary study and detailed study. Both studies reflect the two surveys respectively. Each section contains a comprehensive discussion of the survey, sample design, research design, data collection, data analysis, discussion of limitations and findings. The chapter concludes by illustrating and comparing priority models from both surveys.
6. DATA COLLECTION AND ANALYSIS

After the detailed investigation of global transition issues in chapter 5, this chapter develops a global transition issues priority model to test the hypothesis defined in chapter 1. This priority model is based on an analysis of collected data from two surveys. The preliminary survey is designed to attain a general overview of different priorities in the five major issues categories. However, it does not provide sufficient information on relationships between individual issues and the type of MNCs. Hence, the second survey is introduced to enrich this research. It consists of a comprehensive questionnaire that attempts to acquire specific perceptions of individual issues from MNCs. Complete descriptions of both surveys are provided in the following sections.

6.1 Preliminary Study

6.1.1 Purpose of Study

This preliminary study serves as an initial investigation of how MNCs perceive the importance of global transition issues. It is conducted through a short survey and the collected data is used for the fundamental development of a global transition issues priority model. The priority model illustrates different levels of five key transition categories (information technology management - 'ITM', business information systems management - 'BISM', people management - 'PM', end user management - 'EUM', and culture) in relation to the type of MNCs (multinational, international, global, and transitional). It will be employed for both theoretical and practical purposes. Firstly, it is used as the empirical evidence to support the defined hypothesis (theoretical). Secondly, the priority model can be adopted by organisations involved in the global transition process (practical).
6. DATA COLLECTION AND ANALYSIS

6.1.2 Sampling Design

The survey was mailed to 1,000 private organisations (both MNCs and non-MNCs) all around Australia. The sample was chosen to include the top 1,000 private organisations by revenue.

6.1.3 Research Design

**Constructing questionnaires**

As stated earlier, this survey serves as a preliminary investigation of global transition issues faced by MNCs. The main purpose of this survey is to explore the relationships between five global transition issue categories and four types of MNCs (multinational, international, global, and transitional). To obtain the answers for the above objective, three questions were designed to form the questionnaire. The first question was designed to ask whether the respondent’s company is a multinational corporation. If the respondent’s company is not a multinational corporation, there are no further questions to be answered. On the other hand, if the respondent’s organisation is a MNC, then the respondent is directed to answer the remaining questions (second and third questions). The second question was designed to discover the type of MNC organisational structure that best describes the respondent’s company. It contains four selections representing four types of MNC organisational structures. Each of these selections outlines the characteristics of each type of MNC organisational structures. The characteristics based on Bartlett and Ghoshal’s multinational organisation structure definitions (Bartlett & Ghoshal, 1998). Table 6.1 lists the characteristics of four types of MNC organisation structures. In accordance with a detailed investigation of global transition issues in Chapter 5, the third question presents the five major issue categories, and intends to ask the respondent to rate the importance of issues for the organisation in the transition of globalisation. This question is shown in Table 6.2. For each issue category, respondents were asked to use the following Likert-style
6. DATA COLLECTION AND ANALYSIS

In addition to the three main questions, respondents were asked to indicate their industry (or the nature of their organisation) as well as the total number of employees in the organisation. This information was collected to enable the classification of responses by industry and size of the organisations participating.

<table>
<thead>
<tr>
<th>MNC organisational structure</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multinational</td>
<td>The company is decentralised and nationally self-sufficient in assets, resources and capabilities. Overseas operations are based on seeking and exploiting local opportunities. Knowledge is developed and retained within each business unit (subsidiary).</td>
</tr>
<tr>
<td>International</td>
<td>The company’s sources of core competencies are centralised, other competencies are decentralised. Overseas operations are based on adapting and leveraging parent company’s competencies. Knowledge is developed at the centre and transferred to overseas business units (subsidiaries).</td>
</tr>
<tr>
<td>Global</td>
<td>The company is centralised and is globally scaled. Overseas operations are based on implementing parent company’s strategies. Knowledge is developed and retained at the centre.</td>
</tr>
<tr>
<td>Transitional</td>
<td>The company’s business units are dispersed, interdependent and specialised. Overseas operations are based on differentiated contributions by overseas business units (subsidiaries) to integrated worldwide operations. Knowledge is developed jointly and shared worldwide.</td>
</tr>
</tbody>
</table>

Table 6.1: Characteristics of four types of MNC organisational structures

Administering questionnaires

In October 2001, survey packages were mailed to the heads of the IT functions of the sampled organisations (the top 1,000 private sector organisations by revenue) all around Australia.
6. DATA COLLECTION AND ANALYSIS

<table>
<thead>
<tr>
<th>Issue Category</th>
<th>List of issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSINESS IS MANAGEMENT (BISM)</td>
<td>IS planning, IS business alignment, IS effectiveness, productivity measurements, business reengineering, utilisation of IS, competitive advantage, information quality, office automation, global information systems development and distribution, identification of global business opportunities, and systems reliability/availability/transferability.</td>
</tr>
<tr>
<td>TECHNOLOGY MANAGEMENT (TM)</td>
<td>Telecommunication availability and management, networks infrastructure, security, systems equipment, data resources utilisation, system standards, applications availability, systems integration, and systems recovery.</td>
</tr>
<tr>
<td>PEOPLE MANAGEMENT (PM)</td>
<td>Recruiting, training and education, organisational learning, cross-cultural skills development, and employee assignments.</td>
</tr>
<tr>
<td>END USER MANAGEMENT (EUM)</td>
<td>Managing end user computing facilities, end user computing education, learning of new global information systems, and help desk support.</td>
</tr>
<tr>
<td>CULTURE</td>
<td>Education levels, geographical and time zones, religious aspects, demographic perspective, individual significance and objectives, communication and leadership styles.</td>
</tr>
</tbody>
</table>

Table 6.2: Global transition issue category and individual issues

In order to maximise response rates, the following items were prepared to be included as part of the survey package.

1. Official covering letter;

2. Full name and address of the respondent on the covering letter and the mail envelope;

3. An explanation of the study’s purpose and usefulness (first page of the questionnaire);

4. An assurance of confidentiality stated in the covering letter;

5. An indication of a free complementary executive summary report will be given to each respondent after the results are available;

6. A self-addressed return envelope for each survey was enclosed.
6.1.4 Analysis and Results

The duration of survey data collection was two weeks after it was mailed out. A total of 106 organisations completed and returned the survey instruments, representing all states and territories within Australia. A sample of 106 respondents yields a sampling error of just under +/-10% at the 95% confidence level. Therefore, for example, if half the respondents in the sample agree with an item and half disagree, then in 19 out of 20 cases the true percentage agreeing in the wider population would range between 40% and 60% (ie. +/-10%). That would be the maximum variance potentially arising due to sampling effects.

The distribution of responses among organisations of differing organisational types (multinational, international, global, transnational and non-multinational) varied (Figure 6.2).

![Figure 6.2: Distribution of respondents by organisational structure](image)

While the total respondents are 106, 63 of them are non-multinational organisations and they are not useful for this study. Thus, only 43 (Table 6.3) of them can be
used for data analysis. As the survey focused on two main variables: type of MNC organisational structure and global transition issue category, bivariate analysis is considered an appropriate statistical technique for analysing the survey results. The core concept of bivariate analysis is to find out whether two variables are associated. Based on 43 MNC respondents, two bivariate analysis methods - crosstabulations and bivariate correlations were employed for this preliminary study, and they are explained in the following sections.

<table>
<thead>
<tr>
<th>MNC organisational structure</th>
<th>No. of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multinational</td>
<td>13</td>
</tr>
<tr>
<td>International</td>
<td>17</td>
</tr>
<tr>
<td>Global</td>
<td>4</td>
</tr>
<tr>
<td>Transnational</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 6.3: 3 MNC respondents by organisational structure

**Crosstabulations**

Crosstabulations are a way of displaying data so that researchers can fairly readily detect association between two variables. Basically a table format is the main construct of the crosstabulations method. One independent variable (MNC organisational structure) is placed across the top of the table and a column is drawn for each category of that variable (multinational, international, global, transnational). The other variable - the dependent variable (global transition issue category) is placed on the side of the table and a row is drawn for each category of that variable (IT management, business information systems management, people management, end user management, culture).

Before completing the above two-by-two cross-tabbed table, a calculation of total score of the intersection of a global transition issue category and MNC organisational structure is essential. As each global transition issue category contains five ranking criteria of 1 for "critical" and 5 for "unimportant", to interpret the ranking criteria, a numeric weighting is assigned to each ranking criteria. Thus, 5 for "critical" down to
1 for “unimportant”. Secondly, the count of each cell is multiplied by the numerical weighting of its associate ranking criteria (Table 6.4). Thirdly, a sum of all ranking criteria of individual global transition issues categories of each MNC organisational structure is produced. Finally, all tables of MNC organisational structures with each global transition issue category are integrated to form a single table, which is the combined two-by-two cross-tabbed table (Table 6.5). Figure 6.3 demonstrates the result in percentage format with a graphical presentation.

<table>
<thead>
<tr>
<th></th>
<th>Multinational</th>
<th>International</th>
<th>Global</th>
<th>Transnational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Information Systems Management</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>0</td>
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<tr>
<td></td>
<td>16</td>
<td>36</td>
<td>4</td>
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<td></td>
<td>30</td>
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<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Information Technology Management</td>
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<tr>
<td></td>
<td>2</td>
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<td></td>
<td>12</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>50</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>People Management</td>
<td>1</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
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<td></td>
<td>9</td>
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<tr>
<td></td>
<td>24</td>
<td>36</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>End User Management</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4</td>
<td>0</td>
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</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>15</td>
<td>20</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 6.4: Calculated scores of each crosstabed cell

192
6. DATA COLLECTION AND ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>Multinational</th>
<th>International</th>
<th>Global</th>
<th>Transnational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology</td>
<td>55</td>
<td>77</td>
<td>19</td>
<td>44</td>
</tr>
<tr>
<td>Management</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Business Information Systems</td>
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</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End User Management</td>
<td>52</td>
<td>58</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>People Management</td>
<td>49</td>
<td>63</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td>Culture</td>
<td>43</td>
<td>63</td>
<td>15</td>
<td>36</td>
</tr>
</tbody>
</table>

Table 6.5: Calculated total score for each organisational structure by individual GISM issue category

Figure 6.3: Priority of GISM issues class of four MNC organisational structures
The survey data confirms the different multinational organisation structures have different priorities of the GISM issue classes in the transition of globalisation. The results indicate the priority list of GISM issues classes for "multinational" as ITM, EUM, BISM, Culture, and PM; "international" type as ITM, BISM, Culture, EUM, and PM; "global" type as ITM, BISM, EUM, PM, and Culture; and "transnational" type as ITM, BISM, Culture, EUM, and PM. The rest of the section concentrates on the discussion of correlation between each GISM issue class and four multinational organisation structures.

Information technology management
This preliminary study found the information technology management class is the primary concern for all types of multinational organisation structure. The main conceivable factor seems to be the rapid evolution of information technology. However, information technology has both benefits and drawbacks that can be determined by its costs and productivity. An operative global information system should be based on the coordination and intercommunication of applications, IT infrastructure and global telecommunication networks. These components have been addressed in the sub-categories of information technology management class. Accordingly, adopting suitable information technology as the backbone of a MNC’s information systems seems to be one of the critical factors of operating a global business successfully. In addition, an extended research topic may be introduced to investigate the individual technology management issue and the appropriate IT components.

Business Information Systems Management
Information systems planning and business strategic alignment are always the focus for organisations to maintain a competitive edge on the global market. As a result, the importance of business information systems management issues is at quite the same level for all MNCs regardless of the type of organisation structure.

End user management
A significant difference of the end user management class between multinational and
international is the key factor to support the hypothesis (different multinational organisation structures have a different priority for GISM issues). To find out the causes, the characteristics of both organisation structures (multinational and international) and the issues of end user management class were reviewed. Table 6.6 summarises the comparison of these two organisation structures in accordance with the issues of the end user management aspect. According to the above summary, the decision is

<table>
<thead>
<tr>
<th></th>
<th>Multinational</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic emphasis and global strategic visions</strong></td>
<td>Self-controlling and autonomous authority features cause a lack of exchanging end user needs, and facilitating organisation learning and use of IT between organisation units.</td>
<td>Coordination federation feature supports the frequent knowledge and skills transferred within the organisation. These may include sharing information for end user needs, and the new information system learning.</td>
</tr>
<tr>
<td><strong>Level of centralisation</strong></td>
<td>A low level of centralisation forces each organisation unit to discover their own end user needs when implementing a new global information system.</td>
<td>Higher level of centralisation allows the organisation units to catch the consistent picture of the new global information system, and receive comprehensive end user requirements from the central organisation.</td>
</tr>
<tr>
<td><strong>Level of coordination</strong></td>
<td>Low level of coordination compels each organisation unit to develop their own help desk support.</td>
<td>Higher level of coordination allows the organisation units to share their resources and knowledge for developing cooperative help desk support.</td>
</tr>
</tbody>
</table>

Table 6.6: Comparison of multinational and international structures in EUM aspect (Bartlett & Ghoshal, 1989)

obvious. Multinational type organisations need to place more emphasis on the end user management aspect in order to resolve the inevitable nature of the organisation structure.

**People management**

Level of importance of people management issues is gradually reduced in the sequence of global, international, transnational, and multinational. This reflects the management structures of global human resources in various organisation types. Further
research studies are suggested to discover the key factors that drive different types of MNCs to successfully manage and allocate human resources across borders.

Culture

Culture issues are more important for transnational than the other three. A possible reason is the organisation has already faced the business globalisation transition stage, and realised the cross cultural issues should be heavily considered during the planning of global information systems transition.

Bivariate correlations

In addition to crosstabulations, bivariate correlation is another statistical analysis method to discover a correlation between the global transition issue category and the MNC organisational structure. Prior to conducting a bivariate correlation, two elements should be specified: correlation coefficients and test of significance. For correlation coefficients, Pearson’s product-moment correlation is applied which is a measure of linear association between two variables. Values of the correlation coefficient range from -1 to 1. The sign of the coefficient indicates the direction of the relationship, and its absolute value indicates the strength, with larger absolute values indicating stronger relationships. The second element - test of significance is to specify whether the test is one-tailed or two-tailed. A one-tailed test should be used when there is a specific direction to the hypothesis being tested. On the other hand, a two-tailed test should be applied when a relationship is expected but the direction of the relationship is not predicted (Field, 2000). As this research is trying to investigate whether the change of the MNC organisational structure will affect the emphases of global transition issues, a one-tailed test would be considered as an appropriate test. Table 6.7 illustrates a matrix of the correlation coefficients for the two variables. Underneath each correlation coefficient, the level of significance of the correlation is displayed. The results of bivariate correlation tests highlighted that the information
technology management category is positively related to MNC organisational structures with a Pearson correlation coefficient of 0.328 and the correlation is significant at 0.05 level. This means the issues associated with information technology management derive more attention when a multinational company’s organisational structure is transforming from multinational, international, global towards transnational.

6.2 Detailed Study

6.2.1 Purpose of Study

Although the results of the preliminary study have provided a general perception of global transition issue priority among various types MNC, there is a need to conduct a more detailed survey due to the following reasons.

1. The results were not sufficient enough to draw inference owing to the small number of respondents.
2. Each issue class may be further divided into sub-categories to group global transition issues more precisely.

3. Based on the sub-categorisation of issues, more statistic analysis methods would be applied.

A thorough description of these reasons is addressed in the research design in section 6.2.3.

6.2.2 Sampling Design

In this detailed survey study, sampling is more crucial to make sure that the sample accurately represents its population than the preliminary survey. In order to ensure that the selected sample is representative of the population, a systematic sampling approach is employed to derive the survey sample. The sample requires 1,000 companies across Australia, in which consists of two groups: 500 MNCs and 500 non-MNCs. To obtain a systematic sample, a sample fraction is to be worked out by dividing the population size by the required sample size. For 500 MNCs sample size, the sampling fraction is \( \frac{1}{4} \) by dividing the total population (2,144) by the required sample size (500). As a result, one MNC is selected from every four in the population. For the second sample group (500 non-MNCs) selection, it is necessary to restrict the selected companies (samples) to relatively large organisations, as they are more likely to pursue globalisation than small companies. Thus, two selection criteria are specified to derive the population. This includes the total number of employees is 500 and above, or annual revenue of greater than 100M (million). As the result of a screening process, 1,177 is the total number of non-MNCs. Once again, the sample fraction is required for choosing samples and it is 2 (500/1,177). Hence, each non-MNC is chosen from every 2 in the population. In accordance with the definition of systematic sampling (Scheaffer et al, 1996), ”a sample obtained by randomly selecting one element from
the first k elements in the frame and every 2\textsuperscript{nd} element thereafter is called a 1-in-
\textsuperscript{k}-systematic sample, with a random start”. Consequently the first sample element
of both sample groups must be selected randomly from first 4 elements and first 2
elements respectively.

In summary, the strategy of sampling design for both groups (MNCs and non-MNCs)
in this research is outlined as follows. The first element of MNCs group is obtained
from the second element (randomly picked) of the first four elements (the first frame)
and every 4\textsuperscript{th} element thereafter until the total number of MNCs has reached 500.
Similarly, the firstly element of a non-MNCs group is obtained from the third element
(randomly picked) of the first 2 elements (the first frame) and every 2\textsuperscript{nd} element there-
after until the total number of non-MNCs has reached 500.

6.2.3 Research Design

Constructing questionnaires

This survey serves as a detailed investigation tool for this research. Subsequent to
the analysis of the preliminary survey, three issues have been highlighted. Firstly, the
total number of samples collected was insufficient. It does not provide enough data
to draw a generic inference from the statistical point of view. Secondly, regarding the
result of correlation tests of the preliminary survey, there is a need to explore further
each and all of the global transition issue categories. The further sub-categorisation
of the issue categories would enrich the research development and findings in terms of
validating the appropriateness of the five main global transition issue categories and
discovering prominent relationships between global transition issues. Thirdly, it is
essential to incorporate the views of global transition issues from non-multinational
organisations especially those are who relatively large (as they are more likely to
pursue global transformation). Based on the preliminary survey experience and the
issues, a series of questions were developed to form the survey instrument.
6. DATA COLLECTION AND ANALYSIS

The questionnaire consisted of four sections: rating individual global transition sub-categories, ranking five main global transition issue categories, specifying the nature of the organisation and the total number of employees, and identifying the type of MNC organisational structure or the current status of globalisation.

The first section - rating individual global transition sub-categories, contains 20 questions, 18 of them are distributed under five main categories and the last two are open questions. For the first 18 questions, respondents were instructed to use a Likert-style rating scheme as mentioned earlier in the preliminary survey and illustrated in Figure 6.1. Additionally, the last two questions were included to assist respondents who wished to document and rate further issues they deemed relevant or of importance to their organisations. A full section one of the survey is shown in Table 6.8. The second section - asked respondents to rank the five global transition issue categories. After rating and ranking, respondents were then asked to indicate their industry (or the nature of their organisation) as well as the total number of employees in the organisation.

Finally, depending on the sample group (either MNC or non-MNC) respondents were asked to answer the last section. For MNCs, respondents were requested to select an organisational structure that would represent their organisations. The characteristics of four types of MNC organisation structures are adopted from the preliminary survey and listed in Table 6.1. For non-MNCs, respondents were asked to indicate the current progress or status in regard to globalisation. A list of items included in the globalisation status question for non-MNC respondents is illustrated in Table 6.9.

Administering questionnaires

In June 2001, survey packages were mailed to the chief executive officer (CEO) or managing director (MD) of the sampled organisations (500 MNCs and 500 non-MNCs) all around Australia.

In addition to the specified items for improving response rates in section 6.1.3.2, a
### 6. DATA COLLECTION AND ANALYSIS

<table>
<thead>
<tr>
<th>Table 6.8: Survey section one questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business Information Systems Management</strong></td>
</tr>
<tr>
<td>1</td>
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<td>2</td>
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<tr>
<td>3</td>
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<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td><strong>People Management</strong></td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td><strong>Information Technology Management</strong></td>
</tr>
<tr>
<td>9</td>
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<tr>
<td>10</td>
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<tr>
<td>11</td>
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<tr>
<td>12</td>
</tr>
<tr>
<td><strong>End User Management</strong></td>
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<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td><strong>Culture</strong></td>
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<td>17</td>
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<tr>
<td>18</td>
</tr>
</tbody>
</table>
6. DATA COLLECTION AND ANALYSIS

<table>
<thead>
<tr>
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<th>Current globalisation status lists</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No plan for being globalised.</td>
</tr>
<tr>
<td>2</td>
<td>Not in the process of being globalised, but planning to do so.</td>
</tr>
<tr>
<td>3</td>
<td>Currently in the process of being globalised.</td>
</tr>
<tr>
<td>4</td>
<td>Have already gone through the globalisation process, but there is a need to revisit.</td>
</tr>
<tr>
<td>5</td>
<td>Have already gone through the globalisation process, and have successfully become a globalised company</td>
</tr>
<tr>
<td>6</td>
<td>Have always been a globalised company</td>
</tr>
</tbody>
</table>

Table 6.9: Current globalisation status lists

plan for follow-ups was considered if the initial response rate was less than 10%.

6.2.4 Analysis and Results

The duration of survey data collection was two weeks after it was mailed out. A total of 149 organisations completed and returned the survey instruments, representing both MNC and non-MNC companies in all states and territories in Australia. The sample with 106 respondents bears a sampling error of approximately +/-8% at the 95% confidence level.

There was an almost even distribution of the entire sample between MNCs (48.3%) and non-MNCs (51.7%). The distribution of responses among MNCs of differing organisational types (multinational, international, global, transnational and non-multinational) varied (Figure 6.4).

As mentioned in the beginning of the research design section, questions were developed to answer the research questions and validate five global transition issue categories. Hence, a number of data analysis methods were employed to achieve the goals; these include descriptive statistics, basic frequencies, crosstabulations, comparing two means and factor analysis. Each of these statistical analysis methods and results is explained as follows.
6. DATA COLLECTION AND ANALYSIS

Figure 6.4: Distribution of MNC sample

Descriptive statistics

Descriptive statistics are designed to provide information about the distribution of variables. To probe into the ranking of global transition issue sub-categories, a measure of central tendency - the mean of each issue sub-category was used. The results are shown in Table 6.10, which is based on all samples (combination of MNC and non-MNC responses) and generated through the sorting of all means in descending order. For ranking purposes, the global transition issue sub-categories were clustered into four quartiles ranging from the most important to the least important based on their mean ratings. The first five (first quartile) were those with the means above 4.00. The second quartile (the 6th to the 10th) contained those with their means between 3.80 and 4.00. The third quartile (the 11th to the 15th) included those with their means between 3.60 and 3.80. The last quartile sub-categories (the 16th to the 18th) were those with their means below 3.60.

Most critical global transition issues
### Table 6.10: Ranking of global transition issue sub-categories

<table>
<thead>
<tr>
<th>Rank</th>
<th>Global transition issue sub-category</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>First quartile</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Managing IT quality</td>
<td>149</td>
<td>4.17</td>
<td>0.84</td>
</tr>
<tr>
<td>2</td>
<td>Strategic planning</td>
<td>148</td>
<td>4.13</td>
<td>0.84</td>
</tr>
<tr>
<td>3</td>
<td>Data and information systems improvement</td>
<td>149</td>
<td>4.06</td>
<td>0.82</td>
</tr>
<tr>
<td>4</td>
<td>IT infrastructure</td>
<td>149</td>
<td>4.05</td>
<td>0.82</td>
</tr>
<tr>
<td>5</td>
<td>Role of senior management</td>
<td>149</td>
<td>4.02</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td><strong>Second quartile</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Business applications</td>
<td>149</td>
<td>3.96</td>
<td>0.82</td>
</tr>
<tr>
<td>7</td>
<td>Reengineering and change</td>
<td>149</td>
<td>3.95</td>
<td>0.88</td>
</tr>
<tr>
<td>8</td>
<td>Telecommunications network</td>
<td>149</td>
<td>3.95</td>
<td>0.91</td>
</tr>
<tr>
<td>9</td>
<td>Organisation learning</td>
<td>149</td>
<td>3.80</td>
<td>0.85</td>
</tr>
<tr>
<td>10</td>
<td>Operation and support</td>
<td>149</td>
<td>3.80</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td><strong>Third quartile</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Systems development and implementation</td>
<td>147</td>
<td>3.79</td>
<td>0.94</td>
</tr>
<tr>
<td>12</td>
<td>Education</td>
<td>149</td>
<td>3.75</td>
<td>0.76</td>
</tr>
<tr>
<td>13</td>
<td>Productivity</td>
<td>149</td>
<td>3.73</td>
<td>0.91</td>
</tr>
<tr>
<td>14</td>
<td>Staff recruitment and training</td>
<td>149</td>
<td>3.66</td>
<td>0.91</td>
</tr>
<tr>
<td>15</td>
<td>Individual and interpersonal perspectives</td>
<td>149</td>
<td>3.62</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td><strong>Fourth quartile</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Benefits and compensation</td>
<td>144</td>
<td>3.24</td>
<td>0.92</td>
</tr>
<tr>
<td>17</td>
<td>Geography and economy</td>
<td>141</td>
<td>2.85</td>
<td>1.11</td>
</tr>
<tr>
<td>18</td>
<td>Demographics</td>
<td>144</td>
<td>2.56</td>
<td>1.02</td>
</tr>
</tbody>
</table>

N: Number of samples
Details of the most critical global transition issues (first quartile), including "managing IT quality", "strategic planning", "data and information systems improvement", "IT infrastructure", and "Role of senior management". Both MNCs and non-MNCs have realised that the global transition process is a difficult task and requires paying more attention to the long-term business planning, and ensuring senior managers and leaders have a clear understanding of their roles in achieving globalisation. Furthermore, as information technology has been recognised to help companies in improving business operations and increasing productivity, organisations believe that IT is also playing an imperative role in enterprises’ transition processes towards globalisation. Specifically, organisations have major concerns of IT in terms of quality management, selection and implementation of hardware and software infrastructure, and enhancing the values of data and information that are required within and between organisations. This has resulted in the inclusion of "managing IT quality", "IT infrastructure", and "data and information systems improvement" ranked among the top quartile issues.

Least critical global transition issues

The last quartile represents the least critical global transition issues including "benefits and compensation", "geography and economy", and "demographics". Nearly one-fifth of respondents consider "benefit and compensation" not so important (selected 4 or 5 on the scale), while more than 40% of respondents deem "geography and economy" and "demographics" the least critical (selected 4 or 5 on the scale) over other issues (Figure 6.5).

According to the results, the least two issues are sub-categories of culture class, which can be translated into two distinct causes. Firstly, it can be interpreted that non-MNC respondents have less thoughts or are aware of the implication of cultural difference in transformation of globalisation. When pursuing global transition, enterprises are normally over-excited about investigating new technologies, and developing new global information systems. They often imperceptibly avoid thinking the implication of culture issues or they believe issues in relation to cultural aspect are easier to resolve,
therefore it can be left till the later stage of global transition process. This will result in developing inappropriate global information systems and cause major costs for reconstruction. The second interpretation deals with the perception of MNC respondents. It is quite clear that MNCs have the experience of facing multicultural issues when they first start business operations across national boundaries. Hence, when they are constructing information systems for enterprise-wide operations, cultural issues have already been considered and embedded into the development strategy, and they can stress other transition issues.

![Figure 6.5: The least critical global transition issue sub-categories (forth quartile)](image)

**Basic frequencies**

Apart from the frequencies of MNC respondents distribution illustrated in Figure 6.4, the frequencies of globalisation status for non-MNC respondents seems quite valuable to explore. The results (Figure 6.6) outline that although 38% of non-MNCs have no plan for transforming to globalised companies, there are an approximately equal number of enterprises (38%) that have planned to involve or are currently in the
global transition process. Further, about one in five non-MNCs have gone through the global transformation process and have either successful globalised or require revisiting the globalisation process. About 3% of non-MNCs believe they have always been globalised organisations. This is due to the adoption of the Internet technology. As is the mature of the Internet, some non-MNCs have incorporated World Wide Web (WWW) to be one of their sales or distribution channels. They use the Internet to disseminate products or services information, receive sales orders, or even carry out financial transactions. Thus, their customers and suppliers can be physically allocated anywhere around the globe and they virtually become global organisations.

![Figure 6.6: Distribution of globalisation status for non-MNC respondents](image)

A - No plan for being globalised
B - Not in the process of being globalised, but plan to do so
C - Currently in the process of being globalised
D - Have gone through globalisation process, need revisiting
E - Have gone through globalisation process successfully
F - Have always been a globalised company

Crosstabulations

As mentioned in section 6.1.4.1, crosstabulations is a straightforward statistic method used to ascertain the relationship between two variables. Hence, applying crosstabulations statistic methods is fairly appropriate to discover whether the survey results
support the hypothesis. As each global transition issue class has been subdivided into sub-categories, it is also fascinating to explore the association between MNC organisational structure and individual global transition issues. Table 6.11 summarises the means of intersection of MNC organisational structures and issue sub-categories. It is obvious that each type of MNC has its distinct concern of the importance level of global transition issues. In multinational type, both "strategic planning" and "IT infrastructure" are ranked as the topmost issues (mean = 4.17); MNCs in international format consider "managing IT quality" dominating the priority (mean = 4.39); "role of senior management" is regarded as the most imperative issue for global type enterprises (mean = 4.28); and once again "strategic planning" is nominated as the main concern by transnational type organisations (mean = 4.68). Each of the follow-

<table>
<thead>
<tr>
<th>Global transition issue sub-categories</th>
<th>Multinational</th>
<th>International</th>
<th>Global</th>
<th>Transnational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 Strategic planning</td>
<td>4.17</td>
<td>4.00</td>
<td>4.24</td>
<td>4.68</td>
</tr>
<tr>
<td>Q2 Reengineering and change</td>
<td>3.92</td>
<td>3.83</td>
<td>4.11</td>
<td>4.21</td>
</tr>
<tr>
<td>Q3 Managing IT quality</td>
<td>3.92</td>
<td>4.39</td>
<td>4.17</td>
<td>4.37</td>
</tr>
<tr>
<td>Q4 Productivity</td>
<td>3.42</td>
<td>3.30</td>
<td>4.11</td>
<td>4.11</td>
</tr>
<tr>
<td>Q5 Systems development and implementation</td>
<td>3.67</td>
<td>4.04</td>
<td>3.83</td>
<td>3.89</td>
</tr>
<tr>
<td>Q6 Role of senior management</td>
<td>3.83</td>
<td>4.09</td>
<td>4.28</td>
<td>4.11</td>
</tr>
<tr>
<td>Q7 Staff recruitment and training</td>
<td>3.50</td>
<td>3.52</td>
<td>3.44</td>
<td>3.84</td>
</tr>
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<td>3.65</td>
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<td>4.17</td>
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<td>3.84</td>
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<td>Q13 Improvement</td>
<td>3.92</td>
<td>4.17</td>
<td>3.89</td>
<td>3.84</td>
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</table>

Table 6.11: Means of issue sub-categories cross MNC types

ing four figures (Figure 6.7 - Figure 6.10) illustrate a specific MNC structure with its
6. DATA COLLECTION AND ANALYSIS

perception of importance level of global transition issues. Values of global transition issue sub-categories for a particular MNC type are presented in a bar format and the percentages of sub-categories for overall MNCs are indicated by a trend line. Discussions of these results and figures are presented in the subsequent sections.

Multinational versus overall
Although high independence and autonomy of foreign subsidiaries is one of features of multinational type MNCs, it can be the company’s major concern in the globalisation process. Due to the decentralised characteristic and self-sufficient in resources, IT infrastructure, support and operations are very unique from subsidiary to subsidiary. In addition, employees in different business units have quite distinctive visions in terms of personal and workgroup objectives. The results confirm that these factors have become main concerns of multinationals in global transformation. The issues have been rated higher than the others overall, embracing ”IT infrastructure”, ”operation and support”, and ”individual and interpersonal perspectives”.

In spite of this, each independent foreign subsidiary has enormous authority in managing its own human resources as well as its local market and environment. Thus a number of concerns in relation to globalisation are marginally more serious than the overall MNC’s. These issues are namely ”benefits and compensation”, ”organisation learning”, ”demographics”, and ”geography and economy”.

International versus overall
As the headquarters of international MNCs play a significant role in the strategy of foreign subsidiaries’ operations, the strategic tasks are normally implemented through the headquarters’ guidance. Further, due to the high level of centralisation, the overseas operation and support are based on adapting the headquarters’ competencies. Accordingly, the results showed that the international MNCs have lesser concerns in issues such as ”strategic planning”, ”reengineering and change”, ”productivity”, and
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Figure 6.7: Level of importance of global transition issues for multinational companies

"operation and support". Nevertheless, the way of managing foreign business units (highly centralised) could cause conflict in culture, geography and environment differences, and the implementation of global information systems. These result in having slightly more concern about issues including "business applications", "telecommunications network", "data and information systems improvement", and "geography and economy".

Figure 6.8: Level of importance of global transition issues for international companies
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Global versus overall

As per the analysed results, priority concerns of global transition issues in global type MNCs is quite well aligned with the priority concerns of overall MNCs. In other words, global type organisations can be referred to as being generally representative of the broad MNC domain.

![Figure 6.9: Level of importance of global transition issues for global companies](image)

Transnational versus overall

Based on Bartlett and Ghoshal’s suggestion (1998), transitional type MNCs are considered the most flexible organisational structure. Due to the distinctiveness and interdependence of business activities of foreign subsidiaries, it is comprehensible that the organisation stresses "strategic planning" to ensure the complete integration to worldwide business operations. On the other hand, the results indicate that transnational companies have relatively low concerns regarding "telecommunications network", "demographics", and "geography and economy" than the overall MNC’s perception. This is owing to the flexibility of international operations that foreign
6. DATA COLLECTION AND ANALYSIS

business units have the agility of planning and managing information networking technology as well as human resources and other local related issues.

Figure 6.10: Level of importance of global transition issues for transnational companies

Following the investigations of individual issue sub-categories for each MNC type, Figure 6.11 illustrates the combined MNC structures with amalgamated issue sub-categories and forms a global transition issues priority model. The summarised results and discussions of the priority of GISM issues are the following.


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Figure 6.11: Priority of GISM issues class of four MNC organisational structures

Global transition priority for multinational MNCs
The "Information technology management" issue class is ranked as the first priority for multinational type MNCs; "business information systems management", "end user management", "people management" follow it, and the "culture" issue is considered the least important factor.

Due to the decentralisation of resources and assets, subsidiaries in multinational type MNCs have to seek and exploit their local opportunities. This has a strong impact on the development of business infrastructures, especially from the information technology perspective.

Global transition priority for international MNCs
The transition issue priority for international type MNCs is similar to the multinationals. The only difference is that the "people management" issue class receives
higher priority than "end user management" in international organisations. This dissimilarity can be explained by the overseas operation style. Due to the dissimilar leadership styles of the international MNCs' overseas operations, each foreign subsidiary has a relatively different culture in managing its employees. This causes the human resources management to be considered more prominently in the global transformation process than managing end users of the global information systems.

Global transition priority for global MNCs

In global type MNCs, the headquarters develop the strategic vision and business plan exclusively. In addition, if there is a contradiction between foreign subsidiaries and the headquarters, the foreign subsidiaries' benefits are usually excluded. For this reason, the global type MNC has more concerns of business related issues in terms of strategic implementation through the entire enterprise. As determined in the priority model, global MNCs have nominated the "business information systems management" issue class as the first priority in globalisation. Similarly, highly centralised information technology tactics compel global MNCs to lay emphasis on managing information technology related issues.

Global transition priority for transnational MNCs

Since the transnational type is the ideal MNC organisational structure, its perception of the globalisation process in terms of transition issue priority is considered imperative for those who are pursuing globalisation. The results show that the "business information systems management" issue class is the most critical over others. This can be justified by the business operation characteristic of the transnational type MNC. As the business units (subsidiaries) are dispersed, and become independent and specialised, the business information system strategic plan appears to be quite different from subsidiary to subsidiary. Hence, it seems comparatively challenging to manage and unify these strategic plans throughout the entire organisation. For the same reason, "end user management" and "information technology management" are claimed to be the second and third priority respectively.
Comparing two means

Comparing two means or an independent samples $t$ test is a procedure used for comparing sample means to see if there is sufficient evidence to infer that the means of the corresponding population distributions also differ. To employ the independent samples $t$ test, a sample should be taken from two populations, and the two sample groups are measured on some variable of interest. In accordance with the characteristics of the survey samples, they are divided into two groups: MNC group and non-MNC group, and there is no overlap between membership of the two groups. Moreover, both groups share 18 common variables (Table 6.8). Based on the above characteristics of the survey samples, the independent $t$ test can be applied to determine if the means of the two samples distributions differ significantly from each other. Output of an independent samples $t$ test contains two components, firstly, a table summarises an independent samples $t$ test (Appendix D). It contains the sample size ($N$), mean, standard deviation and standard error mean of both MNC and non-MNC sample groups for each individual global transition issue sub-category (variables). The second component refers to the $t$ test for equality of means (Appendix E). Attributes of the $t$ test for equality of means embrace Levene’s test for equality of variances, a one-tailed test of significance, a two-tailed test of significance, $t$ values and mean difference. Levene’s test allows the result to be interpreted from either an equal-variance test or an unequal-variance test. If variances do not differ significantly ($p \geq 0.05$, then the equal-variance estimate may be used; on the other hand, if the test did show significant differences ($p < 0.05$), then it would be necessary to use the unequal-variance test. The $p$-value for ”strategic planning”, is 0.337, which indicates that the two sample groups do not differ significantly ($p \geq 0.05$), so the statistically stronger equal-variance test may be used. However, the $p$-value for ”telecommunications network” is 0.004, which shows significant differences ($p < 0.05$) between MNC and non-MNC sample groups, thus the unequal-variance test should
be applied instead of the equal-variance test. The t-statistic is calculated by dividing the mean difference by the Standard error of the distribution of the samples. Then the conclusion is drawn on the basis of the significance value of t. If it is greater than 0.05 then there is no significant difference between means of the two samples observed. Otherwise the two sample means differ greatly depending upon the values.

A complete t test analysis of the significance of difference between the responses of MNCs and non-MNCs given in Table 6.12 illustrates the combined independent samples t test and the t test for equality of means with the appropriate Levene’s test (either equal or unequal variances). The result indicates global transition issue subcategories with two-tailed significant difference between the responses of the MNCs and non-MNCs. The two-tailed value of p for most of the variables is greater than 0.05, which indicates that there is no significant difference between MNC and non-MNC groups. However, there are three subcategories with a p value less than 0.05 for the two-tailed t test, which indicates a difference between the MNC and non-MNC for these variables. The three sub-categories include "telecommunications network", "organisational learning", and "operation and support".

**Factor analysis**

When measuring several variables or several survey questions, the correlation between each pair of variables or questions can be arranged in a table form known as an $R$-matrix. An $R$-matrix is a table of correlation coefficients between variables (as the preliminary study applied in section 6.1.4.2). The diagonal elements of an $R$-matrix are all 1 because each variable will correlate perfectly with itself. The off-diagonal elements are the correlation coefficients between pairs of variables or questions. The existence of clusters of large correlation coefficients between subsets of variables suggests that those variables could be measuring aspects of the same underlying dimension or factor.
### Global Transition Issue Sub-Categories with significant levels between MNCs and non-MNCs

<table>
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<tr>
<th>Global Transition Issue Sub-Categories</th>
<th>MNC</th>
<th>Non-MNC</th>
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<th>Mean Difference</th>
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<td>Mean</td>
<td>Sig. (p)</td>
<td>Sig. (2-tailed)</td>
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<td>0.2300</td>
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Table 6.12: Global transition issue sub-categories with significant levels between MNCs and non-MNCs
6. DATA COLLECTION AND ANALYSIS

There are various dimensions of factor analysis but this research has applied the Preliminary Analysis and Factor Extraction constituting Correlation matrix, and KMO and Bartlett’s Test. The purpose of carrying out factor analysis is to validate the questions (variables) that were employed for the analysis. From the results it is concluded that the data is appropriate for carrying out factor analysis, which validates the questions considered for the analysis.

Initial considerations

Correlation Coefficients fluctuate from sample to sample, much more in small samples than in large ones. The reliability of factor analysis depends upon the sample size. A general rule for factor analysis is that the sample size should be 10 times that of the subject or variables assessed. In our case the sample size is 149, which is not far away from ten times 18 variables.

Correlation matrix

Appendix F consists of Pearson’s Correlation Coefficients between all pairs of variables. To do the factor analysis we need to have variables that correlate fairly well if not perfectly. Also we need to eliminate the variables that do not correlate with any others. We can check the pattern of relationship from this table. If we look at the matrix above it clearly shows that the correlation coefficients have fairly good values. Also the majority of values are greater than 0.05 and there are none that have values above 0.9. The conclusion can be drawn that multi-collinearity is not a problem with the data and variables do not need to be eliminated. Hence, all the questions correlate fairly well with all the others.

KMO statistics The KMO statistic can be calculated for individual and multiple

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | 0.804 |
| Bartlett’s Test of Sphericity | Approx. Chi-Square | 812.835 |
| df | 153 |
| Sig. | 0 |

Table 6.13: KMO and Bartlett’s Test
variables and represents the ratio of the squared correlation between variables to the squared partial correlation between variables. The KMO statistic lies between 0 and 1. In our case we have calculated the statistic for all the 18 variables simultaneously. The value of the statistic is close to 1 so the patterns of correlation are relatively compact and factor analysis should yield distinct results. The value in this case is 0.804 (Table 6.13), which falls in the category of being significant. So we are confident that applying factor analysis is appropriate for these data.

6.3 Comparison of Two Surveys

Subsequent to both surveys, two global transition issue priority models are constructed. Each priority model represents the results of the corresponding survey. The remaining section delineates the discussion of the two global transition issue priority models illustrated in Table 6.14. By comparing both priority models the results reveal insignificant changes in both studies for multinational, international and global organisational structures. In the case of transnational type MNCs, the five classes have been reprioritised in the second study. However, the most significant alteration is the information technology management class. It has been re-ranked for the first priority down to the third priority. Generally, there are no substantial changes between the two survey results regardless of the total number of respondents (43 MNCs

<table>
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<tr>
<th>Global Transition Issue Classes</th>
<th>Multinational</th>
<th>International</th>
<th>Global</th>
<th>Transnational</th>
</tr>
</thead>
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<td>P 2 D 2</td>
<td>P 2 D 1</td>
<td>P 2 D 1</td>
</tr>
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<td>P 1 D 1</td>
<td>P 1 D 2</td>
<td>P 1 D 3</td>
</tr>
<tr>
<td>People Management</td>
<td>P 4 D 4</td>
<td>P 3 D 3</td>
<td>P 3 D 3</td>
<td>P 5 D 4</td>
</tr>
<tr>
<td>End User Management</td>
<td>P 3 D 5</td>
<td>P 5 D 4</td>
<td>P 2 D 4</td>
<td>P 3 D 2</td>
</tr>
<tr>
<td>Culture</td>
<td>P 5 D 5</td>
<td>P 3 D 5</td>
<td>P 5 D 5</td>
<td>P 4 D 5</td>
</tr>
</tbody>
</table>

Table 6.14: Comparison of two global transition issue priority studies
6. DATA COLLECTION AND ANALYSIS

in the preliminary study versus 72 MNCs in the detailed study). Accordingly, the
global transition issue priority model is deemed to be validated and representative of
multinational corporations in general.

6.4 Summary

A global transition issue priority model is constructed to support the hypothesis that
indicating the global transition issue priority varies depending upon the type of MNC
organisational structure. With the assistance of the global transition issue model,
multinational companies are able to precisely identify the level of emphasis of global
transition issues in preparing the globalisation process according to their organisational structures.

Two surveys were conducted to investigate the priority of global transition issues. The
first survey was considered as the preliminary study that was based on the responses
by 43 MNCs, while the second survey, which was a detailed study, was concluded by
participation of 72 MNCs and 77 non-MNCs. Both survey audiences were randomly
selected from all around Australia.

After collecting the survey data, a number of statistical analysis methods were employed
to determine the findings. In the first survey, crosstabulations and bivariate
correlations were applied to ascertain the priority of global transition issue classes,
and to identify any relationships between the issue classes and the MNC organisational structures respectively. In addition to the statistical analysis methods used
in the first survey, the second survey exploited an independent samples $t$ test and
factor analysis to discover the difference of issue priorities between MNC and non-
MNC groups, and to validate the necessity of each variable (global transition issue
sub-category) correspondingly.

The outcomes of both studies suggest that the emphasis of each global transition
issue class in association with an organisation’s globalisation process is reliant on the
6. DATA COLLECTION AND ANALYSIS

type of MNC organisational structure. Furthermore, the results also indicated that there are differences between MNCs and non-MNCs in relation to the significant level of global transition issues.
Chapter 7

Global IT Transition Framework

Abstract

Based on the findings documented earlier, this chapter provides organisations with a step-by-step framework for transitioning to a global structure. The framework recommends five stages for the global transition:

1. Planning for global IT transition
2. Investigating current business
3. Identifying global transition requirements
4. Enacting the global transition process
5. Verifying global transition achievement

Furthermore, in order to demonstrate the practicality of the results of this research, an in-depth case study is presented.
7. GLOBAL IT TRANSITION FRAMEWORK

This chapter is primarily aimed at tying together the theory of the global transition with a practical application. A framework is constructed in this chapter to demonstrate the practical application of the concepts of global transition. This global IT transition framework consists of five phases leading an organisation from the pre-globalisation situation toward the globalised state (Figure 7.1). These global transition phases are:

1. Planning for global IT transition
2. Investigating current business
3. Identifying global transition requirements
4. Enacting global transition process
5. Verifying global transition achievement

![Figure 7.1: Global IT transition framework](image)

Each of the above phases is further subdivided into component tasks, which are discussed in detail in the remaining chapter. This chapter also instantiates the framework discussed so far through an in-depth case study that intends to present to potential organisations the global transformation process with a step-by-step practical guide. Additionally, a quality assurance scheme has been incorporated into each phase to ensure the completeness and correctness of the global transition framework.
7. GLOBAL IT TRANSITION FRAMEWORK

7.1 Company Background of the Case Study

In order to demonstrate the applicability of the framework, Mahan Industrial Co., Ltd. has been selected to trial this research. This company was founded in 1980 and is one of the top five manufacturers of electronic connectors for use in Personal Computers (PCs) in Taiwan as well as one of the leading suppliers of ATX power connectors in the world. Its customers are spread across five continents in more than 20 countries. The company also manufactures crimping tools for telephone plug and cable connections. The annual turnover of the company is around US$8.5 million.

In 1998, Mahan faced rising pressure from global competitors and increasing product demands from overseas customers. The president and the founder of the company realised that the only way to survive and overcome the global challenges was to transform the company into a globalised organisation. The president also indicated that the information and communication technology was considered the perfect tool to accelerate the global transition process.

A two year plan was set and agreed by the entire company for establishing foreign subsidiaries and processing the transition to globalisation. The corresponding processes of Mahan’s global transition strategy will be outlined and embedded in each phase and its subsections of the following global IT transition framework.

7.2 Planning for Global IT Transition

7.2.1 Need for a Plan

Global transition process is not a simple and straightforward project. It requires intensive involvement in human resources and management operations. Hence, developing a detailed plan is considered the primary and initial phase of the global transition framework. Additionally, writing a clear plan is the best way to formalise
the global transition ideas and structure them so that the organisation can realistically assess whether the transition project will be viable, and to ensure that the transition processes are operating within the time and budget limits.

An appropriate global transition plan will help the organisation to discover the right questions as well as to provide some of the answers in the global transition process. It will reveal areas where the organisation needs to find out more, and eventually the transition plan will provide the organisation with a roadmap to development.

### 7.2.2 Specific Issues Related to the Transition Plan

When preparing the transition plan, certain issues should be outlined to draw the organisation’s attention at this early stage of the global transition framework. These issues may be identified in five areas consisting of the executive consensus, the investigation of foreign markets, the allocation of personnel and resources management, the global operation strategy, the time and the budget. Each of these issues is further discussed in the following subsections.

**Executive consensus**

The preliminary condition prior to starting off the global transition plan development is to ensure that the senior executives of the organisation have consented to pursuing global transition. It is imperative that the decision makers of the organisation have a clear understanding of globalisation strategy and have recognised the implication of undertaking the global transition process. Without the consensus, it is pointless to approach any activities in regard to the globalisation. As mentioned earlier in the case study introduction, the global transition strategy in Mahan has been recognised by not only the senior executives but the rest of the company also have the common vision for globalisation. To publicise the top management’s commitment to global transition, Mahan has conducted the following four activities prior to the process of
global transition, they are as follows:

1. communicating with its internal employees and external business partners such as suppliers and customers about the organisation’s global strategic vision;

2. updating the company’s quality policy and quality objectives to incorporate the global transition mission;

3. conducting management reviews to ensure the concept of globalisation has been recognised by the company as a whole; and

4. preparing to provide necessary resources to accommodate tasks in global transition.

Investigation of foreign markets

The key difference between an MNC and a non-MNC is the presence of foreign business units. To become a globalised organisation, establishment of foreign subsidiaries or business units is considered an essential process in the early global transition stage. In addition, it is crucial to investigate the intended foreign markets before establishing the business units or subsidiaries. The investigation should not be concentrated merely on the market itself. It needs to be comprehensively covering almost every aspect of the market such as the freedom of fund flows, taxation systems, employees’ knowledge level, labour costs, effective distribution channels, telecommunication infrastructure, culture, political situation, encouragement of foreign investment, public order and human rights. In addition, as globalisation is considered a long-term and continuous business strategy, the conditions of these factors will be changing dynamically. Thus, the evaluation of these factors should not be restricted in the current status; it is more appropriate to deliberate over these factors for a relatively long period of time (say for the next ten years). In other words, the measurement of appropriateness should be focused on both current and long-term business operations.
In order to reduce the labour costs and shorten the distribution channels, Mahan has chosen two foreign cities as the appropriate targets for establishing overseas business units. The two cities are Guangzhou in China and Bandung in Indonesia. In early 1998, the president of Mahan and his two senior managers spent around three weeks in each city to acquire local business information and engage with the local governments and the existing customers. Subsequently, the information gathered from these two candidate cities was analysed in detail to make decisions on overseas investments. Due to a number of negative results revealed in Indonesia, the final decision for establishing an overseas operation was to found a foreign subsidiary in Guangzhou in China. The following metrics (Table 7.1 and Table 7.2) were developed to use as the measurement of candidate cities to determine the level of appropriateness in foreign subsidiary establishment. Each metric contains a list of measurement attributes and the appropriateness level (low, medium, high).

<table>
<thead>
<tr>
<th>Candidate City – Bandung, Indonesia</th>
<th>Appropriateness Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Freedom of fund flows</td>
<td></td>
</tr>
<tr>
<td>Taxation systems</td>
<td></td>
</tr>
<tr>
<td>Employees’ knowledge level</td>
<td>X</td>
</tr>
<tr>
<td>Labour costs</td>
<td></td>
</tr>
<tr>
<td>Effective distribution channels</td>
<td>X</td>
</tr>
<tr>
<td>Telecommunication infrastructure</td>
<td>X</td>
</tr>
<tr>
<td>Culture</td>
<td>X</td>
</tr>
<tr>
<td>Political situation</td>
<td>X</td>
</tr>
<tr>
<td>Encouragement of foreign investment</td>
<td></td>
</tr>
<tr>
<td>Public order</td>
<td></td>
</tr>
<tr>
<td>Human rights</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 7.1: Measurement of appropriate foreign subsidiary for Bandung city

Allocation of personnel and resources management

Human resources are always one of the important components in most projects. It is even imperative in the global scaled projects. During the development of the global
Table 7.2: Measurement of appropriate foreign subsidiary for Guangzhou city

transition plan, companies need to identify the employees’ involvement in each stage of the framework, and the roles and responsibilities of employees in the whole transition process. Moreover, to develop an effective global information system towards the success of global transition, the management of resources is considered as a crucial element throughout the entire project. The availability of resources should be made in a timely manner to ensure the continuous progress of the project and to eliminate the delay of the transition processes. In Mahan, the resources refer to three categories, namely, people (as human resources), information, and infrastructure (both business and technology) resources. These three categories of resources are the essential and critical components in the company’s global transition project and they are further delineated below.

1. People - refer to any employees who are directly or indirectly involved in the company’s global IT transition project. There are three types of operations staff who will be involved during the global transition. These are the investigation of a suitable foreign subsidiary, establishment and operation of the foreign subsidiary, and the development of global information systems. The CEO and
the senior managers are heavily engaged in the investigation stage. After the foreign investment decision has been made, the vice president, production manager, plant administrator, and chief engineer are the key personnel involved in the establishment and operation of the new foreign subsidiary. The development of the global information system requires intensive analysis, programming and testing activities by a highly cooperative team. The vice president leads Mahan’s global information systems development team together with several team members consisting of two dedicated IT officers and five contract system developers.

2. Information - refers to all data and materials related to the global IT transition. For example, the investigation report of foreign markets, the estimated foreign subsidiary’s monthly total products manufactured, labour costs of the foreign subsidiary, and so forth. All these data and information are documented and archived in both paper and electronic formats for immediate and future reference, quality and legal purposes.

3. Infrastructure - refers to both business infrastructure and technology infrastructure. In the business aspect, the infrastructure resources include production machinery, engineering and mechanical equipment, delivery trucks, raw material areas, semi-product areas, final product areas, storage areas and packaging areas, and so on. From the technology perspective, the infrastructure resources embrace fax machines, computer servers, computer workstations, computer peripherals (printers, scanners), network components (hubs, routers and cables), and backup equipment. All items listed here have operation manuals and maintenance procedures documented to provide users with the standards for operations. Additionally, each item is also assigned to at least one responsible person who carries out the maintenance and quality control activities.
Details of the responsibilities and tasks of personnel involved in the global transition project are outlined in section 7.2.3 (development of the global transition plan).

Global operation strategy

When a non-MNC is committed to engage in global transition, the company has to figure out the appropriate type of multinational organisational structure to follow. As mentioned in Chapter 2, each of the four MNC organisational structures has quite distinct characteristics, advantages and drawbacks. Choosing a suitable structure depends upon the company’s strategy to operate its business globally and what sort of relationships will be maintained between the headquarters and subsidiaries.

In Mahan, the global business strategy is to maintain a highly centralised structure that all decisions made by the headquarters and the foreign business units who are merely required to implement the home company’s strategy. Specifically, Mahan’s manufacturing function will be the main business process operating in the foreign subsidiaries. The knowledge, skills and technology in association with manufacturing are developed and remain in the home company. In accordance with these global operation criteria, the ”global” organisational structure is the most suitable MNC type among the four.

Time and budget

A thorough project plan requires incorporating the management of company resources, time and cost towards the completion of all project activities (Kerzner, 2001). Time and cost are the constraints on the project. A comprehensive project plan should be presented so that it is possible to manage the project within the allocated time period and within the budgeted cost. A global transition process is considered a comparatively large project in terms of time, cost and resources. Without specifying the required time and cost, such global scale projects would not be successful in terms of time and budget limits. Thus, it is essential that the plan clearly states the costs and
time allocated for each and all activities. Time and budget allocations for Mahan’s
global transition plan are specified in the following section (section 7.2.3).

7.2.3 Development of the Global Transition Plan

A global IT transition plan is an imperative strategic approach to transforming
domestic companies towards globalised operations. It is crucial to consider and accom-
modate the specific issues mentioned above when developing an effective transition
plan. Additionally, although any project plans are expected to be prepared in a clear
and logical manner. It is even more critical for a global IT transition plan to avoid any
major conflicts, unexpected shortages of resources and budget related issues during
the global transition process. Generally, there are a number of components involved
in an appropriate transition plan such as the mission statement, aims and targets of
the project, human resources, and budgets. The subsequent section describes each of
the components and outlines the plan of Mahan’s globalisation project.

Mahan’s globalisation project plan

Mission statement

A mission statement is the overview of what a project is trying to achieve. Following
is the mission statement of Mahan:

"The mission of the global IT transition project is to adopt and utilise
information technology to expand the current business operations to the
global scale, to reduce production costs, to enrich the business competen-
cies, to increase market opportunities and competitiveness by developing
a fully IT-enabled globalised multinational corporation."

Aims and targets

The aims explain what the company hopes to achieve and the targets explain how
the company wishes to achieve those aims. They should be very clear and precise,
ideally they are specific, measurable, achievable, relevant and timely. The aims and targets should also incorporate the time period over which the company anticipates to achieve those objectives. The following table (Table 7.3) lists the aims and targets in regard to Mahan’s global IT transition project.

<table>
<thead>
<tr>
<th>Aims</th>
<th>Targets</th>
<th>Time allocated</th>
</tr>
</thead>
<tbody>
<tr>
<td>to expand business operations across national boundaries</td>
<td>to outline and investigate potential nations or regions for overseas investment</td>
<td>4 months</td>
</tr>
<tr>
<td></td>
<td>to establish new foreign subsidiaries and prepare for business operations</td>
<td>4–8 months</td>
</tr>
<tr>
<td>to utilise information technology and develop global information systems for global business operations</td>
<td>to outline the current information technology adoption status</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td>to analyse global business processes</td>
<td>3 months</td>
</tr>
<tr>
<td></td>
<td>to develop a global information strategy and align it with global business processes</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td>to identify the necessary components of global information systems</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td>to construct the global information systems</td>
<td>6–8 months</td>
</tr>
<tr>
<td></td>
<td>to develop and carry out testing for quality assurance</td>
<td>2 months</td>
</tr>
<tr>
<td></td>
<td>to develop training programmes for operations</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td>to perform the transition for daily operations</td>
<td>1 month</td>
</tr>
</tbody>
</table>

Table 7.3: Aims and targets of Mahan’s global IT transition project

**Human resources**

As mentioned earlier, there will be 11 out of 15 administrative staff involved in the global transition project. In order to assign appropriate tasks to each of them, there is a need to define the specific skills required for the tasks. Table 7.4 summarises various types of staff involved in the project and lists tasks that each staff member will be taking responsibility for during the global transition process.

**Budgets**

The financial plan varies from project to project. It is very difficult to have fixed
values for the project tasks to apply at the initial planning stage. However, Mr. Lan states that although there are no such fixed values that every company can follow, there should be no more than 20% of the company’s capital invested in the early stages of the globalisation process. The reason is that if the entire investment fails, damage to the home company should be minimised. It is believed that companies will still survive if the investment loss is less than 20% of the capital. Based on this principle, the budget for the global transition project can be determined with minimum investment risk.

7.3 Investigate Current Business - Information Technology, Knowledge, Processes and their Status

The first step after developing a detailed global IT transition plan is to identify the company’s existing information technology structure, knowledge level and business processes. Additionally, it is imperative to recognise types of customers, their requirements and level of satisfaction. The following subsections explore these areas
7. GLOBAL IT TRANSITION FRAMEWORK

and identify the contents of each aspect in Mahan.

7.3.1 Information Technology Capabilities

The company’s technical capabilities can be delineated through the following five categories including hardware construction, software systems and applications, network architecture, database systems, and security structure.

1. Hardware construction There are a total of 11 computers situated in the company’s sales and marketing office, and the production factory, which consists of 3 servers and 8 workstations. Additionally, there are 3 notebook computers available for remote product demonstration, sales and promotional marketing purposes. Other computer peripherals include 3 laser printers and two scanners.

2. Software systems and applications The background operating system of the entire system is based on Microsoft Windows NT 4.0 (Server version for 3 dedicated servers and Workstation version for 8 desktop workstations and 3 notebook workstations). The in-house developed applications have been implemented for the last 12 months. They have incorporated almost all business functions and are designed to facilitate communications between business processes. Moreover, these applications have been designed as network-enabled applications running across the company’s local area network.

3. Network architecture Mahan’s local area network (LAN) architecture is based on “star” topology via the central hub, and the systems and applications are implemented over the Microsoft Windows NT platform. The network servers are physically located in the production factory where most workstations are connected via the central hub. In the sales and marketing office, communication between local workstations and the servers is based on the dial-up remote access method. In other words, whenever data transfer is required between the sales
and marketing office, and the production factory, the dial-up connection will be established, otherwise the sales and marketing office site will remain isolated.

4. Database system A single backend database system is applied through the company’s entire information system. A database server is devoted to handle any queries and requests from local and remote workstations. In order to maximise the performance under the Microsoft Windows NT operating system, the database system is built on Microsoft SQL server 7.

5. Security structure Although the information system allows remote access (dial-up connection enabled only from the sales and marketing office), it is considered as a closed local area network architecture. As the independent characteristic, the information system requires minimum security functions to prevent unauthorised access. Besides the security structure, the company has implemented a multi-backup strategy (as discussed in Chapter 5, Section 5.1.1.4) to prevent data losses from unexpected situations. Basically, a doubled backup procedure is applied to secure data stored from both the production factory, and the sales and marketing office. The idea is to implement a standard of each site locally and conduct a remote backup of each other. Thus, any one site that has suffered data losses would be able to recovered through the remote restore procedure. To fulfil quality standards, all backup/restore manuals and procedures have been documented in both paper and electronic forms.

7.3.2 Knowledge Evaluation

Knowledge of the employees is an important asset of any enterprise. In Mahan, the skills, capabilities and knowledge of each staff member are recorded and updated to ensure the suitability of performing appointed business operations and activities. These elements of employees’ competencies are also incorporated into the company’s information system to accomplish five major benefits. These benefits are outlined as
7. GLOBAL IT TRANSITION FRAMEWORK

follows.

1. The improvements in efficiency - by considering the abilities of employees, the same operation or activity can be done faster.

2. The improvements in effectiveness - employees’ skills and knowledge are kept up-to-date to increase intellectual specialisation within the organisation.

3. The improvements in focus - through the employees’ knowledge database, daily business operations can be implemented with pre-scheduled arrangement; and hence, mission critical business processes can be given more attention.

4. Automating and eliminating work - since knowledge of the employees is integrated in the information systems, some of the business tasks may be operated automatically and some redundant work may be eliminated.

5. Reduction of rework - as the result of knowledge evaluation and management, required jobs are implemented with less mistakes; therefore, the rework is reduced.

7.3.3 Business Processes

As suggested by Ginige et al. e-business transformation methodology (2001), business processes are reengineered through exploiting of information technology. A number of core business processes have been identified and IT enabled through the operation of the company’s information system. These core business processes embrace raw materials purchasing, raw materials process outsourcing, products assembling, final products packaging and stocking, sales order processing, production scheduling, and products dispatch and delivery. In order to comprehend the activities of each, brief descriptions of these processes are outlined as follows.
1. Raw materials purchasing - A process of raw materials purchases is triggered by the detection of a low safe stock level. It requires the preparation of formal purchase orders containing detailed contents of each item, agreed prices, payment terms and requested delivery information.

2. Raw materials process outsourcing - Raw materials are required to be further processed by external business partners prior to the production factory for assembling. This process is activated by the identification of a low safe stock level of processed raw materials. An outsourcing job request sheet will be prepared consisting of the details of raw materials for processing and the anticipated return time.

3. Product assembling - In the production factory, each automated assembling machine is attached to an electronic data collector. This functions to collect data such as the item details, the total number of successfully assembled products, the total number of failed products, and the total operation period. At sixteen hundred hours everyday, all assembling machines are terminated for half hour maintenance; meanwhile, data collected and stored in the electronic data collector is transmitted to a workstation computer. The data is further analysed and recorded in the company’s information system. One of the critical features of the assembling machine is that the quality control process is embedded as the final part of the assembling procedure. Hence, a successfully assembled product is classified as a QC passed final product.

4. Final products packaging and stocking - After the assembling process, the products are collected in containers labelled with barcode information labels. These containers are transferred to the packaging section for packaging. Packaged products are labelled with the associated barcode label and transferred to the inventory. At both entry and exit points of the inventory, product packages are scanned into the information system for stocking and dispatching purposes.
5. Sales order processing - Sales orders are received through telephone or fax on a daily basis. The contents of received orders will be entered in the system and made available for the production department to arrange manufacturing schedules. A confirmation of agreed products, prices and delivery schedules, together with a copy of the order, is forwarded to the customer.

6. Production scheduling - This is considered as one of the most sophisticated processes. The production schedules are generated in accordance with various factors available in the database containing available stock, available raw materials (both processed and unprocessed), expected delivery date, consideration of concurrent orders, production capacity, labour availability, and overtime requirement. All these factors are taken into account when preparing production schedules for the purpose of accurate products delivery.

7. Products dispatch and delivery - A delivery schedule is produced daily to detail the delivery information and associated sales orders. The delivery truck driver follows the schedule to distribute the products. When products are delivered to the corresponding customer, the delivery personnel perform a scan activity; the scanned data is transmitted to the information system when the truck returns.

The above mentioned business processes are considered mission critical processes, and the procedure of each is documented in detail to fulfil quality assurance requirements.

7.3.4 Customer Evaluation

Undoubtedly, the above three subsections identified the elements of the current business investigation from an internal viewpoint. However, it is imperative to obtain the existing business status from the external perspective as well. Since customers are the most important entity of most organisations, this subsection deals with the analysis of the company’s existing customers in terms of their characteristics, requirements,
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and level of satisfaction.

First of all, each customer should be categorised in accordance with the level of importance. The important factors can be identified through the analysis of sales orders, the monthly sales total and the payment history. Customers determined as crucial ones are those who feature in a high monthly sales total with a correspondingly large volume of sales orders and acceptable payment schedules (no delays). Secondly, customer service programmes should be developed to fulfil the requirements and achieve the level of satisfaction, particularly for those identified as crucial customers. The construction of appropriate customer service programmes should consider several factors including the location of customers, customers’ access times, creating a value-added supply chain, and developing or enhancing appropriate business processes to facilitate customers. Each of these factors is briefly delineated as follows.

1. Location of customers - Customers are located everywhere in the world. When investigating the location of customers, organisations mainly concentrate on the analysis of product distribution. However, there are other concerns that also need to be addressed in relation to the location, which contains cultural diversity, taxation and regulation systems, distribution channels, and methods of transportation.

2. Customers’ access times - Further to the location of customers, organisations also need to recognise the time of access of information by each customer. In the global business environment, customers place orders and request services at anytime as necessary. It is imperative for organisations to ensure the information requested by customers is made available as needed.

3. Creating a value-added supply chain - In order to provide customers with additional benefits over the purchased products, the improvement and effective management of the company’s supply chain can be seen as an appropriate approach. To achieve this, firstly, the organisation has to clearly identify each and
7. GLOBAL IT TRANSITION FRAMEWORK

all components of the supply chain and indicate the relationships between them. Once the processes and flows of the supply chain are determined, the analysis and redesign of the supply chain takes place to identify the improvement and develop value-added components.

4. Developing or enhancing appropriate business processes - Activities and operations in association with customers are accommodated by several of the company’s business processes. These business processes generally include ordering, production scheduling, delivering, accounting, and after-servicing. The functionality and concepts of these processes should be built to maximise customer benefits and facilitate customers in any circumstances.

7.4 Identify Global Transition Requirements

Following the investigation of current business status, organisations need to identify what they wish to achieve to globalise. These objectives are the main driving forces, or global business drivers as defined by Ives et al. (1996) for organisations pursuing globalisation. Some of them are identified and delineated as follows.

1. Utilising global resources - In accordance with the main characteristics, the global resources can be further divided into two categories, which are global human resources and global material resources. Labour costs are always the main concern of any organisation. By pursuing global operations, organisations have opportunities to utilise global human resources by means of obtaining a highly skilled workforce with favourable salary levels. Similarly, some countries or regions may provide cheaper material costs than others. Through the global operations, organisations are capable of obtaining and utilising global material resources with competitive costs.
2. Implementing rationalised and flexible operations - In rationalised operations, the same products are manufactured through various dispersed business units where the components are produced based on the availability of resources and materials. Moreover, one of the purposes of establishing overseas activities is to relocate the company’s production operation. Moving the production around the world and sharing production resources across boundaries would be advantageous to the company, and would result in optimising manufacturing performance and capacity.

3. Diminishing risks - The globally dispersed business functions strategy allows the company to spread out its investments and thus minimise the risks. Additionally, distributed enterprise competencies would leverage the risks for those who are vulnerable to political and economic conditions in particular countries.

4. Building global products - Developing consistent products on a global scale is becoming an important part of meeting customer requirements. The standardisation of products would allow the company to satisfy customer requirements in a number of circumstances such as:

- allowing multinational customers to access the consistent products across their dispersed global operations;
- providing global consumers with standardised products and services regardless of location;
- providing the basis for economies of scale;
- achieving homogenised customer needs; and
- overcoming competitive pressures.

5. Reducing material costs - Setting up a production plant nearby the source of materials would provide the company with competitive advantages in terms of reducing costs, shortening delivery period and easy access to suppliers.
6. Improving customer services - This is considered the most common globalisation requirement among all other global business drivers. As customers are pursuing globalisation, the organisations have to transform themselves to fulfil the requirements as well. Organisations need to ensure that the services they can provide to those global customers are consistent across national boundaries. This global services network enables quicker responses of customer enquiries and shortens the time for problem-solving processes. In order to maintain this global services capability, the information and telecommunication architectures should be accurately incorporated into the companies’ organisational and operational structures.

7. Increasing revenue - This can be seen as the ultimate objective of globalisation. It is the result of global establishment and operations. Although the benefits are invisible at the early stage of global transition, in fact, organisations normally spend an enormous amount of investment on establishing foreign business units. Nevertheless, globalisation is such a long-term business operation and investment that organisations would be anticipating the growth of revenue due to more and more customers and suppliers transforming towards globalisation and seeking global business partners.

8. Having opportunities to access different types of markets - Operating a business in the global scale allows organisations to broaden their business activities from limited or restricted regions to a diverse spectrum of markets all around the globe. In addition to accessing a diversity of markets, organisations are also gaining the flexibility to allocate their resources effectively to the specific market requirements.
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7.5 Enacting the Global Transition Process

After the development of the global transition plan, identification of the current business status, and indication and realisation of the global transition requirements, this phase deals with the actual implementation of the global transition process.

A number of activities are involved in the enactment of the global transition process, beginning with the launch of the transition, monitoring the transition process, accepting and reviewing feedback. These activities are briefly discussed in the subsequent subsections.

7.5.1 Launching of Global Transition

The time of launching a global transition depends upon the existing business situation and it is broken into three stages consisting of preliminary investigation, establishment of global business units, and implementation of global operations. In the preliminary investigation stage, organisations would spend the majority of the time collecting foreign market information and analysing appropriate locations for overseas business operations. These activities are mainly initiated by the chief executive officer or senior managers who have been appointed to be involved in the management of the global transition process. In the second stage, the transition activities focus on the establishment of global business units. Establishing foreign business units is a complicated task. In order to ensure the successful establishment of overseas business units, it is crucial that the parent company is effectively providing necessary resources and support. Senior managers and middle-level managers who have the knowledge of local markets and foreign business operating capability are the most appropriate candidates at this stage. The third stage is the implementation or operation of the global transition stage. Activities at this stage rely on the specific business functions assigned to the business unit. For instance, if the foreign business unit is to conduct production activities, then the implementation of the global operation would be based
on performing production-related tasks such as the purchases of materials, stock and inventory management, the manufacturing process, the quality control process, the packaging process, and the distribution and delivery operations. Consequently, human resources are intensively involved in this stage to ensure the sufficient resources are available for perpetual implementation.

With the intention of applying IT in the global transition process, some activities of the above three stages would be conducted through information systems enabled operations. For example, data collected in stage one can be centralised in a database management system, which would be employed as the information source for other information system components to provide further analysis to the organisation. In the establishment and implementation stages, intensive data and information are flowing between the parent company and the overseas business unit. To perform an effective data transferring process, both sites (the parent company and the foreign business unit) should construct equivalent information architecture. Such information architecture should have the capability to cope with heavy data traffic and be available at all times (detailed information architecture and IT-related issues have been outlined and can be found in Chapter 5 Section 5.1.1).

### 7.5.2 Monitoring Transition Process

The global transition process should be closely watched at all times. The entire global transition operation is a sophisticated project that involves an enormous amount of resources from almost all aspects of the organisation. It is suggested that each phase of the transition should be partitioned into small chucks that can be easily assessed through the appropriate measurement protocol at each checkpoint or milestone. However, the measurement protocol at this point is slightly different from the verification of global transition achievement in the following phase (Section 7.6). The monitoring
tasks at this phase aim at the purpose of quality assurance. Through the internal audits and reviews, the procedures of each task or activity of a transition phase would be recorded and the final reviews will be in place to fulfil the requirements of the quality standards applied (such as ISO 9000 or CMM).

7.5.3 Accepting and Reviewing Feedback

Accepting feedback is always important for any projects as this helps the project to make further improvement. The primary objective of constantly obtaining feedback for the global transition process is to provide organisations with opportunities to identify significant issues, which, if left unattended, may cause failure of the entire project. The feedback would allow organisations to quickly respond to the problems and assure the transition activities are conducted accurately. Generally, feedback originates from people who have the association or involvement with the transition project. These people may spread across the entire organisation regardless of their locations or the level of authority. For instance, they could be senior managers who are greatly involved in the global transition process, or a local order entry operator who wishes to provide comments on the global information systems for enhancement. Additionally, feedback from independent parties would supply the organisation with invaluable information. These external views are mainly from the organisation’s suppliers and customers who have more concerns about the effectiveness of the organisation’s global operations in association with their business activities and competitive advantages.

7.6 Verifying Global Transition Achievement

After the enactment of the global transition process, it is necessary to evaluate and determine whether the organisation has achieved its globalisation objective. Developing and implementing an appropriate global transition measurement will provide benefits to companies in various aspects. First, the purpose of the measurement is
to help the company understand basic behaviours of the business system, to explore and discover the relationships between business and information systems. Second, another purpose is to evaluate the status of projects and their relationships to the business plans. This evaluation is used to judge progress toward corporate or business unit strategic goals or specific initiatives. Third, yet another purpose is to identify opportunities for future improvement.

In order to construct such appropriate and precise measurements for evaluating the company’s global achievement, it is crucial to develop the measurement model in a systematic manner. Generally, the measurement model development starts with determining what to measure. In the context of globalisation, the objects to be measured are the five global transition issue categories (information technology management, business information systems management, people management, end user management, and culture) identified in Chapter 5. However, due to the broad coverage of individual categories, each of these categories is further subcategorised into subcategories (see Chapter 6). There are 18 subcategories and they are referred to as the measuring factors.

The second step of the model development deals with defining measurement criteria. Based on the definition of each factor (subcategory), numerous issues can be identified and transformed into the measurement criteria, which the organisations have to accommodate during the process of global transition. Consequently, a measurement technique should be designed to assess these criteria. In this study, the measurement technique is designed as a 100 percent scale, which is partitioned into ten measurement blocks and illustrated in Table 7.5. Once the measurement objects and the criteria and measuring technique are defined, the measurement model is ready in its implementation position. Each of the following tables (7.6 - 7.10) contains the measurement criteria of a GISM issue category, a list of measuring factors, the associated measuring criteria and the measurement results that are based on the evaluation of the global IT transition achievement of Mahan in June 2001. After the evalua-
7. GLOBAL IT TRANSITION FRAMEWORK

<table>
<thead>
<tr>
<th>Measurement Block</th>
<th>Percentage of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 – 10 %</td>
</tr>
<tr>
<td>1</td>
<td>11 – 20 %</td>
</tr>
<tr>
<td>2</td>
<td>21 – 30 %</td>
</tr>
<tr>
<td>3</td>
<td>31 – 40 %</td>
</tr>
<tr>
<td>4</td>
<td>41 – 50 %</td>
</tr>
<tr>
<td>5</td>
<td>51 – 60 %</td>
</tr>
<tr>
<td>6</td>
<td>61 – 70 %</td>
</tr>
<tr>
<td>7</td>
<td>71 – 80 %</td>
</tr>
<tr>
<td>8</td>
<td>81 – 90 %</td>
</tr>
<tr>
<td>9</td>
<td>91 – 100 %</td>
</tr>
</tbody>
</table>

Table 7.5: Indication of achievement level

tion, a calculation mechanism should be applied to conclude about the globalisation achievement. This calculation mechanism is described as follows. The first calculation item is the achievement of each measurement factor. It is derived from the average of the associated measuring criteria. For example, in Table 7.6 the "strategic planning" (the measurement factor) consists of three measuring criteria (1-3), and their measuring results are 9, 8, and 8 respectively. Thus the achievement level of "strategic planning" is 8.3 (or 83% as in Table 7.5). After the achievement levels of all measurement factors are determined, each GISM issue category can be evaluated. Once again, this is calculated from the average of associated measurement factors. From Mahan’s "people management" achievement evaluation table (Table 7.7), the achievement level is calculated from the average of three measurement factors which are the role of senior management: 7, staff recruitment and training: 7.3, and benefits and compensation: 7.5. Hence, the achievement level of the people management category in Mahan is 7.3 (or 73% as in Table 7.5).

The final step of calculating the achievement level of the entire global IT transition is determined by amalgamating all calculated achievement levels of GISM categories and the GISM issues priority model. Depending upon the type of MNC organisational structure, each GISM issue category is assigned a numeric weighting, which is decided in accordance with the level of importance in the GISM issues priority model.
### 7. GLOBAL IT TRANSITION FRAMEWORK

<table>
<thead>
<tr>
<th>Category 1: Business Information Systems Management</th>
<th>Measuring Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic planning</strong></td>
<td></td>
</tr>
<tr>
<td>Applying information systems for global business opportunities and competitive advantage</td>
<td>9</td>
</tr>
<tr>
<td>Alignment of information systems and business objectives</td>
<td>8</td>
</tr>
<tr>
<td>Understanding of information systems roles, contribution and justification of information systems investments</td>
<td>8</td>
</tr>
<tr>
<td><strong>Reengineering and change</strong></td>
<td></td>
</tr>
<tr>
<td>Business processes are reengineered through the adoption of IT</td>
<td>8</td>
</tr>
<tr>
<td>Developing necessary procedures and programmes for managing business reengineering changes</td>
<td>8</td>
</tr>
<tr>
<td>Applying quality assurance scheme for organisational management</td>
<td>9</td>
</tr>
<tr>
<td>IT professionals possess business-oriented competence when developing global information systems</td>
<td>7</td>
</tr>
<tr>
<td><strong>Managing IT quality</strong></td>
<td></td>
</tr>
<tr>
<td>The global information system is reliable, available and transferable within the organisation</td>
<td>7</td>
</tr>
<tr>
<td>Applying appropriate quality control mechanisms for inputs and outputs of information systems</td>
<td>8</td>
</tr>
<tr>
<td>Applying software quality assurance standards in the development and maintenance of global information systems</td>
<td>8</td>
</tr>
<tr>
<td><strong>Productivity</strong></td>
<td></td>
</tr>
<tr>
<td>Developing an appropriate measurement and improvement of information system productivity and effectiveness</td>
<td>8</td>
</tr>
<tr>
<td>Full utilisation of data resources</td>
<td>7</td>
</tr>
<tr>
<td><strong>Systems development and implementation</strong></td>
<td></td>
</tr>
<tr>
<td>The new global information system has been constructed, implemented and managed</td>
<td>7</td>
</tr>
<tr>
<td>Implementing office automation</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 7.6: Measurement criteria for the business information systems management category
### Category 2: People Management

<table>
<thead>
<tr>
<th>Measuring Scale</th>
<th>0 - 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role of senior management</td>
<td></td>
</tr>
<tr>
<td>Possessing quality skills in people management</td>
<td>8</td>
</tr>
<tr>
<td>Developing training programmes for senior management in IS and cross cultural skills</td>
<td>6</td>
</tr>
<tr>
<td>Staff recruitment and training</td>
<td></td>
</tr>
<tr>
<td>Retaining, recruiting, and training IT personnel</td>
<td>7</td>
</tr>
<tr>
<td>Sufficiency and availability of IT staff</td>
<td>6</td>
</tr>
<tr>
<td>Organising and managing expatriated employee and assignments</td>
<td>9</td>
</tr>
<tr>
<td>Benefits and compensation</td>
<td></td>
</tr>
<tr>
<td>Incorporating multinational compensation schemes into the company’s policy</td>
<td>9</td>
</tr>
<tr>
<td>Company’s travel activities are minimised to reduce unnecessary costs</td>
<td>6</td>
</tr>
</tbody>
</table>

**Table 7.7: Measurement criteria for people management category**

### Category 3: Information Technology Management

<table>
<thead>
<tr>
<th>Measuring Scale</th>
<th>0 - 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT infrastructure</td>
<td></td>
</tr>
<tr>
<td>Appropriate computer hardware and operating systems have been selected and the management and support procedures are clearly outlined</td>
<td>9</td>
</tr>
<tr>
<td>Business applications</td>
<td></td>
</tr>
<tr>
<td>Appropriate software applications have been identified, constructed, implemented, and managed</td>
<td>7</td>
</tr>
<tr>
<td>Information systems are integrated across all business functions</td>
<td>7</td>
</tr>
<tr>
<td>Telecommunications network</td>
<td></td>
</tr>
<tr>
<td>Appropriate management, planning, support, and availability of telecommunication infrastructure and technology</td>
<td>7</td>
</tr>
<tr>
<td>Data and information systems improvement</td>
<td></td>
</tr>
<tr>
<td>Procedures for continuous improvement of data, information and knowledge quality</td>
<td>6</td>
</tr>
<tr>
<td>Developing security, control, and disaster recovery capabilities</td>
<td>7</td>
</tr>
<tr>
<td>Integration of databases for data mining ability</td>
<td>7</td>
</tr>
</tbody>
</table>

**Table 7.8: Measurement criteria for information technology management category**
### 7. GLOBAL IT TRANSITION FRAMEWORK

#### Category 4: End User Management

<table>
<thead>
<tr>
<th>Organisation learning</th>
<th>Measuring Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures for facilitation and management of organisational learning</td>
<td>8</td>
</tr>
<tr>
<td>Enhancing staff absorption of the new information systems</td>
<td>8</td>
</tr>
<tr>
<td>Procedures and facilities for end user computing</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation and support</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures for managing IT operations</td>
<td>9</td>
</tr>
<tr>
<td>Developing help desk support</td>
<td>7</td>
</tr>
</tbody>
</table>

**Table 7.9: Measurement criteria for end user management category**

#### Category 5: Culture

<table>
<thead>
<tr>
<th>Education</th>
<th>Measuring Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigation of the level of general education of people in the region or nation</td>
<td>6</td>
</tr>
<tr>
<td>Investigation of the level of computer knowledge of people in the region or nation</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Demographics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigation of regional or national gender perspective</td>
<td>6</td>
</tr>
<tr>
<td>Investigation of age distribution of the region or nation</td>
<td>6</td>
</tr>
<tr>
<td>Investigation of regional or national religion</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Individual and interpersonal perspectives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigation of leadership style of the region or nation</td>
<td>6</td>
</tr>
<tr>
<td>Investigation of values and goals of individuals and groups of the region or nation</td>
<td>7</td>
</tr>
<tr>
<td>Investigation of interpersonal communications of the region or nation</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Geography and economy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigation of currency stability</td>
<td>8</td>
</tr>
<tr>
<td>Coping with time-zone difference</td>
<td>8</td>
</tr>
</tbody>
</table>

**Table 7.10: Measurement criteria for culture category**
7. GLOBAL IT TRANSITION FRAMEWORK

identified in Chapter 6. Based on the results of the empirical data analysis in Chapter 6, Table 7.11 contains numeric weightings of GISM issue categories of four multinational organisational structures. As Mahan’s organisational structure is the "global" type, the numeric weightings of the GISM issue categories are 0.21 for "information technology management", 0.22 for "business information systems management", 0.19 for "end user management", 0.20 for "people management", and 0.18 for "culture"; and the entire global IT transition achievement level is 7.496 or 74.96%.

<table>
<thead>
<tr>
<th>Issue Category</th>
<th>Multinational</th>
<th>International</th>
<th>Global</th>
<th>Transnational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology Management</td>
<td>0.22</td>
<td>0.22</td>
<td>0.21</td>
<td>0.20</td>
</tr>
<tr>
<td>Business Information Systems Management</td>
<td>0.22</td>
<td>0.21</td>
<td>0.22</td>
<td>0.24</td>
</tr>
<tr>
<td>End User Management</td>
<td>0.20</td>
<td>0.19</td>
<td>0.19</td>
<td>0.20</td>
</tr>
<tr>
<td>People Management</td>
<td>0.19</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Culture</td>
<td>0.17</td>
<td>0.18</td>
<td>0.18</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Table 7.11: Numeric weightings of GISM issue categories

The measured results do not merely indicate the company’s achievement level in globalisation; they also specify the less emphasised aspects, which the company has to pay more attention to for future improvement. To generalise the above measurement procedures, a conceptual model for measuring global IT transition achievement is developed, which is illustrated in Figure 7.2 and described as follows.

The conceptual model of globalisation achievement measurement is constructed as a top-down decomposition hierarchical structure. This hierarchical structure allows organisations to view their globalisation achievement in four levels, including the entire organisation level, main GISM issues category level, GISM issues subcategory level, and measuring criteria level. The highest level represents the globalisation achievement of the entire organisation. The result of this level would provide senior executives with an abstract view of what is the company’s status and achievement of the global transition process. This organisation level is based on the amalgamation of the second level - the main GISM issues category level components. It consists of the measurement of the five main global information systems management issues.
categories defined in Chapter 5. Each of these five is further broken into a number of subcategories, which form the third level. For example, the business information systems management category in the second level of the hierarchy is divided into five subcategories containing strategic planning, reengineering and change, managing IT quality, productivity, systems development and implementation, which form the third level. Furthermore, the bottom level represents a range of validating criteria that are identified and applied for the measurement of each subcategory.

During the global transition process, it is crucial that organisations are aware of the progress and levels of achievement through a measurable topology. By following the model, organisations are capable of determining their stages and achievements in the globalisation process across all business functions and perspectives at any point of time.

Figure 7.2: Conceptual model of globalisation achievement measurement
7.7 Summary

The global IT transition framework aims to identify and provide the essential activities required for organisations undertaking the global transition process. In developing the conceptual model, the transition activities are categorised into five abstract phases and presented in three logical stages. The first stage is the preparation stage consisting of planning for global IT transition, investigating current business, and identifying global transition requirements. It is followed by the second stage, which concentrates on the enactment of the global transition process. The verification of global transition achievement serves as the final (third) logical stage to measure the level of globalisation accomplishment. The concept of quality assurance has also been incorporated into each and all phases to attain excellence of achievement.

The case of the Taiwanese electronic manufacturing firm - Mahan, serves to illustrate the global transition process throughout the entire framework. First of all, the concept of developing the entire global transition plan is outlined and it is initiated by identifying five specific transition issues. These issues are predominantly faced by Mahan, which include the executive consensus, investigation of foreign markets, allocation of personnel and resources management, global operation strategy, time and budget. Through understanding those issues, a precise transition plan with appropriate tasks, resources and budgets was constructed to lead the organisation toward global operations. Second, the company’s current business and status are discussed in detail for the areas embracing information technology capabilities, knowledge evaluation, business processes and customer evaluation.

Based on Ives et. al.’s global business drivers, eight global transition requirements or objectives have been identified and further delineated to provide a clear understanding of the purposes of globalisation. These eight global requirements include utilising global resources, implementing rationalised and flexible operations, diminishing risks,
7. GLOBAL IT TRANSITION FRAMEWORK

building global products, reducing material costs, improving customer services, increasing revenue, and having opportunities to access different types of markets.

Once the plan, the status and the requirements are ready, the enactment of the global transition is in its operating position. To conduct a successful transition, the launching of the transition process in various stages and the respective responsibilities are outlined, and the transition plan is regularly reviewed in conjunction with the acceptance of feedback from both internal and external participants.

Finally, the global transition achievement measurement is conducted to examine the extent to which the company has reached its globalisation vision. A conceptual model is developed to verify the company’s global transition process through a four level (organisational level, GISM main category level, GISM subcategory level, and measuring criteria level) hierarchical structure. The analysed results show that the company’s entire global IT transition process has achieved 74.96%, which is considered a reasonable outcome after a two-year global transition operation.
Chapter 8

Conclusion

Abstract

This chapter summarises the work performed during the research including the creation and application of the theory of the global IT transition framework. It summarises the construction of an enterprise’s global transition process through each development step including investigation of multinational organisation structures, investigation of enabling information technology for globalisation, identification of global transition issues, development of a global transition issue priority model, and development of a global IT transition framework. It also describes how the concept of global IT transition is applied to a manufacturing company through an in-depth case study. Finally, the future directions of this research are considered from both industrial and academic research viewpoints.
8. CONCLUSION

8.1 What Has Been Achieved?

This research followed the quantitative approach in investigating the research questions outlined in Chapter 1. The research started with a formal hypothesis (Chapter 1, Section 1.2.1), which was translated into specific research questions (Section 1.2.2). The entire study has been an attempt to answer those questions and thereby investigate the validity of the hypothesis. In addition to the quantitative approach, through empirical data collection and analysis of two surveys, an in-depth case study has also been conducted for the development of a global IT transition framework. The questions investigated during the research are an attempt to construct a framework for enterprises pursuing global transition through the adoption of information technology. It is an attempt to produce a model that organisations can employ by exploiting information technology in transforming business operations towards globalisation. In order to achieve this aim of developing a global IT transition framework, this research concentrated on both investigating multinational organisation structures and exploring issues with respect to global information systems management. The theory was developed with the following five steps:

1. *Investigation of multinational organisation structures*

   Here, the characteristics, advantages and drawbacks of each multinational type company are investigated and discussed. The specific research questions that were investigated here included the various types of multinational organisational structures and the differences between these organisational structures.

2. *Investigation of enabling information technology for globalisation*

   Here, the latest information technologies are identified and described in the areas of computer hardware, networking technology, and software applications. In this step, the research focus is concentrated on identifying the enabling technologies for enterprises pursuing globalisation.
3. Identification of global transition issues

Here, a comprehensive list of global transition issues were identified, which comprise areas in business information systems management, information technology management, people management, end user management, and culture. The results were specifically answering the research question in relation to companies’ concerns of becoming multinational corporations.

4. Development of a global transition issue priority model

Here, a global transition issue priority model was developed to verify the main research hypothesis - “Depending on the type of multinational corporation (multinational, international, global, and transnational) aimed at, the issues of information technology management, business information systems management, people management, end user management, and culture apply with different priorities in the global transition process.”

5. Development of a global IT transition framework

Based on the previous stages, here, a global IT transition framework was developed to provide organisations with the direction to transforming to globalised operations through the adoption of information technology. A quality assurance scheme is also incorporated into each transition phase to minimise the failure possibility and transition delay.

The following sections summarise the achievements of this research in these areas in greater detail, as well as delving deeper into the potential for further study in managing organisations’ changes in globalisation.

8.1.1 Investigation of Multinational Organisation Structures

This was the first step of this research. The preliminary activity in transforming a non-multinational company to a multinational corporation is to understand what is
8. CONCLUSION

a multinational company and to recognise the various types of multinational organisation structures.

Prior to exploring the types of multinational organisational structures, the trend of globalisation was stated to provide a general overview of the global business operations and strategies. It starts with identifying the global challenges faced by organisations, discussing the evolution of the global market, and determining arguments for enterprises pursuing globalisation. It is followed by indicating the factors that will influence the enforcement of globalisation. Subsequently, an explanation of the global strategic vision and identification of essential elements of strategic thinking follow it.

To adopt an appropriate structure for global business operations, this study identifies and discusses four types of multinational organisation structures, namely multinational, international, global and transnational. These structures are defined by Bartlett and Ghoshal (1989, 1998) and they have been widely implemented by many multinational corporations. Each structure is investigated in detail in terms of its core characteristics including strategic point of emphasis, global strategic vision, control and coordination, domestic autonomy, relationships between the headquarters, subsidiaries and local markets, enterprise culture, selection of senior managers, strategic decision processes, and information flow.

In addition to the discussion of core characteristics, the advantages and disadvantages of performing each organisational structure are also outlined. As a result of exploring these four organisational models, enterprises are able to adopt the most suitable structure for implementing their global operations.

8.1.2 Investigation of Enabling Technology for Globalisation

As the study concentrates on the application of information technology for implementing enterprise global transition, it is crucial for companies to understand what is the global information system and what components construct an effective global
information system. Based on the literature survey and the meaning of global business operations, a global information system can be defined as an expansion of an information system that operates across geographical and time boundaries. Furthermore, essential components of a global information system can be categorised into five key modules including functional architecture, the Internet technology, intranet and extranet models, middleware technology, and groupware technology. Elements of each key module are summarised as follows.

**Functional architecture**  Functional architecture refers to the architecture of the information systems as viewed by the business. In other words, functional architecture represents the business competencies in the orientation of information systems. Due to the conditions of global business markets changing continually, it is imperative to design a comprehensive and flexible functional architecture for the global information system.

**The Internet technology**  As defined in Chapter 3 (Section 3.3), the Internet technology facilitates business communication all around the globe. The important features of the Internet explain its rapid growth to prominence and popularity, and the potential application for global businesses. These significant characteristics have been discussed in areas such as global coverage, the extensive and large number of users, accessibility, availability, ease of use, low usage costs and big benefits, being informative for users, and interactivity.

However, there are many issues that an organisation should be concerned about when applying the Internet technology. These concerns are related to information reliability, copyright, computer viruses, and security issues. Furthermore, when adopting Internet technology as part of a companies’ information systems platform, it is necessary to analyse the possible online traffic required and set up the appropriate communication speed for maximum utilisation.
Intranet and extranet models Although the Internet provides a convenient background for business communications across national boundaries, certain information or processes are not suitable to flow via this public channel. Instead, intranet and extranet models have been discussed to facilitate these needs. Using the intranet model for internal communications within organisations presents the lowest security risk of transferring data and information amongst dispersed business units inside of the organisation.

An extranet model on the other hand, is an expanded model of the intranet. This information systems model aims to minimise the communication hurdles and bottlenecks between business units and certain external business partners. It is mainly applied for implementing effective supply chain operations.

Middleware technology In multinational companies, the architecture and construction of information systems may differ from one business unit to another. In order to integrate dispersed information systems and enable the communication among them, it is crucial to exploit the middleware technology in the global information system architecture. A number of middleware applications have been discussed including CORBA, MDA, Microsoft .NET, Enterprise JavaBeans, IPlanet, WebLogic and WebSphere.

Groupware technology In the development of global information systems, tasks are mainly allocated to development teams that are not positioned in a single location. Utilising groupware technology, developers can communicate with each other virtually without face-to-face discussions. Besides, end users also receive benefits with groupware technology. Two well-known groupware applications which have been outlined are Lotus Notes and Microsoft Exchange.
8. CONCLUSION

8.1.3 Identification of Global Transition Issues

During the globalisation process, companies often face hurdles that would hold back the transition progress. It is crucial to identify those issues and determine the possible solutions before the actual global transition takes place. In accordance with the literature review from the last decade, numerous global transition issues have been identified. These issues are mostly related to information technology and the global transition process, and they have been categorised according to the characteristics of each. These five GISM issue categories are business information systems management, information technology management, end user management, people management, and culture.

In order to obtain an in-depth understanding of these issues, each defined category is further subcategorised into smaller components or subcategories. The following subsections list and outline the subcategories that are associated to each GISM issue category.

**Business information systems management**  In the process of globalisation, business and information system strategies are often the senior executives’ major concern. The alignments of global information strategy and the new business visions are crucial to the success of global business operations. Subcategories identified in this category contain strategic planning, reengineering and change, managing IT quality, productivity, systems development and implementation.

**Information technology management**  Issues considered as part of this category deal with the information technology as well as its management concerns in the global context. According to the literature (Sankar & Prabhakar, 1992; Knowles, 1996; Passmore, 1997), information technology can be generally subdivided into four aspects, which are hardware, software, networking, and data. Based on these four components and the characteristics of information technology, from the global management
8. CONCLUSION

Perspective, the four subcategories are defined as global IT infrastructure, global business applications, global telecommunication network, and data and information improvement.

**End user management** Managing end users in the global business environment requires well-structured information centres (or helpdesks), coherent logistics for equipment distribution and maintenance, and end user training programmes. Based on these concepts, two subcategories defined to incorporate the related issues are organisational learning, and operation and support.

**People management** As the employees of global organisations spread across nations, it is imperative to define an effective human resources management scheme to determine the benefits and clarify the responsibilities of staff (specifically the senior managers), maximise the usage of people's knowledge and skills, and minimise the associated costs. Hence, the correlated issues to form subcategories of people management are identified as the role of senior management, staff recruitment and training, and benefits and compensation.

**Culture** When operating businesses across national boundaries, culture is considered as one of the critical success factors in global transformation. The diversity of culture differs from country to country in terms of languages, time, education, geography, religions, demographics, individual and team perspectives and so on. In the global transition process, organisations should be encouraged to incorporate cultural diversity into the strategic plan.

**8.1.4 Development of a Global Transition Issue Priority Model**

The heart of this study is to investigate whether there are correlations between multinational organisation structures and the global IT transition issues. Hence, the global
8. CONCLUSION

transition issue priority model is developed for the purpose of hypothesis validation. In order to support the hypothetical theory, an empirical data analysis has been applied through two survey studies - a preliminary study and a detailed study.

In the preliminary study, data has been collected from 43 valid respondents who are multinational companies across Australia, and it has been analysed through two statistical analysis methods including crosstabulations and bivariate correlations. The results indicate that there are certain degrees of correlation between the types of multinational organisation structures and five GISM issues categories.

In the detailed study, the strategy of selecting survey audiences has been changed from merely multinational corporations (in the preliminary study) to including non-multinational companies. There are a total of 149 valid respondents consisting of 72 MNCs and 77 non-MNCs. The survey questionnaires were designed to obtain the perceptions of global transition issues from both MNC and non-MNC audiences. Collected data has been statically analysed through quantitative methods embracing descriptive statistics, basic frequencies, crosstabulations, comparing two means and factor analysis. The developed GISM issue priority model determines that the emphasis of each global transition issue class in association with an organisation’s globalisation process is reliant on the type of MNC organisational structure. The results also show that there are differences between MNCs and non-MNCs in association with the level of significance of GISM issues.

8.1.5 Development of a Global IT Transition Framework

Global transition is not a simple and straightforward project. It contains a high level of complexity and requires detailed planning. To succeed in the global transition through the utilisation of information technology, organisations need to follow a well-defined transformation structure. The transformation structure, or global IT
8. CONCLUSION

transition framework embraces five main phases pertaining to the path of a company’s globalisation vision. These phases are outlined step-by-step to provide organisations with a systematic concept for globalisation, and they are identified as planning for global IT transition, investigating current business, identifying global transition requirements, enacting global transition processes, and verifying global transition achievement.

8.2 An In-depth Industry Case Study

In addition to verifying the proposed GISM issue priority model, which uses a quantitative research approach, an industry case study is included in this. A domestic manufacturing company is used to facilitate the application of the idea of a global IT transition framework in a real life situation. Since global IT transition requires structured planning and methodical implementation, it is ideally suited to incorporate a case study to analyse the appropriateness of the framework.

The company planned to expand its business operations across national boundaries and has committed to spending two years on the global transition process. According to the global IT transition framework, the company started by preparing a comprehensive global transformation plan. In developing the transition plan, a number of global-specific issues have been addressed to ensure the completeness of the strategy, which include executive consensus, investigation of foreign markets, allocation of personnel and resources management, global operation strategy, time and budget.

When the plan is in its readiness stage, it is followed by the investigation of current business status in terms of the company’s technology, knowledge and processes. Subsequently, the requirements for globalisation need to be identified before the enactment of the global transition process.
Finally, application of globalisation achievement metrics was demonstrated to measure the level of achievement in the company’s global transition process. The measured results indicate not merely the company’s achievement level in globalisation; they also specify the less emphasised aspects, which the company has to pay more attention to for future improvement.

8.3 Implications for Theory and Practice

After the review of the entire project, two main points are highlighted in relation to the implications for theory (research) and practice (management) domains. First, the proposed GISM issues model illustrates the convergence of the global business environment and the IT transition issues, which contributes a multi-discipline research approach in the globalisation literature. Researchers are recommended to utilise the outcome of this project as their literature background and conduct further development in the global transition field.

Secondly, the proposed global transition framework provides enterprises with a step-by-step globalisation process. The framework allows practitioners (senior managers or CEOs) to conduct their globalisation agenda through a systematic roadmap. It outlines overall activities and phases required in the global transition process and enables organisations to construct appropriate globalisation strategies that fit into their organisational structures and current globalisation status.

8.4 Future Directions

The concepts of global IT transition have been investigated here from the perspective of an enterprise globalisation vision. This has led naturally to many ideas, which could be further pursued, by this author, as well as other researchers who might be interested in these ideas and who embrace a similar research paradigm. Furthermore, as has
been mentioned in the introduction, the global business environment and information technology are continuously changing and evolving. Therefore, enterprises are likely to face many other global transition issues and applications of new technology. The following subsections suggest a number of future research topics that are emerging from this thesis - which include both strategic management perspectives as well as other collaborative research areas of interests.

8.4.1 Investigating Related Legal Issues in Global Management

Although this study has covered a comprehensive spectrum of global transition issues, it is noted that issues related to the legal perspective in the global business environment have not been identified. As global information systems are designed to accommodate the needs of business operations all around the globe, it is crucial to investigate the legal requirements of different nations/regions, and incorporate these legal factors into the structures of global information systems. A detailed study of each country’s legal systems in association with global business operations is suggested as the extension of this research.

8.4.2 Applying Mobile Technology in Global Business Operations

In today’s online environment, an increasing amount of organisations adopt the Internet as one of the operation channels for implementing business functions and conducting financial transaction activities. It is even perfectly suitable for multinational organisations to operate their dispersed business units through the Internet platform. As mobile technology is maturing, MNCs can utilise it to operate their global business activities with more flexibility and efficiency. Thus, organisations can conduct business at any time and in any place in order to meet the product demands, increase
8. CONCLUSION

customer satisfaction, and even reduce costs.
However, to maximise the competence of mobile technology, it is necessary to investigate a number of factors prior to applying mobile technology into the global business operations. These factors include ascertaining the appropriate business functions or activities for mobile operations, identifying new business processes as the result of implementing mobile technology, and indicating foreseeable issues and resolutions for adopting mobile technology in the global information architecture.

8.4.3 Transforming SMEs into Global Operations

As mentioned in the previous subsection, the Internet enables enterprises, regardless of size to extend their business operations beyond traditional limitations and geographical boundaries. Especially in SMEs, companies are able to trade with remote business partners through few appropriate settings based on the Internet platform. However, a well-designed e-commerce website does not mean the company has reached globalised operations. The true challenge for SMEs in global transformation consists of the management of global business activities and performance, and identifying issues and the associated resolutions for operating global business perpetually.

8.4.4 Developing Dynamic Global Strategies and Decisions Through Application of Artificial Intelligence

The rapid change of the global business environment presents difficulties to organisations in making critical decisions. In order to ensure the accuracy of the decisions, senior managers should consider not only referring to previous experiences, but also taking into account the dynamic changes of global conditions. These conditions refer to fixed and floating factors of global business operations in all aspects. By developing dynamic global strategies and decisions, organisations are capable of reacting to any
8. CONCLUSION

emergent situations, and providing instant and accurate decisions. The application of artificial intelligence (AI) can be seen as an appropriate vehicle to achieve this objective.

This proposed collaborative investigation would provide unprecedented challenge to both globalisation and AI research fields.
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Related Publications


Appendix A

Applications of asynchronous and synchronous groupware
### Asynchronous Groupware

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
</tr>
</thead>
</table>
| Email                            | - the most common groupware application  
- can be defined as “the transmission of text from one computer to another” (Wong, 1995)  
- today’s email application contains more features than just transmitting texts  
- interesting features include forwarding messages, filing messages, creating mailing groups, attaching files with a message, automatic sorting and processing of messages, automatic routing, and structured communication.  
- messages in the email could be in various presentations such as plain text, html format, images, sounds, and even video clips |
| Newsgroups and mailing lists      | - similar in spirit to email systems except that they are intended for messages among large groups of people instead of one to one communication  
- the main difference between newsgroups and mailing lists is that newsgroups only show messages to a user when they are explicitly requested, while mailing lists deliver messages as they become available |
| Workflow systems                 | - can be defined as “the automation and management of business processes” (Marshak, 1995)  
- allow documents to be routed through a relatively-fixed process in the organisation  
- provide features such as routing, development of forms, and support for differing roles and privileges |
| Group calendars                  | - allow scheduling, project management, and coordination among many people  
- provide support for scheduling equipment  
- typical features detect when schedules conflict or find meeting times that will work for everyone  
- group calendars help to locate people  
- typical concerns are privacy, completeness and accuracy |
| Collaborative writing systems     | - provide both real-time support and non-real-time support  
- word processors provide asynchronous support by showing authorship and by allowing users to track changes and make annotations to documents  
- authors collaborating on a document may be given tools to help plan and coordinate the authoring process, such as methods for locking parts of the document or linking separately-authored documents  
- synchronous support allows authors to see each other’s changes as they make them, and usually needs to provide an additional communication channel to the authors as they work |
## Synchronous Groupware

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared whiteboards</td>
<td>- allow two or more people to view and draw on a shared drawing surface even from different locations</td>
</tr>
<tr>
<td>Video communications systems</td>
<td>- allow two-way or multi-way calling with live video,</td>
</tr>
<tr>
<td></td>
<td>- mainly used in multiple location conference meetings</td>
</tr>
<tr>
<td>Decision support systems</td>
<td>- are designed to facilitate groups in decision-making</td>
</tr>
<tr>
<td></td>
<td>- provide tools for brainstorming, critiquing ideas, putting weights and probabilities on events and</td>
</tr>
<tr>
<td></td>
<td>alternatives, and voting</td>
</tr>
</tbody>
</table>
Appendix B

Preliminary survey
To be answered only by the multinational organisations by circling each item appropriately.

1. Please circle the number that best describes your organisation (circle one only).

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1 | - Organisation decentralised and nationally self-sufficient in assets, resources and capabilities  
- Overseas operations based on sensing and exploiting local opportunities  
- Knowledge developed and retained within each unit (subsidiary) |
| 2 | - Organisation’s sources of core competencies centralised, others decentralised  
- Overseas operations based on adapting and leveraging parent organisation’s competencies  
- Knowledge developed at the centre and transferred to overseas units (subsidiaries) |
| 3 | - Organisation centralised and globally scaled  
- Overseas operations based on implementing parent organisation’s strategies  
- Knowledge developed and retained at the centre |
| 4 | - Organisation dispersed, interdependent and specialised  
- Overseas operations based on differentiated contributions by overseas units (subsidiaries) to integrated worldwide operation  
- Knowledge developed jointly and shared worldwide |
2. How would you rate the importance of the following factors for the organisation?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
<th>1 = Critical</th>
<th>2 = Significant</th>
<th>3 = Impartial</th>
<th>4 = Insignificant</th>
<th>5 = Unimportant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business IS Management</td>
<td>IS planning, IS business alignment, IS effectiveness, productivity measurements, business reengineering, utilisation of IS, competitive advantage, information quality, office automation, global information systems development and distribution, identification of global business opportunities, and systems reliability/availability/transferability.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End User Management</td>
<td>Managing end-user computing facilities, end-user computing education, learning of new global information systems, and help desk support.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>People Management</td>
<td>Recruiting, training and education, organisational learning, cross-cultural skills development, and employee assignments.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology Management</td>
<td>Telecommunication availability and management, networks infrastructure, security, systems equipment, data resources utilisation, system standards, applications availability, systems integration, and systems recovery.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture</td>
<td>Education levels, geographical and time zones, religious aspects, demographic perspective, individual significance and objectives, communication and leadership styles.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C

Detailed survey
University of Western Sydney
School of Computing and Information Technology
Locked Bag 1797, Penrith South DC, NSW 1797

Strategy for Global Transition

The Critical Factors

Thanks for taking part in this nation-wide survey of the organisation’s global transition in Information Systems Management areas. This questionnaire which is extremely well researched is sent to the Chief Executive Officers of selected organisations all over Australia.

Please take 5-10 minutes of your valuable time to complete the questionnaire and return it in the enclosed addressed envelope latest by 4 July 2002.

The results of this survey will be published end September 2002. A complimentary copy of the Executive Summary of the report will be available to you. You would find the results of this survey extremely valuable for your business.

Please note that this questionnaire is aimed at the CEO and executive management level, and is not suitable for IT (Information Technology) management.

If you have any questions regarding the survey, please do not hesitate to contact myself (phone: 9685-9283, or email: yichen@cit.uws.edu.au) or Ms. Nicolle Fowler (tel: 9685-9065 or email: n.fowler@uws.edu.au).

Once again thank you for taking part in this important project.
Please rate each item by circling 1, 2, 3, 4, 5 or N, using the following scale that corresponds to your company. Critical: 1 – Non-critical: 5; Not applicable: N

<table>
<thead>
<tr>
<th>Business Information Systems Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Strategic planning – Application of information systems for global business opportunities and competitive advantage; alignment of IS (information systems) and business objectives; clear understanding of information systems roles, contribution and justification of information systems investments.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>2. Reengineering and change – Business process reengineering enabled by IT; change management; quality of organisation management; business orientation of IT professionals.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>3. Managing IT quality – Reliability, availability and transferability of information systems; quality of inputs and outputs; software quality assurance standards.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>4. Productivity – Measurement and improvement of information system productivity and effectiveness; utilisation of data resources.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>5. Systems development and implementation – Construction, implementation, and management of the new global information systems; office automation.</td>
<td>1 2 3 4 5 N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>People Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Role of senior management – Quality of people management; education of senior management in IS and in cross cultural skills.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>7. Staff recruitment and training – Retaining, recruiting, and training IT personnel; availability of IT staff; expatriate employee assignments.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>8. Benefits and compensation – Differing compensations across nations; travel costs.</td>
<td>1 2 3 4 5 N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information Technology Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. IT infrastructure – Development, management, and support of computer hardware and operating systems.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>10. Business applications – Identification, construction, implementation, and management of software applications; IS integration across business functions.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>11. Telecommunications network – Management, planning, support, and availability of telecommunication infrastructure and technology.</td>
<td>1 2 3 4 5 N</td>
</tr>
<tr>
<td>12. Data and information systems improvement – Improvement of data, information and knowledge quality; security, control, and disaster recovery capabilities; integration of data processing.</td>
<td>1 2 3 4 5 N</td>
</tr>
</tbody>
</table>
End User Management

13 Organisation learning – Facilitation and management of organisational learning; staff absorption of the new information systems; end user computing.

14 Operation and support – Management of IT operations; help desk support.

Culture

15 Education – Level of education of people at regional or national level generally, and computer knowledge, specifically.

16 Demographics – Regional or national gender perspective; age distribution; religion.

17 Individual and interpersonal perspectives – Leadership style; values and goals of individuals and groups; interpersonal communications.

18 Geography and economy – Currency stability; time-zone difference.

Any Other Critical Factors

Please rank the following globalisation issue categories 1 (high) : 5 (low)

<table>
<thead>
<tr>
<th>Business Information Systems Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>People Management</td>
</tr>
<tr>
<td>Information Technology Management</td>
</tr>
<tr>
<td>End User Management</td>
</tr>
<tr>
<td>Culture</td>
</tr>
</tbody>
</table>

Your industry, or nature of the organisation

Total employees in the organisation

Finally, please circle the number that best describes your company.

1 - The company is decentralised and nationally self-sufficient in assets, resources and capabilities.
   - Overseas operations are based on seeking and exploiting local opportunities.
   - Knowledge is developed and retained within each business unit (subsidiary).

2 - The company’s sources of core competencies are centralised, other competencies are decentralised.
   - Overseas operations are based on adapting and leveraging parent company’s competencies.
   - Knowledge is developed at the centre and transferred to overseas business units (subsidiaries).

3 - The company is centralised and is globally scaled.
   - Overseas operations are based on implementing parent company’s strategies.
   - Knowledge is developed and retained at the centre.

4 - The company’s business units are dispersed, interdependent and specialised.
   - Overseas operations are based on differentiated contributions by overseas business units (subsidiaries) to integrated worldwide operations.
   - Knowledge is developed jointly and shared worldwide.
Appendix D

Independent samples $t$ test
Global Transition Issue Sub-Categories: Variances

<table>
<thead>
<tr>
<th>Organisational Type</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic planning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinational</td>
<td>71</td>
<td>4.27</td>
<td>0.77</td>
<td>9.18E-02</td>
</tr>
<tr>
<td>Non-Multinational</td>
<td>77</td>
<td>4.00</td>
<td>0.89</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Reengineering and change</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinational</td>
<td>72</td>
<td>4.01</td>
<td>0.9</td>
<td>0.11</td>
</tr>
<tr>
<td>Non-Multinational</td>
<td>77</td>
<td>3.88</td>
<td>0.86</td>
<td>9.78E-02</td>
</tr>
<tr>
<td><strong>Managing IT quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinational</td>
<td>72</td>
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<td>0.73</td>
<td>8.56E-02</td>
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<tr>
<td>Non-Multinational</td>
<td>77</td>
<td>4.10</td>
<td>0.93</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Productivity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinational</td>
<td>72</td>
<td>3.74</td>
<td>0.99</td>
<td>0.12</td>
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<tr>
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<td>77</td>
<td>3.73</td>
<td>0.84</td>
<td>9.54E-02</td>
</tr>
<tr>
<td><strong>Systems development and implementation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinational</td>
<td>72</td>
<td>3.89</td>
<td>0.9</td>
<td>0.11</td>
</tr>
<tr>
<td>Non-Multinational</td>
<td>77</td>
<td>3.69</td>
<td>0.97</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Role of senior management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>72</td>
<td>4.10</td>
<td>0.79</td>
<td>9.31E-02</td>
</tr>
<tr>
<td>Non-Multinational</td>
<td>77</td>
<td>3.95</td>
<td>1.06</td>
<td>0.12</td>
</tr>
<tr>
<td><strong>Staff recruitment and training</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinational</td>
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<td>3.58</td>
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<tr>
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<td>3.74</td>
<td>0.91</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Benefits and compensation</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
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<td>70</td>
<td>3.29</td>
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</tr>
<tr>
<td>Non-Multinational</td>
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<td>0.84</td>
<td>9.81E-02</td>
</tr>
<tr>
<td><strong>IT infrastructure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinational</td>
<td>72</td>
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<td>0.77</td>
<td>9.06E-02</td>
</tr>
<tr>
<td>Non-Multinational</td>
<td>77</td>
<td>4.13</td>
<td>0.86</td>
<td>9.84E-02</td>
</tr>
<tr>
<td><strong>Business applications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinational</td>
<td>72</td>
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<td>9.68E-02</td>
</tr>
<tr>
<td>Non-Multinational</td>
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<td>0.83</td>
<td>9.41E-02</td>
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<tr>
<td><strong>Telecommunications network</strong></td>
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<td></td>
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<td></td>
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<tr>
<td>Multinational</td>
<td>72</td>
<td>3.79</td>
<td>1.01</td>
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<td>Non-Multinational</td>
<td>77</td>
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<tr>
<td><strong>Data and information systems improvement</strong></td>
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<td></td>
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<td>0.1</td>
</tr>
<tr>
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<td>4.14</td>
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<td>0.86</td>
<td>9.78E-02</td>
</tr>
<tr>
<td><strong>Operation and support</strong></td>
<td></td>
<td></td>
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<td>3.63</td>
<td>0.81</td>
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<tr>
<td><strong>Education</strong></td>
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<td>3.74</td>
<td>0.77</td>
<td>9.06E-02</td>
</tr>
<tr>
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<td>0.76</td>
<td>8.65E-02</td>
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<tr>
<td><strong>Demographics</strong></td>
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<td>77</td>
<td>2.56</td>
<td>1.01</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Individual and interpersonal perspectives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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Appendix E

$t$ test for equality of means
## APPENDIX E

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