

An Empirical Evaluation of eBusiness Capability in the Chinese IT Sector

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1	ABSTRACT	3
2	INTRODUCTION.....	3
	2.1 Background	4
	2.2 The problem	5
	2.3 Objectives of the research	5
	2.4 Research method and process.....	6
	2.5 Related work.....	6
3	RESEARCH METHOD AND PROCESS.....	8
	3.1 The research method	8
	3.2 Why e-business applications via enterprise portals on the web?	9
	3.3 Why enterprises in the IT sector?	10
	3.4 Determination of benchmark companies.....	11
	3.5 Selection of the IT enterprises in Mainland China for the study	12
	3.6 Selection of the e-business applications to be evaluated.....	14
	3.7 Evaluation criteria, method and process	16
	3.8 The analysis method	21
4	EVALUATION AND ANALYSIS	23
	4.1 Interface design and website technology.....	23

4.1.1	Interface design	23
4.1.2	Website technology.....	26
4.1.3	Conclusions on interface design and website technology	28
4.2	Usage rates of various e-business applications.....	29
4.2.1	Presentations of the usage rates of e-business applications by international companies and domestic companies.....	30
4.2.2	Comparisons of the usage rates of e-business applications of international companies and overall domestic companies	34
4.2.3	Comparisons of the usage rates of e-business applications of international companies and three kinds of domestic companies based on their size	37
4.2.4	Comparisons of the usage rates of e-business applications of the domestic companies in three regions	42
4.2.5	Comparisons of the usage rates of e-business applications of the four types of domestic companies	44
4.3	Level of applications and their effectiveness of e-business applications on enterprise portals	46
4.3.1	Presentation of the evaluation results of e-business applications of international companies and domestic companies.....	47
4.3.2	Comparison of the effectiveness of e-business applications of international companies and overall domestic companies.....	54
4.3.3	Comparison of the effectiveness of e-business applications of international companies and three kinds of domestic companies based on their size	56
4.3.4	Comparisons of the effectiveness of e-business applications of the	

domestic companies in three regions	59
4.3.5 Comparison of the effectiveness of e-business applications of the four types of domestic companies	61
4.4 Concluding Remarks on the Comparative Analysis	64
5 CONCLUSIONS AND FUTURE WORK.....	69
REFERENCES.....	71
APPENDIX A List of chosen domestic companies	76
APPENDIX B Evaluation scores of e-business applications of each chosen company.....	81

1 Abstract

Business of all kinds is increasingly being conducted on-line, potentially dissolving the boundaries between local, national and global entities. Enterprise Information Portals are a vital tool for doing business over the internet. No matter how sophisticated a company's traditional business model is, its eBusiness capability is only as effective as its EIP presence. It is to be expected that companies of developed countries will perform better than companies in developing countries in this respect.

This report describes an evaluation of the current status of eBusiness portals of Mainland Chinese IT companies, compared with those of companies based in developed countries. A benchmark is established by analysing the EIPs of leading international companies and developing a method of evaluating eBusiness capability from an external, client viewpoint. The benchmark is then used to determine the degree of difference between Chinese companies on the basis of size, region, and business focus. This is the first systematic study on the effectiveness of e-business applications of Mainland Chinese companies. The method and process described in this work can be used to develop benchmarks and perform comparative evaluations of eBusiness capability for any business sector.

2 Introduction

On-line presence is essential in the new age of eBusiness. Static web pages describing traditional business services are no longer adequate for competing in a local market, let alone a national or global market. Enterprise Information Portals (EIP) are the shop fronts for eBusinesses. Depending on their capabilities, they have the potential to provide companies with a competitive advantage by providing access to all through a single gateway.

No matter how sophisticated are a company's internal technologies, systems and processes, on-line clients do business by interacting through its EIP. The EIP in effect represents the company's eBusiness model. The extent to which a portal offers the range of information and application services expected of a particular type of company, and the perceived effectiveness of those services, is a measure of its eBusiness capability.

This report presents our research on the current status of eBusiness applications used by IT companies in general and software companies in particular, of Mainland Chinese information technology industry.

The research method is described below:

1. We chose a group of international IT companies that are generally regarded as having an effective eBusiness presence against which to Benchmark the Chinese companies.
2. We formalized the set of e-business applications that are commonly implemented in corporate websites in a systematic manner. This framework can be revised to different industry sectors.
3. Chinese IT EIPs were classified according to size, region, and business focus.
4. We proposed a method and process to evaluate the effectiveness of e-business applications from a client viewpoint. This approach is an extension to and can be used in combination with methods to evaluate the effectiveness from a company's internal management viewpoint.

2.1 Background

Internet use and applications are becoming an essential part of running business throughout of the world. More and more businesses start to realize the potentials of the Internet. For example, the Internet user population has been rapidly increased to 100 millions in the middle of 2005 [CNNIC2005] from the mere 270,000 in early 1997. Businesses in all industry sectors can benefit from the Internet technology to provide better services and quick response, as well as extending or building up new market throughout the Internet. In recent years, the concept of "e-business" and related applications starts to be used by many companies. E-business applications have been regarded by many as the key to success in the Internet age [KR2001, SABGMM2003, EO2005, UNCTAD2004]. More noticeably, e-business technologies and applications are regarded as the key issues for medium and small enterprises (MSEs), especially for MSEs in developing countries [EO2005, UNCTAD2004, GS2002]

Gerstner of IBM describes the concept of electronic business (e-business) in [Gerstner1998]:

The Net, or the Web, in our view, is a world of transactions. We call it "e-business." And e-business encompasses all of what you think of as e-commerce -- that is, selling and buying over a network. But it encompasses a lot more than that. It encompasses the transactions or the connectivity and relationships between employers and employees; and employees and other employees and colleagues inside an institution. It involves the transactions and connections across a supply chain, between suppliers and distributors and consumers. And very importantly, e-business encompasses the relationships between individuals and institutions: between healthcare providers, for example, and patients; between governments and citizens; and between learning institutions, schools and universities, and students.

We can see from the above description that any business activities over the network facilities or by using the facilities are regarded as e-business activities. We also note

that any applications using the network or based on the network technology, either the Internet, intranet, or extranet, is regarded as an e-business application. Therefore in this report, we use the term "e-business application" to mean a specific application to help in business operations.

In this work, we focus our attention on e-business applications usually implemented on the Internet or having an interface on the Internet. More specifically, such e-business applications are used through enterprise portals (EIPs). Shilake and Tylman of Merrill Lynch proposed the concept of Enterprise Information Portal (EIP) [ST1998]:

Enterprise Information Portals are applications that enable companies to unlock internally and externally stored information, and provide users a single gateway to personalized information needed to make informed business decisions.

EIPs are often called corporate portals or simply corporate websites. We use "EIP" "enterprise portals", "corporate portals" and "corporate websites" interchangeably.

As new technologies spread, developed countries typically are more advanced, and thus their industries are more competitive, deepening the divide between companies in developed countries and companies of developing countries. [UNCTAD2004, GS2002]. The divide is of particular concern when developing countries are competing in a global market. Developing an effective e-business presence is therefore an important issue for all developing countries. Mainland China is particularly keen to see its enterprises become e-business competitive in order to meet the requirements of its rapid economic development. Although there have been many reports and research project on applications of the Internet technology, there is no specific research on the overall level of e-business applications in general and the effectiveness of e-business applications in particular.

The goal of this research is to study the current status of e-business applications used by a representative industry sector of Mainland China.

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2.2 The problem

The work described in this report focused on the following problems:

- What is the current status of e-business applications via enterprise portals on the web of Mainland Chinese companies in IT sector, compared with those from developed countries?
- What are the differences?
- What are the future goals for Mainland Chinese companies in the IT sector to further develop their e-business applications?

2.3 Objectives of the research

In order to solve the problems the objectives of the work were to:

- Identify the current e-business applications used by successful IT companies (reference companies) that represent the state of the art of e-business applications in developed countries.
- Develop a set of eBusiness evaluation factors and use them to evaluate the reference companies' EIPs.
- Evaluate Mainland Chinese companies using the same evaluation factors.
- Determine the differences of e-business applications between the benchmark companies and Mainland Chinese companies.
- Further analyze the differences between Mainland Chinese IT companies based on their regions, business types, size.
- Based on the above results, analyze the possible reasons behind the differences.

Overall, this is a comparative study on the current status of Chinese IT companies applying e-business in their operations. Such a study focuses more on the comparison in order to find out where the differences lie and the possible reasons of such differences.

2.4 Research method and process

We used a three-phase approach:

- The first phase was to determine a set of representative international IT companies. We used the set of companies as benchmark to determine the commonly used e-business applications. We also developed a set of effectiveness evaluation criteria based on the benchmark companies.
- The second phase was to select a group of Mainland Chinese software companies sufficiently representative of the overall Mainland Chinese software industry.
- The third phase was to evaluate the effectiveness of e-business applications of the chosen domestic companies. Based on the evaluation, we analysed the evaluation results by comparing the effectiveness of various groups of companies.

2.5 Related work

The following sources establish a context for this work:

Definition of eBusiness, EIP: What are e-business and enterprise information portals, e.g. [MA2000, KR2001, SABGMM2003, ST1998, Gertner1998, Clarke2001, CMUPDCCRS2003]. Based on existing work, it is clear that e-business is all the activity related to a business operation and by using the Internet technology. Information portal, or corporate website or portal, is an appropriate system to integrate e-business applications especially on the web. Enterprise information portal is an architectural framework to implement e-business applications.

Developed vs developing countries: E-business applications around the world and digital divide between developed countries and developing countries, e.g. [UNCTAD2004, GS2002, GKN2005, OCED2004, OCED2004a]. The main point is that there is a rapid development of the Internet development and applications but developed countries are well ahead of developing countries in adopting e-business applications.

E-business applications and SMEs, e.g. [EO2005, UNCTAD2004, OCED2004, OCED2004a, YSL2003]. E-business applications are regarded as a good opportunity for

SMEs to enhance their competitiveness in the global economy. The problems with SMEs adopting e-business applications are mainly the confidence and the availability of sufficient and appropriate strategies.

eBusiness best practice and challenges of e-business, e.g. [KR2001, Moore2001, LW2005, EO2005, GS2002, OCED2004, CS2003, YFA2003, FNC2003, Evans2001, VD2003, PSF2002].

Current status of the Internet use and e-business applications in Mainland China, e.g. [CNNIC2004, CNNIC2004a, CNNIC2004b, CNNIC2005, CNNIC2005a]. The current Internet population of Mainland China is just over 100 million. There are over 660, 000 corporate websites in Mainland China. Many of them are still merely simple company introductions and e-business applications technology is still in an early stage of development in Mainland China. With such a big population of Internet users, there is an urgent need to have systematic studies on e-business adoption, strategies in e-business applications, effectiveness evaluation of e-business applications, etc.

Evaluation of various aspects of e-business, such as the adoption of e-business applications and the effectiveness of e-business applications, e.g. [Bolin1998, LW2005, BKWY2001, EO2005, GS2002, GKN2005, YSL2003, VD2003, SCHPS2000, OP2003, PER2003]. Most of the studies propose models for evaluations and/or evaluate aspects related to e-business. Among them, the most relevant study related to our work is [PER2003].

In [PER2003], a conceptual model for measuring effectiveness of e-business systems is proposed. The model is based on a combination of user satisfaction and service quality, initially from the information system evaluation domain. Our research method is consistent with the model proposed in [PER2003] in several ways:

- We evaluate the effectiveness of e-business applications via enterprise portals on the web by evaluating the services available in the portal and the level of services provided.
- The level of services provided is defined based on a benchmark of successful e-business applications. Therefore the level of effectiveness in our research is along the same lines of user satisfaction in the sense that we regard those successful e-business applications as having a good level of user satisfaction.
- The scaling mark system we developed in order to evaluate the actual effectiveness of an e-business application or application aspect is consistent with service quality. For example, we use a 0 to 5 marking system to mark the evaluation or the perception of using the application. The mark 3 indicates the perception is the same as expectation. The mark 0 indicates the absence of the e-business application. If the mark is below 3, it means that the expectation is higher than perception. If the mark is higher than 3, it means that the perception is higher than expectation. Because of the difficulty of having users directly mark the perception, we use a panel of experts in addition to a benchmark to check that our result is consistent and valid.

Note that the model proposed in [PER2003] has not been applied. To our knowledge this work is the first comparative evaluation of eBusiness effectiveness applied to mainland Chinese companies

In Section 2, we focus on the research method and process. We discuss how to achieve the objectives of the research by an appropriate method. We discuss in more detail a number of key issues in research design and determining the research method and process. In this section, we also discuss in details of determining the e-business applications, evaluation criteria and the benchmark companies. Finally, we discuss how we chose the set of domestic companies for our research.

Section 3 describes in detail how we applied the research method and process to carry out the evaluation and analysis. Finally we conclude our research in section 4 and discuss future work of the research.

3 Research method and process

3.1 The research method

In order to achieve the objectives of the study, we use a three-phase approach.

Phase 1: The first phase was to determine a set of representative international IT companies. We firstly studied the types and factors of e-business applications used by those international companies. Then we evaluated the level of each application type or factor of each company.

Ideally, it would have been better for the evaluation process to be carried out by a group of experts in the field, for example five e-business application experts or consultants. The final evaluation of each type or factor was derived by removing the highest and lowest evaluation marks and calculating the mean value of the remaining evaluation values. However, due to the limitation time and resources of this project, we chose a simplified approach.

- Once we decided the items in the set of e-business applications and the evaluation criteria, we invited a group of experts and consultants to discuss the issues. The e-business application items and evaluation criteria were then revised according to the comments made in the meeting. The group of experts and consultants consisted of four people, one being an expert in e-business applications for more than six years and the other three being consultants for at least two years.
- After we completed the evaluation criteria by applying the above method to the selected international companies, the expert group met again to discuss the actual evaluation results. The meeting helped us to stabilize the evaluation method and criteria.
- The evaluation of domestic companies was carried out without further discussion with the expert panel

The most important results of this phase were:

- A set of representative international IT companies, to be used as benchmark companies against Mainland Chinese IT companies in the rest of the study.
- A set of e-business application types and factors typically used by those benchmark companies. The rest of the study on the Chinese IT companies will be based on those types and factors.
- The actual evaluation results for the reference companies, that were used to benchmark the Chinese IT companies.

The second phase was to select a set of Mainland Chinese IT companies to represent the overall Mainland Chinese IT industry. In the process of the selection, we also grouped the Chinese IT companies based on their region, type of business, and size.

The third phase of the study was to apply the evaluation method to the selected Chinese IT companies against the types and factors of e-business applications derived from the first phase. Based on the evaluation, we carried out a number of analyses in order to gain a better understanding of the differences between successful IT companies and IT companies in Mainland China.

We now proceed to discuss in more detail a number of key issues in developing and using the research method. Those issues are:

1. Why do we carry out our study on the e-business applications via enterprise portals on the web?
2. Why do we choose IT industry for our study?
3. Considerations in determining the benchmark companies.
4. Considerations in selecting Mainland Chinese IT companies for the study.
5. Considerations in selecting types and factors of e-business applications.
6. Considerations in determining the evaluation method and process.
7. Considerations in determining the analysis method.

3.2 Why e-business applications via enterprise portals on the web?

We are studying the overall Chinese IT industry's e-business applications. This requires that we need determine a common application scope applicable to both small, medium and large IT companies. E-business applications via enterprise portals on the web are the only e-business aspect satisfying the requirement. Although e-business applications are far more than those can be implemented on the enterprise portals on the web, such applications typically are the most essential starting point for all implementing e-business applications. Most importantly, such applications are normally the only ones usable or capable by those small IT companies.

On the other hand, due to the current stage of development of e-business applications in developing countries, and particularly Mainland China, e-business applications via enterprise portals are the most advanced applications compared with other e-business applications. There is no independent study on those particular applications in Mainland Chinese companies, including IT companies. This makes another motivation of the study.

Another motivation for the study is the question of how to carry out the evaluation and hence the analysis in a more systematic way. Many similar studies used survey and interview approach to collect data on the actual application and effect of those applications [refs]. We believe such approaches are not very applicable to companies in Mainland China, especially with respect to the kind of study employed in this research. There are several reasons. The first reason is differing understandings of the types and factors of eBusiness applications. Currently there is no common standard to clearly state the exact meaning of the types and factors. Therefore people in different companies would have quite different understandings and the evaluation results would

not be consistent. Secondly, with the evaluation standard, different people would also have different understandings so that the evaluation results would not be consistent. Thirdly, people in Mainland Chinese companies are not very willing to carry out such surveys and interviews. There are very few industry exhibitions where such a survey and interview would best be carried out. If we used email and other postal approach, we would not be sure to have sufficient responses in order to make the evaluation and analysis representative and sound.

Study on e-business application via enterprise portals on the web is essential and a starting point for such a study in Mainland China in the first place. The study is carried out through investigating their websites from a client perspective. This will remove the most difficult aspects in order to carry out the study objectively and accurately. On evaluation process, we use a panel of e-business application experts and consultants. The panel met a number of times to discuss the types and factors and the evaluation standards. This enabled the evaluation to be more accurate and consistent. Most importantly, we were able to inform the study with a set of consistent and sound data.

3.3 Why enterprises in the IT sector?

Mainland China is still developing its information technology and related applications. Although Mainland China now has over 100 million Internet users [CNNIC2005], the development of e-business is still in its early stage [CNNIC2004, UNCTAD2004].

According to a CNNIC (China Internet Network Information Centre) report on email and e-commerce [CNNIC2004], many Chinese companies are starting to use basic Internet technology and applications such as email but still very few are using more advanced applications such as e-commerce.

As the research reported in this thesis is on the e-business applications of Mainland Chinese companies, we need to select an industry sector that satisfies the following requirements, in order to have sound and consistent data:

- The industry should have a relatively wide use of e-business applications.
- The industry should have a large set of companies in various sizes.
- The industry should have wide locations in different regions in Mainland China.
- The researchers of this project should have a good understanding of the industry, due to the nature of the research being a thesis project.
- The industry should be of representative among all industries. This is important as the method and process developed in research could be used in more industry sectors with small modifications, provided the industry sector we choose in the research is representative.

The Information technology (IT) industry satisfies all the requirements listed above. Most importantly, the IT industry in Mainland China has been under rapid development in the past decade. Companies providing software development and related services are the major force in this growth. The number of IT, especially software, companies is large - there are more than 15,000 software or related companies in Mainland China [MPRC2005].

In this research, we will use "IT company" and "software company" interchangeably, for the following reasons:

- According to central government policy, most IT companies in Mainland China could be regarded as software companies.
- Very few IT companies do not belong to the software company category. For the purpose of this research, we chose software related companies. This made the comparative study more concentrated, and the data analysis more consistent.

Another reason for choosing the software industry is that the sector has the highest rate of web presence [CNNIC2005, CNNIC2004a].

In fact the software sector has the highest level of e-business applications. This is because companies in the sector have more resources and more understanding of e-business, compared with other more traditional industry sectors. This makes this research more easily to be carried out without concerning data resources.

3.4 Determination of benchmark companies

As far as we know, there is no previous study directly on the e-business applications via enterprise portals on the web. Previous studies usually concentrated on the understanding of e-business application by business managers or enterprises, or on the facilities and infrastructure support, or on the aspect of return of investment (ROI) of e-business applications [UNCTAD2004, GKN2005, OCED2004].

We selected a set of benchmark companies in order to carry out the comparative study for the following reasons:

- We used the benchmark companies to determine the e-business applications commonly being used by successful companies.
- We used the benchmark companies to establish criteria to evaluate the effectiveness of e-business applications. Therefore we can reuse the criteria to evaluate other companies with a view that the evaluation results can be interpreted in a comparative way so that the evaluation data are consistent and sound.
- The set of benchmark companies should be commonly regarded as leading and successful companies in the software industry.
- They should operate in Mainland China. The evaluation of those companies should be based on their Mainland China's operations.

We choose a set of international IT companies, most of them software companies, with significant operations in Mainland China.

Another option would have been to choose a set of leading domestic software companies. We do not take the option for a number of reasons:

- Most domestic large and leading software companies are still not well established compared with those in developed countries. This is mainly because that Mainland China does not have well established software industry yet.
- Mainland Chinese companies are still in the stage to understand the best practice of e-business applications. This would be making the benchmark not representative and accurate.

- There is no commonly accepted understanding on who are the leading domestic software companies, although they are official release of top domestic software companies. The criteria using in such release are mainly in terms of size or revenue.
- Since most international leading software or IT companies already have operations in Mainland China, we are able to select a set of 10 international companies for the benchmark set. Most of them have their major business in software products, development, integration, or services.

Table 2.4 International IT companies with a base and business in Mainland China

	Location	Name	Website address	Note
1	Beijing	IBM China	http://www.ibm.com/cn/	System software, Application Supporting software
2	Beijing	Microsoft China	http://www.microsoft.com/china/	System software, office software
3	Beijing	BEA China	http://www.bea.com.cn/index.jsp	Middleware software
4	Beijing	ORACLE China	http://www.oracle.com/global/cn/index.html	System software, application software
5	Beijing	HP China	http://welcome.hp.com/country/cn/zh/welcome.html	System integration, system software
6	Beijing	Autodesk China	http://www.autodesk.com.cn/	Application software
7	Beijing	CA China	http://ca.com.cn/	Application software, application integration
8	Beijing	SAP China	http://www.sapchina.com/	Application software, application integration
9	Beijing	Symantec China	http://www.symantec.com/region/cn/	Application software
10	Beijing	Sybase China	http://www.sybase.com.cn/	System software, application supporting software

3.5 Selection of the IT enterprises in Mainland China for the study

As the primary objective of this study was to evaluate the status of e-business applications by Mainland Chinese IT companies, we needed to select a set of companies sufficiently representative of the overall Mainland Chinese IT companies in term of size, region and business.

Most Mainland Chinese software companies are medium and small according to international standards. However, we still divide the companies into three groups: large and public companies, medium but regional leading companies, medium and small companies.

Although medium and small companies make up of more than 80% of overall Mainland Chinese companies, those in the other 20% would be more representative for the

Mainland Chinese software industry. Therefore we decided to have slightly more companies in large and regional groups. The selection criteria are as follows:

- Large and public companies: 10. The criteria were either they are public companies, or close to be public companies. Normally such a company has over 500 staff.
- Medium but regional leading companies: 30. Medium companies are those with at least 100 staff. As Mainland China has many provinces and cities, we selected for each province one or two leading companies if they are medium companies. Those companies play a very important role in the regional software industry.
- Medium and small companies: 50. Among the remaining software companies, we chose those with proper operations. We also tried to select the best examples from each region.

Based on the above selection criteria, we added further criteria on the number of companies of different regions. We do not use the administration regions to determine the companies. Instead we divide Mainland China into three regions according to the state of development of the software industry:

- Central cities of software industry (33). Four cities are regarded as centres of the software industry. They are Beijing(12), Shanghai(10), Shenzhen(6) and Guangzhou(5). Although many other cities such as Hangzhou, Dalian, Xi'an and Chengdu claim to have a large software industry, they are not comparable to the above four cities in terms of revenue and scope. We also choose Beijing as the representative city for the group.
- Eastern region with developed economy (31). The region has a more advanced economy to support a rapid and healthy software industry. This includes Hangzhou(10), Shenyang(1), Dalian(5), Nanjing(5), Jinan(2), Fuzhou(2), Xiamen(2), Zhuhai(2), Suzhou(2). Hangzhou is chosen as the representative city of this group.
- Central and western region with under developed economy (26). Although some of the cities of the region have a relatively large software industry, the size and scope of software industry is restrained by the slow and low level development of the economy. The cities are Xi'an(10), Chengdu(5), Chongqing(5), Zhengzhou(1), Changsha(2), Kunming(1), Lanzhou(2). Xi'an is chosen as the representative city of the region.

We also established criteria to divide the chosen 90 domestic companies into four groups according to their main business:

- Type A: General purpose software development and services 4; General purpose software includes system software, application support software, office software, middleware software, etc. The representative companies are IBM, Microsoft, Oracle, etc.
- Type B: Application software development and services 35; Type B means application software and application integration oriented companies. CA, Autodesk, etc. are the representative companies.
- Type C: Domain-specific application development and services 46; This type means those industry specific application software development and services, for example, Shanghai Baosight Software which is oriented to the EIP system of the iron and steel industry.
- Type D: Systems, communication system development, related software development and services 5. Type D means system integration oriented companies. HP, Cisco, etc. are the representative companies.

It is worth mentioning that, due to the actual status of IT industry development, we had some difficulty in selecting more companies to be evaluated in types A and D. In our set of companies selected for evaluation and analysis, there are only 4 companies in type A and 5 companies in type D. Most companies in our selection are of type B or C. The main reason for not having many companies in type A is due to the reality of the Mainland Chinese software industry, where general purpose software companies cannot survive easily. The main reason for not having many companies in type D is that many such companies do not tend to care about their presence on the web, as their main business approach is to build internal relationships. Another reason for not having many selected companies in types A and D is due to the constraints and priority used in our selection process. In our selection process, we first need to fulfill the requirement for the required number of large, regional leading, medium and small companies. The second priority is to have the required number of companies located in central cities of software industry, eastern region, central and west region. The last priority is the types of selected companies' main business, i.e. the company type. Because the first two constraints we cannot put in more companies in types A and D and still satisfy the first two priorities. This weakness of our selection set of companies can be improved by more detailed studies of Mainland Chinese software companies in order to expand the size of selected set of companies. We leave this to future work.

The sources of the list of candidate companies are as follows:

- The Ministry of Information Industry "Top 100 Software Companies of P.R. China of 2004" [MPRC2005].
- The Ministry of Information Industry "Top 30 Independent Software Companies of P.R. China of 2004" [MPRCa2005].
- The lists of software companies of Software Associations of provinces and cities.

The complete list of chosen domestic companies can be found in Appendix B.

3.6 Selection of the e-business applications to be evaluated

The e-business applications to be evaluated against chosen companies are restricted to those applicable to enterprise portals on the web. Those portals on the web are often called corporate website, or simply website. Therefore applications normally used within a corporate intranet are not within the scope of this research.

The e-business applications were primarily chosen and determined from those that are currently being used in the web portals of the benchmark international companies.

Bear in mind that most Mainland Chinese software companies are still regarded as medium and small enterprises according to international standards. We eliminated e-business applications not applicable to medium and small companies, such as advanced CRM (Customer Relation Management) systems. The selected set of e-business applications are those most commonly used and applicable to all software companies.

Many applications are very primitive but essential. For example, information about the organization and related information can normally be provided simply by a few static web pages. But the information is essential and can be provided more effectively. For example, the organization information could be sufficiently rich to give potential customers and partners more confidence in doing business with the company. The

information could be updated whenever there is a change. The information could be personalized so that different people would see the information most relevant to them. In addition, the organization's introduction could employ many approaches such as showing the performance of the organization, the good reputation of the organization, etc.

Many e-business applications are for the purpose of providing better and quick services to customers and partners. Such applications usually require them to be interactive and responsive.

The table below lists the set of e-business applications selected for evaluation to the selected companies.

Table 3.6. E-business Applications via enterprise portals on the web

About the organization	• Organization Introduction
	• Organization culture
	• News
	• Contact Information
Products, Services and solutions	• Product catalog and description
	• Services and solutions
	• Technical white paper and archives
	• Demos and online product demos
	• Trials and betas
	• Resource and interaction for Developers
Customer service and technical support	• Introduction of the services and supports
	• Online consultation
	• Online technical communication and support
	• Downloads of drivers, upgrade, patches
	• Knowledge and information archives
	• Frequently asked questions
Online selling	• B2C
	• B2B
Marketing	• Marketing news
	• Sales network
	• Promotion and specials
Human resources	• Online recruitment
	• Employment policies and organization culture
Partners and collaborations	• Catalog and introduction of partners
	• How to be a partner
	• Online application for being a partner
	• Online technical support for partners
	• Business and product information for partners
	• Accessing marketing and sales information for partners
Online education and training	• Introduction of training courses
	• Online training
	• Online application for training courses
	• Download of training materials
	• Online survey
	• Personalized support
	• Newsletter
	• Access to internal system for staff

3.7 Evaluation criteria, method and process

Our evaluation approach consists of three related evaluations:

- The overall evaluation of an enterprise portal on the web from an e-business perspective. In other words, we evaluate a corporate web portal on its usability, stability, speed, and freedom from errors. This is an overall evaluation but very important as a corporate portal for e-business is more like a business shopfront of the company.
- For each e-business application to be evaluated, we need to know whether or not the company uses the application. Based on the information, we can then calculate the usage rate of a specific e-business application among a group of companies, for example domestic large companies. The usage rate is useful to see the overall status of a sector of the industry in applying e-business applications.
- The most important evaluation is of the effectiveness of a specific e-business application by a specific company. There are many ways to measure the effectiveness. In this work we evaluate the effectiveness of e-business applications from the actual use of the implementation, taking the customers' viewpoint. Furthermore, we use a set of marking criteria determined by e-business experts and consultants in the area.
- The evaluation method is based on a 0 to 5 ranking scheme. The mark 5 means the application is implemented to the best possible way to achieve its objective. The mark 0 means the application is not implemented at all. The mark 3 means the application is acceptable or average. For the purposes of this study, it is assumed that the scale is ****ordinal** - there is an equal distance between each rank.

To evaluate the overall effectiveness of a corporate website respect to e-business applications, we chose the two most significant aspects instead of evaluating many possible dimensions. The two aspects are the most essential ones: interface design and website technology. The evaluation on each aspect is on the overall effect. We do not further divide, for example, interface design into more detailed items.

The following two tables list the overall effectiveness marking criteria and the marking criteria for each e-business application.

Table 3.7. Overall effectiveness marking criteria

● Interface design	5: Effective interface, good channel/column setting, good usability 4: Effective interface, acceptable channel/column setting, acceptable usability 3: Average 2: Below average interface design 1: Poor interface design
● Website technology	5: Fast access speed, no error links, use of multiple web technologies 4: Acceptable speed, no error links, use of at least two web technologies in the website 3: Average speed and use of technology 2: Slow, mostly static web pages 1: Slow and many errors

Table 3.8. Marking criteria for each e-business applications

<ul style="list-style-type: none"> Organization Introduction 	<p>5: Detail and effective information to the target readers 4: Detail information 3: Average information 2: Brief introduction 1: Poor content quality 0: No introduction</p>
<ul style="list-style-type: none"> Organization culture 	<p>5: Detail and effective information 4: Detail information 3: Acceptable information 2: Brief information 1: Poor content quality 0: No information</p>
<ul style="list-style-type: none"> News 	<p>5: Frequently updated news, use of Newsletters and mailing list tools, good news content and coverage 4: Updated news, relatively good content and coverage 3: Acceptable updates, content, and coverage 2: Rarely updated news, brief content 1: Poor content quality 0: No such option</p>
<ul style="list-style-type: none"> Contact Information 	<p>5: Detail and effective 4: Sufficient 3: Acceptable 2: Brief 1: Poor 0: No such option</p>
<ul style="list-style-type: none"> Product catalog and description 	<p>5: Effective catalog structure, detail and effective product information, providing related information and links, use of search engines 4: Good catalog structure and sufficient product information 3: Acceptable catalog and product information 2: Low quality of catalog and product information 1: Poor quality of catalog and product information 0: No such information</p>
<ul style="list-style-type: none"> Services and solutions 	<p>5: Effective catalog structure, detail and effective product information, providing related information and links, use of search engines 4: Good catalog structure and sufficient product information 3: Acceptable catalog and product information 2: Low quality of catalog and product information 1: Poor quality of catalog and product information 0: No such information</p>
<ul style="list-style-type: none"> Technical white paper and archives 	<p>5: Providing most product information, sufficient and easy to locate 4: Providing information of major products 3: Providing information of part of the products 2: Providing only little information 1: Information unusable 0: No information available</p>
<ul style="list-style-type: none"> Demos and online product demos 	<p>5: Providing most product information, sufficient and easy to locate 4: Providing information of major products 3: Providing information of part of the products 2: Providing only little information 1: Information unusable 0: No information available</p>
<ul style="list-style-type: none"> Trials and betas 	<p>5: Providing most product information, sufficient and easy to locate 4: Providing information of major products 3: Providing information of part of the products 2: Providing only little information 1: Information unusable 0: No information available</p>

<ul style="list-style-type: none"> Resource and interaction for Developers 	<p>5: Providing rich technical information, using various online communication methods such as BBS and BLOG, using technologies such as newsletters and RSS to collect related technical information, frequently updated</p> <p>4: Rich information, using at least one online communication method</p> <p>3: Rich information</p> <p>2: Some information</p> <p>1: Poor information</p> <p>0: No information</p>
<ul style="list-style-type: none"> Introduction of the services and supports 	<p>5: Detail and sufficient introduction of all services and supports</p> <p>4: Detail introduction of services and supports</p> <p>3: Acceptable introduction</p> <p>2: Brief introduction</p> <p>1: Poor introduction</p> <p>0: No introduction</p>
<ul style="list-style-type: none"> Online consultation 	<p>5: Quick and effective responding</p> <p>4: Fast and effective responding</p> <p>3: Acceptable speed and effectiveness of responding</p> <p>2: Slow and sometime no responding</p> <p>1: Not working</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Online technical communication and support 	<p>5: Interaction by using BBS or similar technologies, appropriate settings and arrangement, appointed people to reply to questions, quick and effective responding</p> <p>4: Interaction by using BBS or similar technologies, relatively quick and effective responding</p> <p>3: Interaction by using BBS or similar technologies, Acceptable speed and effectiveness of responding</p> <p>2: None appointed to be responsible for the management and support</p> <p>1: Not working function/channel/column</p> <p>0: No such function/channel/column</p>
<ul style="list-style-type: none"> Downloads of drivers, upgrade, patches 	<p>5: Detail and sufficient download items, effective and appropriate catalog, easy to locate</p> <p>4: Detail download items, relatively effective and appropriate catalog</p> <p>3: Some downloads, acceptable catalog</p> <p>2: Few items for downloads, poor catalog</p> <p>1: Few items, cannot work properly</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Knowledge and information archives 	<p>5: Detail and sufficient archives, good catalog, easy to locate, search engine</p> <p>4: Rich archives, relatively good catalog, easy to locate</p> <p>3: Acceptable amount archives, acceptable catalog</p> <p>2: Small amount archives</p> <p>1: Poor archives and function</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Frequently asked questions 	<p>5: Detail and sufficient archives, good catalog, easy to locate, search engine</p> <p>4: Rich archives, relatively good catalog, easy to locate</p> <p>3: Acceptable amount archives, acceptable catalog</p> <p>2: Small amount archives</p> <p>1: Poor archives and function</p> <p>0: No such option</p>
<ul style="list-style-type: none"> B2C 	<p>5: Support of complete process of online selling, personalization, good usability, sufficient related support to all steps of the process, all products of rich number of products</p> <p>4: Support of complete process of online selling, good usability, most products or many products</p> <p>3: Support of complete process, small number of products</p> <p>2: Only support online expression of interest but not selling</p> <p>1: Not workable</p> <p>0: No such option</p>
<ul style="list-style-type: none"> B2B 	<p>5: Support of complete process of online selling, personalization, good usability, sufficient related support to all steps of the process, all products of</p>

	<p>rich number of products</p> <p>4: Support of complete process of online selling, good usability, most products or many products</p> <p>3: Support of complete process, small number of products</p> <p>2: Only support online expression of interest but not selling</p> <p>1: Not workable</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Marketing news 	<p>5: Rich and effective news, frequently updated</p> <p>4: Good amount and relatively effective news, updated regularly</p> <p>3: Acceptable news and some updates</p> <p>2: Some news with updates</p> <p>1: Poor quality</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Sales network 	<p>5: Detail and sufficient information</p> <p>4: Detail to certain degree information</p> <p>3: Information can be of some use</p> <p>2: Only small amount of information</p> <p>1: Poor quality and quantity of information</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Promotion and specials 	<p>5: Complete, frequently updated, appropriately organized</p> <p>4: Detail information, regularly updated, organized</p> <p>3: Acceptable amount of information, updates, and organized</p> <p>2: Small amount of information</p> <p>1: Poor quality of information</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Online recruitment 	<p>5: Detail and sufficient information, Online Resume Submission, Frequently Updated</p> <p>4: Sufficient information, regularly updated</p> <p>3: Brief information, regularly updated</p> <p>2: Sometime updated</p> <p>1: Small amount of information</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Employment policies and organization culture 	<p>5: Detail and sufficient description</p> <p>4: Sufficient description</p> <p>3: Some description</p> <p>2: Very brief description</p> <p>1: Small amount information</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Catalog and introduction of partners 	<p>5: Detail catalog and description, search facility</p> <p>4: Relatively detail information</p> <p>3: Some information</p> <p>2: Very brief information</p> <p>1: Only partial information</p> <p>0: No such option</p>
<ul style="list-style-type: none"> How to be a partner 	<p>5: Detail</p> <p>4: Sufficient</p> <p>3: Some information</p> <p>2: Very brief information</p> <p>1: Poor information</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Online application for being a partner 	<p>5: Introduction of workflows, help information, effective and detail design of application forms, prompt reply</p> <p>4: Sufficient help information, proper design of application forms, reply to questions</p> <p>3: Some help information, usable application forms, reply to question sometimes</p> <p>2: Not easy to use</p> <p>1: Option not working</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Online technical 	<p>5: Detail and sufficient archive for downloading, prompt and effective online</p>

support for partners	<p>technical support and communication</p> <p>4: Sufficient archive, effective technical support and communication</p> <p>3: Some archive to download, some support and communication</p> <p>2: Small amount of information or none to download, poor support and communication</p> <p>1: Option not working properly</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Business and product information for partners 	<p>5: Detail and complete information, updating timely, search facility, easy to find information</p> <p>4: Sufficient information, regularly updated, workable search facility</p> <p>3: Useful but not complete information, update sometimes</p> <p>2: Poor information either in amount or quality, rarely updated, not easy to locate information</p> <p>1: Poor or unusable information, no update</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Accessing marketing and sales information for partners 	<p>5: Powerful system with sufficient function to accessing information, rich information and statistics</p> <p>4: Usable system for accessing information, sufficient information and statistics</p> <p>3: Workable system for accessing information, useful information and statistics</p> <p>2: Simple accessing facility, brief information and statistics</p> <p>1: Option not working properly or information not useful</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Introduction of training courses 	<p>5: Detail and sufficient description of training courses, search facility</p> <p>4: Sufficient information on training courses, search facility</p> <p>3: Acceptable description of training courses</p> <p>2: Very brief description</p> <p>1: Poor information</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Online training 	<p>5: User-friendly visual interface, effective technical implementation, many training courses, frequently updated</p> <p>4: User friendly interface, sufficient amount of training materials, regularly updated</p> <p>3: Usable interface, some training materials, updated</p> <p>2: Small amount training materials</p> <p>1: Option not useful or not working properly</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Online application for training courses 	<p>5: Online application support, online payment when applicable</p> <p>4: Application form to download, submission by fax or email, prompt reply and effective</p> <p>3: Slow responding</p> <p>2: Rarely reply</p> <p>1: No reply</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Download of training materials 	<p>5: Detail and complete training materials to be downloaded, frequently updated</p> <p>4: Sufficient amount of training materials, regularly updated</p> <p>3: Some material to be downloaded</p> <p>2: Only small amount of material</p> <p>1: Option not useable or not useful</p> <p>0: No such option</p>
<ul style="list-style-type: none"> Online survey 	<p>5: Effective use of website for products survey, effective design of survey content</p> <p>4: Using product survey, either design of survey not effective or only use to some products</p> <p>3: Use at some places or some products</p> <p>2: Rarely use</p> <p>1: Not workable or poor use</p> <p>0: No such option</p>

<ul style="list-style-type: none"> Personalized support 	5: Variety and powerful personalization functions, easy to use 4: Useful personalization functions, usable 3: Acceptable personalization options 2: Poor function 1: No effective or not working 0: No such option
<ul style="list-style-type: none"> Newsletter 	5: Detail and sufficient newsletters, sending on time 4: Sufficient news, acceptable frequency of sending newsletters 3: Acceptable content, acceptable frequency of sending newsletters 2: Poor content 1: Some newsletters, not sufficient updated information 0: No such option
<ul style="list-style-type: none"> Access to internal system for staff 	Y: Have the option N: No such option

3.8 The analysis method

The evaluation was made on three major types of issues:

- Evaluation of overall interface design and website technology of each company.
- Evaluation of the usage rate of e-business applications across different groups of companies.
- Evaluation of the effectiveness of e-business applications of each company.

Based on the above evaluation, we derived more evaluation data such as the overall level of interface design and website technology of a certain group of companies. Such evaluation data and derived data was then used in our comparative analysis.

Since we group the selected companies in several ways, the comparative analysis is on the differences between different groups. The followings are the set of reasonable comparisons to be made:

On the interface design and website technology:

- The comparison of the overall evaluation on interface design between international companies and domestic companies. The same comparison is also done on the website technology use.
- The comparison of the overall evaluation on interface design of three groups of domestic companies in terms of their size. The same comparison is also done on the website technology use.
- The comparison of the overall evaluation on interface design of the three groups of domestic companies in terms of their locations. The same comparison is also done on the website technology use.
- The comparison of the overall evaluation on interface design of the four groups of domestic companies in terms of their main business. The same comparison is also done on the website technology use.

On the usage rate of e-business applications:

- The comparison of the overall usage rates of international companies and domestic companies.
- The comparison of the usage rates of three groups of domestic companies in term of their size.
- The comparison of the usage rates of three groups of domestic companies in terms of their locations.

- The comparison of the usage rates of four groups of domestic companies in terms of their main business.

On the effectiveness of e-business applications:

- The comparison of the overall effectiveness evaluation results of international companies and domestic companies.
- The comparison of the effectiveness evaluation results of three groups of domestic companies in term of their size.
- The comparison of the effectiveness evaluation results of three groups of domestic companies in terms of their locations.
- The comparison of the effectiveness evaluation results of four groups of domestic companies in terms of their main business.

Analysis is also done on combining the comparison of usage rates and effectiveness evaluation results.

4 Evaluation and Comparative Analysis

We now present the evaluation results of evaluating both international benchmark companies and domestic IT companies. More importantly, we compare the results of international companies and domestic companies; compare the results of domestic companies of different size, of different regions, and of different businesses. Based on the comparison, we analyse the possible reasons behind the differences wherever they occur. We must emphasize that the absolute difference between international companies and those medium and small domestic companies is not the essential issue; the relative difference is more important. As the benchmark companies we choose are all successful and well-established international companies, their e-business applications should be much better than those medium and small companies, both in overseas and in mainland China. It is more useful to see from our comparison where the differences lie.

4.1 Interface design and website technology

This section represents the interface design and website technology evaluation of the selected companies. Based on the evaluation, we analyse the difference and possible reasons or explanations behind the differences.

4.1.1 Interface design

Figure 4.1.1. Comparisons of the average scores on interface design of international companies, domestic large and public companies, regional leading companies, medium and small companies

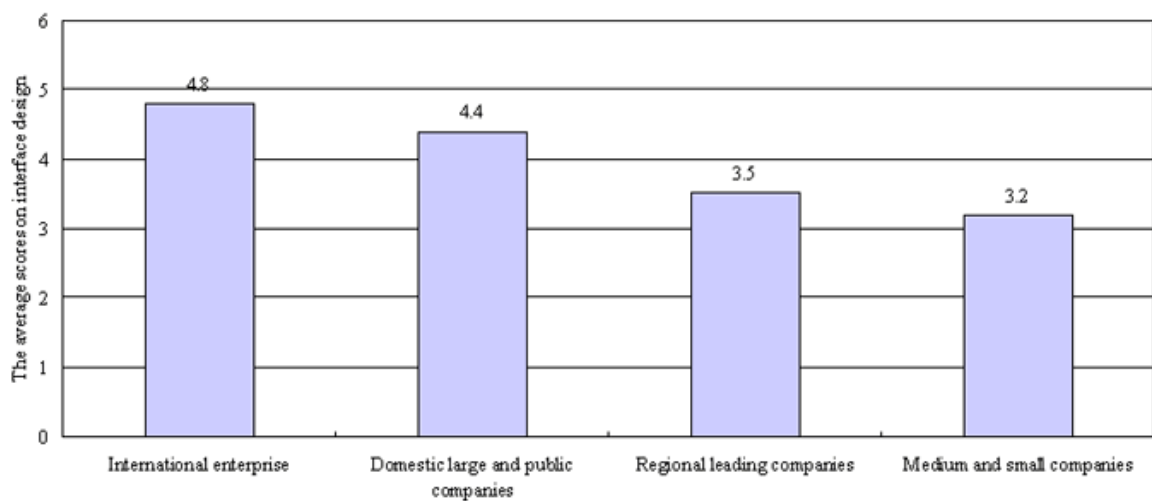
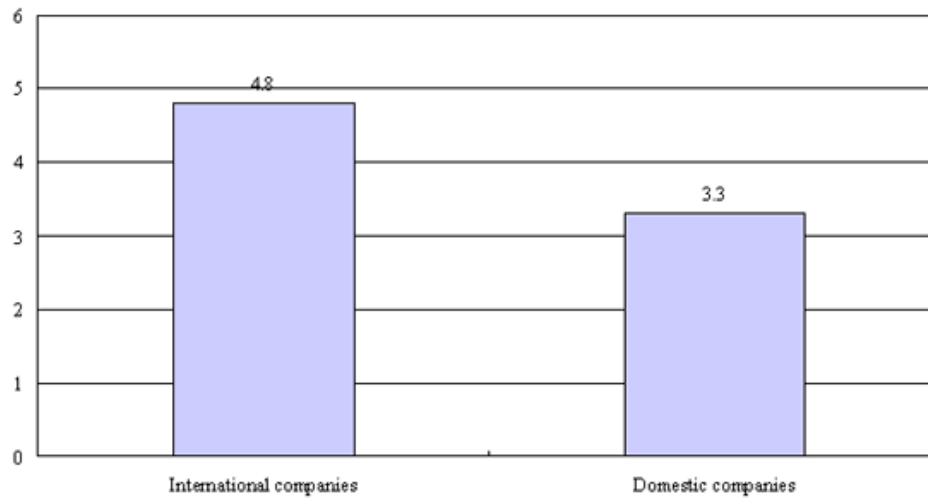


Figure 4.1.2. Comparisons of the average scores on interface design of international companies and domestic companies



In Figure 4.1.2, international companies score an average 4.8 on their website interface design while the domestic companies score an average 3.3. Although domestic companies' average is much lower than the international companies', their average is over 3. This means in general that although the domestic companies need to improve the interface design aspect of their website, at least the current status is satisfactory.

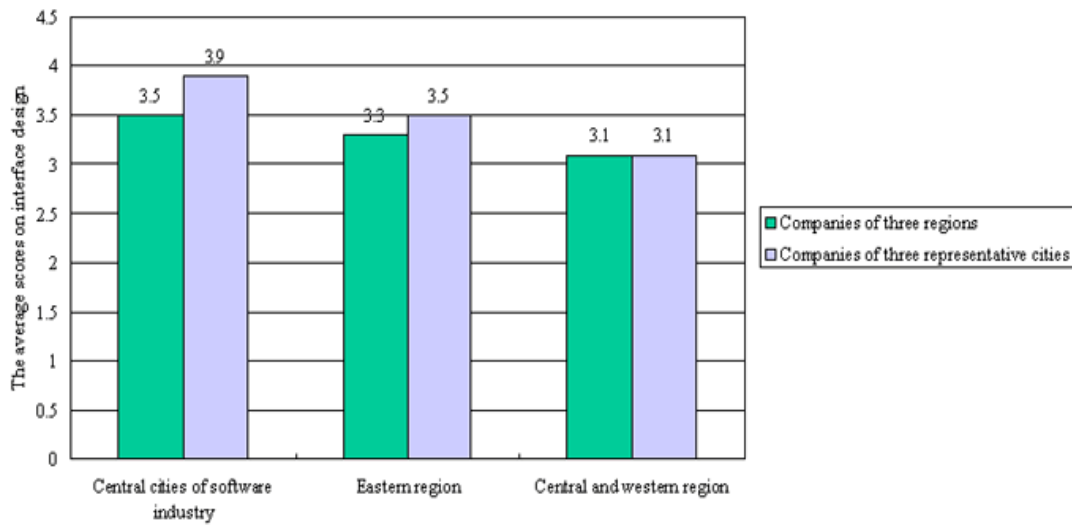
From Figure 4.1.1, the difference between international companies and domestic large and public companies is relatively small. The domestic companies score 4.4, a very high performance on this aspect. However, medium and regional leading companies score much lower than the above two types companies, while the small companies' score is lower.

Interface design requires a rather high investment, including previous investment on VI of a business. Normally large companies are rather keen to keep a high and public image, while smaller companies are normally not up to this stage. Therefore although there is a large difference between large and smaller companies, the difference is not significant as long as the interface design of their websites is satisfactory, i.e. scores 3 or above.

Whether the company is small or large, a good performance on website interface design is a good approach to improving and presenting a good business image to potential customers.

Figure 4.1.3 compares the average interface design scores of companies from different regions, as well as the average scores of the companies of the three representative cities. The three regions are central cities, eastern developed region, and central and western under developed region. The three representative cities of the regions are Beijing, Hangzhou and Xi'an.

Figure 4.1.3. Comparisons of the average scores on interface design of the domestic companies in three regions



Companies in central cities score the highest (3.5), higher than the score of those of the eastern region. Companies of eastern region score 3.3, higher than those of central and western region. The central and west region scores the lowest 3.1. All the three regions' average score on this aspect pass the satisfactory mark, score 3.

It is noticeable that companies from Beijing score a much higher 3.9. Companies from Hanzhou also have a higher score than the average score of its region, while companies from Xi'an score the same as the average of its own region.

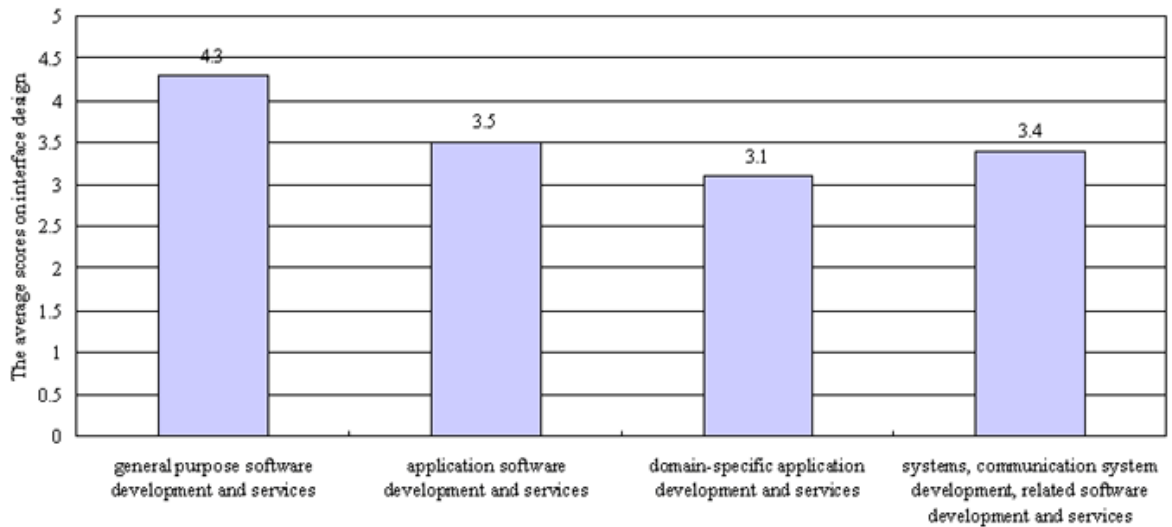
We explain the distinguishing high score of those from Beijing as companies in that city are strongly influenced by international companies, which normally have their China head office in Beijing.

We suggest that the clear difference among the three regions is mainly due to the difference of the degrees of competition in the three regions. Another contributing factor is the level of technical service development in different regions.

Figure 4.1.4 compares the interface design factor among the four types of IT companies. The four types are general purpose software development and service companies, application development and service companies, domain-specific application and service companies, and system, communication system development, related software development and service companies.

Among the four types, general purpose software companies score a distinguishing high mark of 4.3. The other three types of companies score from 3.1 to 3.5. The difference between application software companies and system companies is rather small, only 0.1. It is noticeable that the domain application development and service type scores the lowest 3.1. The explanation is that domain application companies normally have a small number of long term customers. The need for presenting their public image on the Internet is not a high priority for them at this stage. We believe in the near future those companies would need to improve the interface design once e-business applications become standard practice.

Figure 4.1.4. Comparisons of the average scores on interface design of the four types of domestic companies



4.1.2 Website technology

Figure 4.2.1. Comparisons of the average scores on web technology of international companies, domestic large and public companies, regional leading companies, medium and small companies

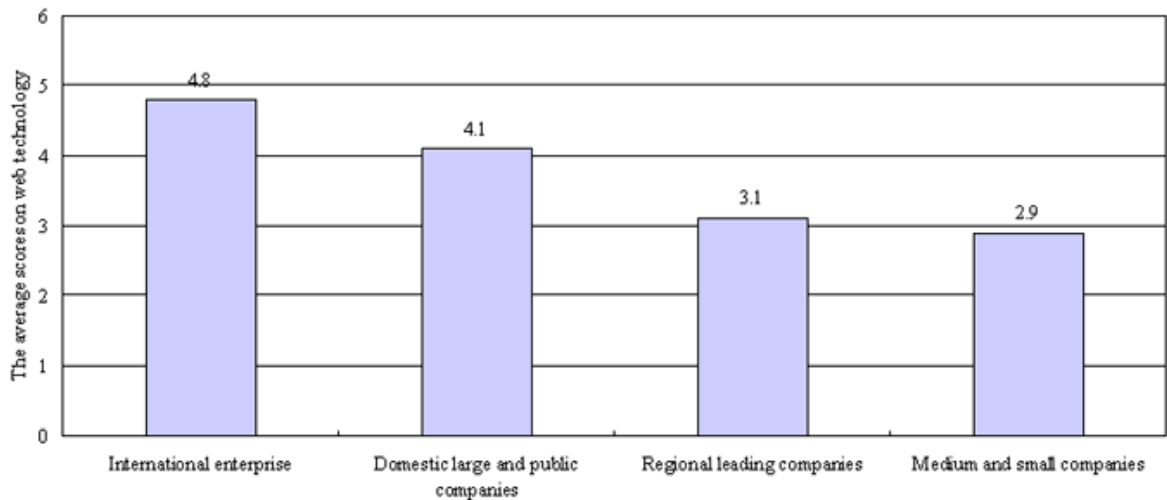
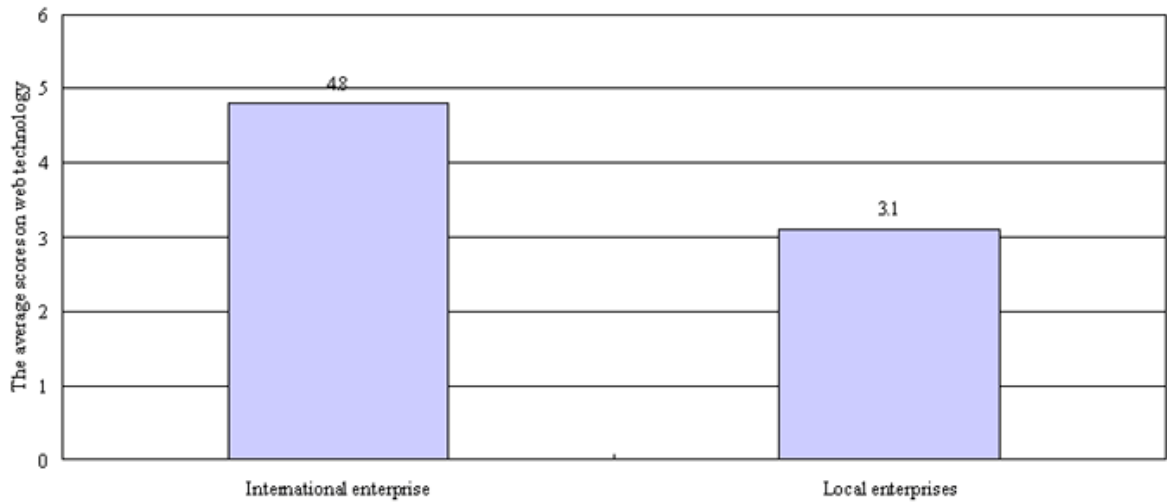


Figure 4.2.2 compares the web technology used on websites of international and domestic companies. The difference is big, bigger than the difference in interface design. However, the average score of domestic companies still passes the satisfactory mark 3.

From Figure 4.2.1, we notice that domestic large companies have a rather high score 4.1, while we see the same difference pattern of the score from high to low comparing large, medium and small companies.

Figure 4.2.2. Comparisons of the average scores on web technology of international companies and domestic companies



The above differences can be explained using the following reasoning: Technology is still expensive so that different sized companies would have different levels of technology investment. Domestic companies are still behind the international companies not only in technology but also in understanding of and ability to adopt new technologies.

Figure 4.2.3. Comparisons of the average scores on web technology of the domestic companies in three regions

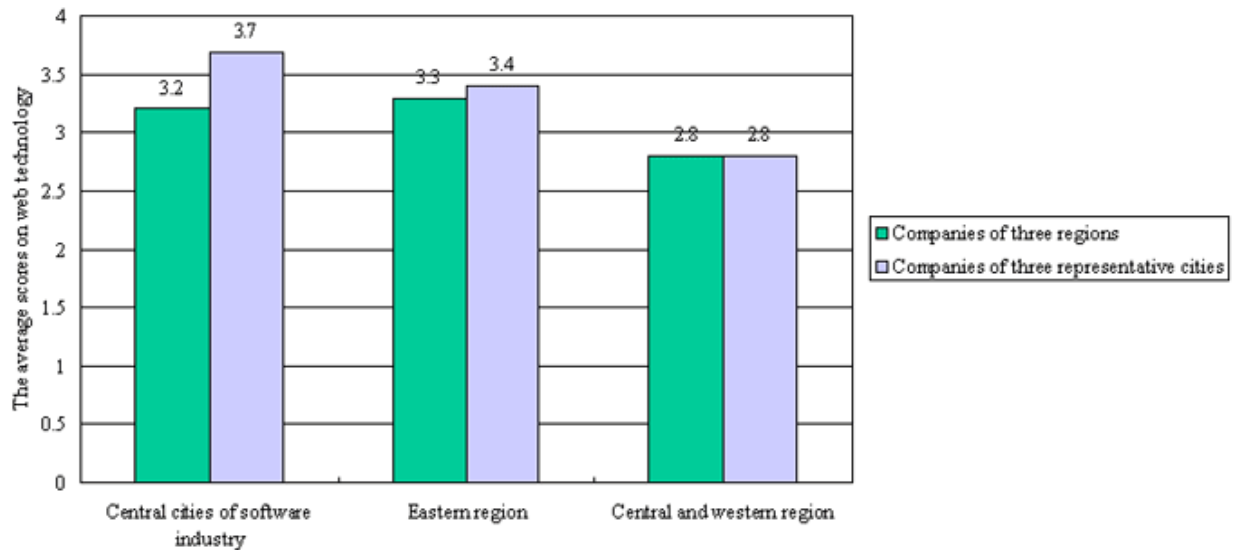


Figure 4.2.3 compares the three regions on website technology. The East region scores a little higher, 3.3, than central cities. This can be explained by the fact that both regions are developed regions in China and capable of having the resources for website technology. The central and western region has a much lower score 2.8, lower than the satisfactory mark 3. There are two possible reasons for this difference. The first reason is that companies in the central and western region are less capable of paying for better technology. The second reason is due to the relatively under developed IT

industry especially on web technology related services, the overall web technology is not as advanced as those in other two regions.

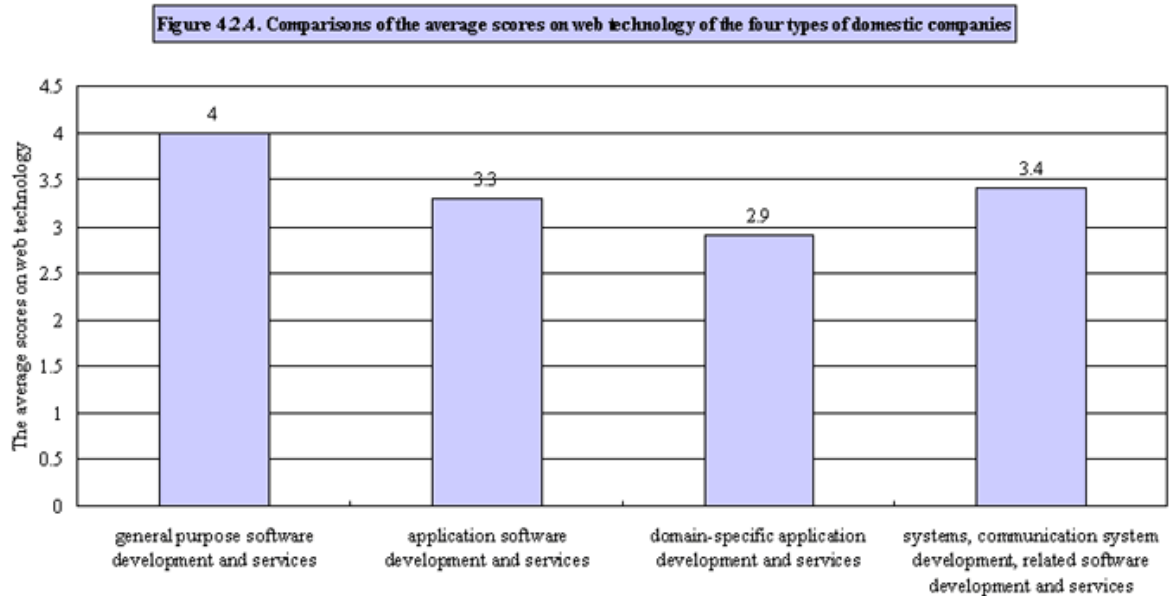


Figure 4.2.4 shows the comparison on website technology among the four types of companies. Again we see a very similar pattern as of interface design. General purpose software companies have the highest average score. The system and communication companies score the second but with some difference. The domain application companies again have the lowest average score. The same explanation as in interface design factor applies here.

4.1.3 Conclusions on interface design and website technology

Overall, we make the following conclusions after our analysis and comparison of interface design and website technology:

- Compared with international companies, domestic companies show large difference in interface design and website technology. The difference is about two levels, provided that we divide the score from 9 to 5 as six levels.
- However, on both factors, domestic companies pass the satisfactory level.
- In both factors, domestic large companies have smaller differences compared with international companies, while companies in central and western regions clearly have huge differences. There are two reasons for this. One is the capability of those companies to invest on the factors. The second is the lack of good technical services in the region. Especially on website technology, central and western region is below the satisfactory mark 3.
- Companies in Beijing have the highest score compared with companies of other cities and regions. There are several reasons to explain this. The first reason is that many domestic large companies are located in Beijing and this fact lifts up the average score. The second reason is due to the fact that most international companies are also located in Beijing, bring a higher standard and being models for other domestic companies. The third reason is that Beijing has the biggest

IT industry compared with other cities. This would enable a stronger related technical service sector to provide better service and technology.

- General purpose software companies have the highest average scores in both factors, compared with the other three types of companies. The main reason is that general purpose software companies are normally large companies and have sufficient capability to invest on the interface design and website technology. Another reason is that those companies are more willing to improve their public image and use the web for mass public dealings.
- Domain application companies score the lowest. The main reason is those companies normally target at a very small but concentrated well established customer base.

4.2 Usage rates of various e-business applications

In this section, we compare and analyse the usage rates of various e-business applications of the selected companies. There are some considerations in the usage rate calculation:

- The set of e-business applications via enterprise portals on the web is carefully selected based on the benchmark study on international companies. We only choose those commonly used and also applicable to all types of companies both in terms of size, business and region. We do not include those clearly only applicable to a particular type or group of companies.
- Different companies may use different names, and methods to implement those e-business applications. When we determine if a company uses a specific e-business application, we not only search the name of the content or functionality. We also analyse the company's portal carefully to determine if the company has the application implemented in its portal on the web. In some cases, a company may not directly implement an application, but could be regarded as offering the same functionality through other means. In such a case, we regard the company as using the application in its portal on the web.

4.2.1 Presentations of the usage rates of e-business applications by international companies and domestic companies

Figure 4.3.1.a. The usage rates of e-business applications used by international companies

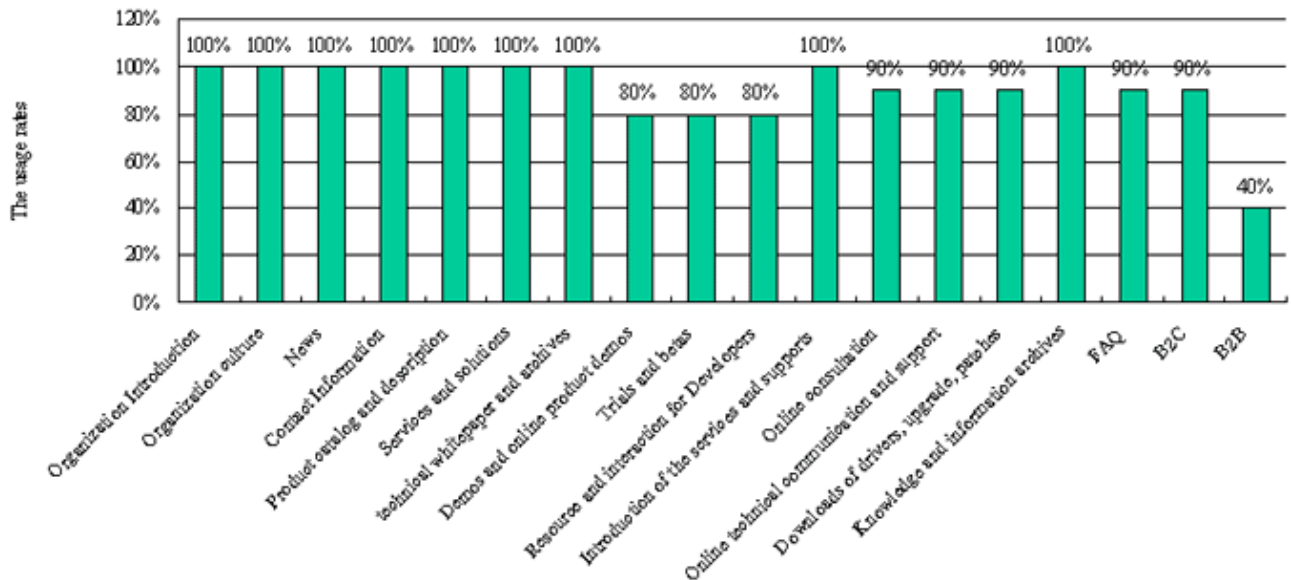


Figure 4.3.1.b. The usage rates of e-business applications used by international companies

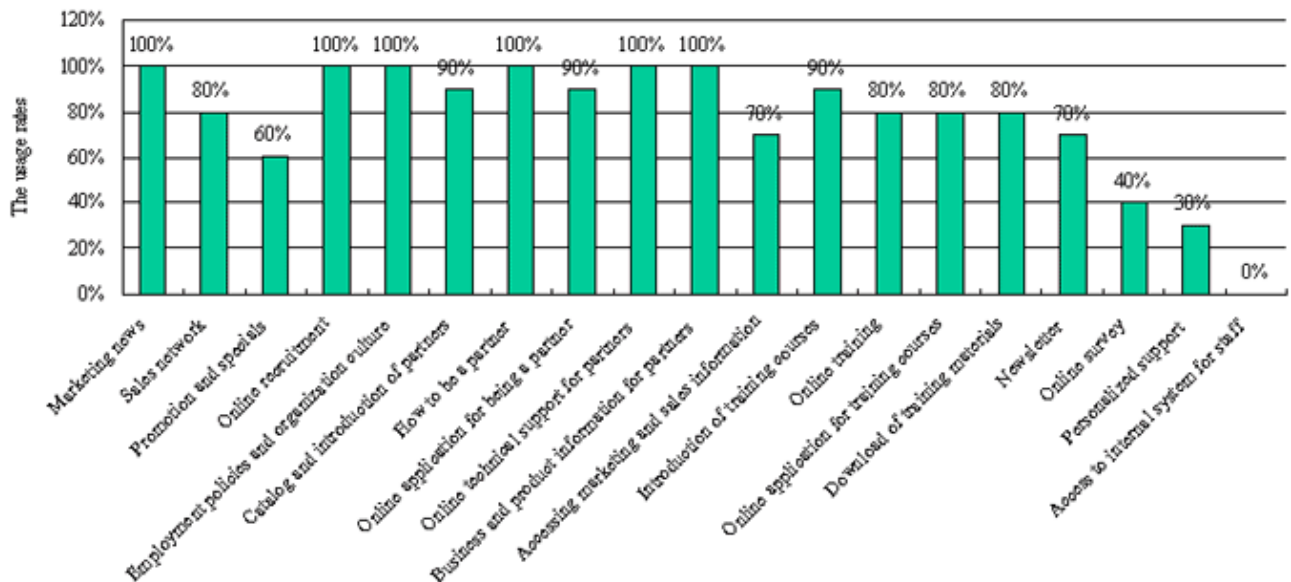


Figure 4.3.1a and Figure 4.3.1b display the usage rates of e-business applications by international companies. On most application factors and types, the usage rates are over 80%, while almost half of the factors and types are 100%. This confirms the soundness of our approach from another angle that we choose international companies as benchmark.

However we still selected a small number of applications for inclusion in the set of types and factors, even though their usage rates are not high among the international companies. Such applications are B2B (40%), online survey (40%), personalized support (30%) and access to internal system for staff (0%). One of the reasons we chose those applications is that they are emerging e-business applications. Another reason is that some of the applications are more applicable to domestic companies while international companies do not support them. For example, access to the internal system for staff has 0% usage rate among international companies. One reason to explain this is that international companies do not use their public enterprise portals to provide access to these applications but use separate systems.

Figure 4.3.2.a. The usage rates of e-business applications used by domestic large companies

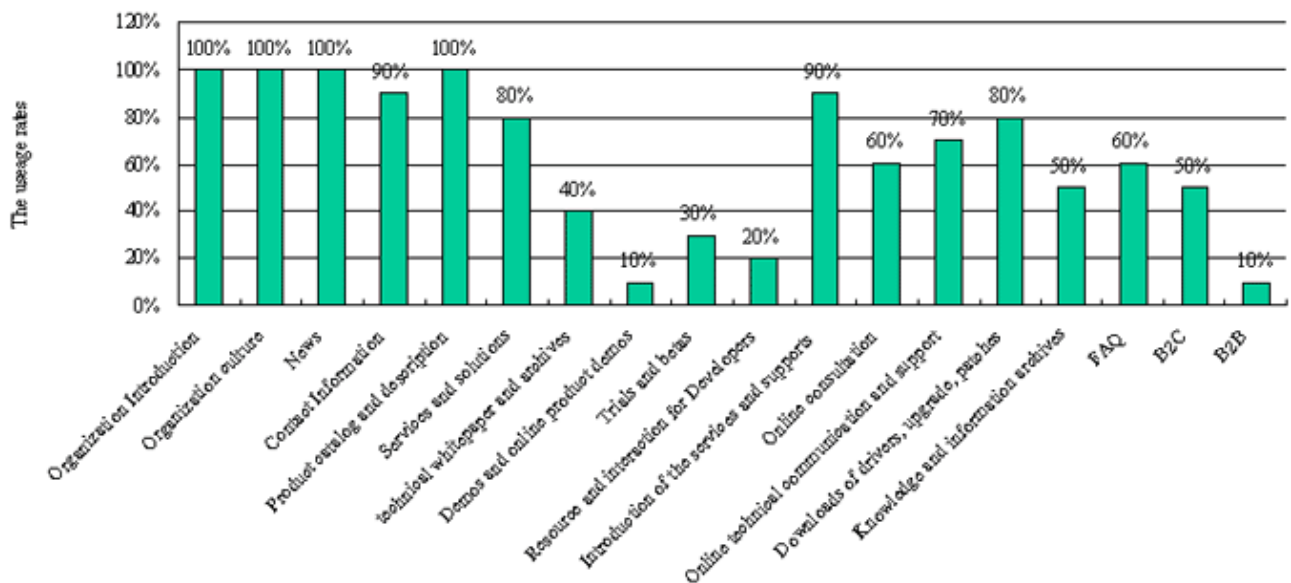


Figure 4.3.2.b. The usage rates of e-business applications used by domestic large companies

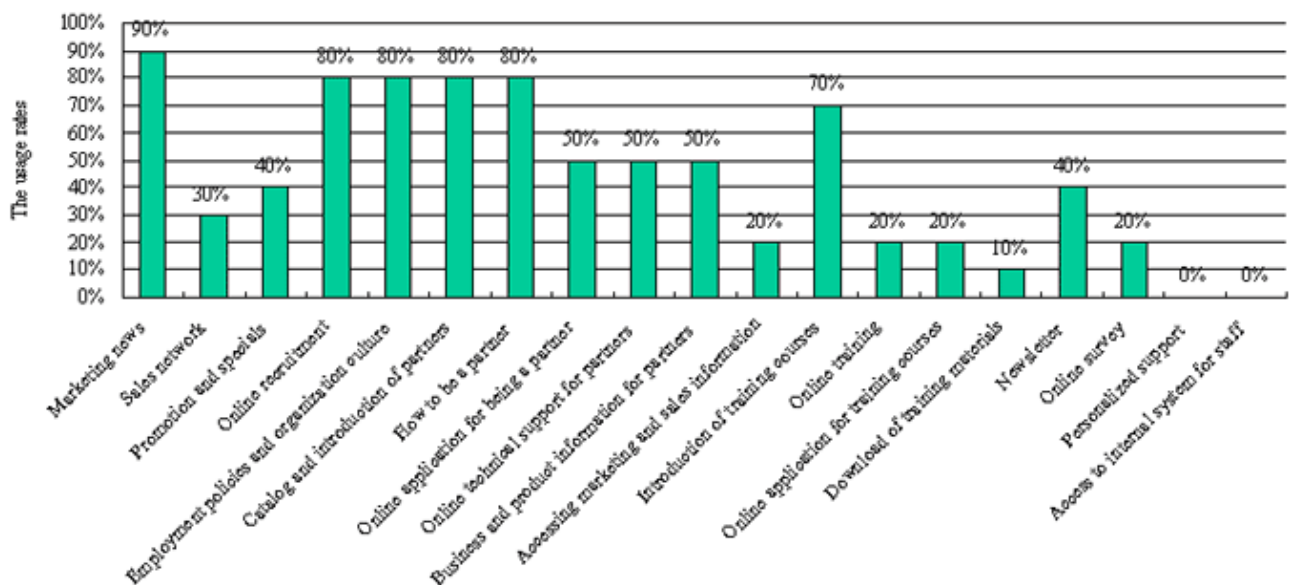


Figure 4.3.2a and Figure 4.3.2b show the usage rates of e-business applications used by

domestic large companies. We notice that about half of the applications have less than 50% usage rate. The following applications have very low usage rate: Demos and online product demos (10%), Trials and betas (30%), Resource and interaction for Developers (20%), B2B (10%), Sales network (30%), Accessing marketing and sales information for partners (20%), Online training (20%), Online application for training courses (20%), Download of training materials (10%), Online survey (20%), Personalized support (0%), Access to internal system for staff (0%)

We can see that domestic large companies have very low usage rates on key e-business applications in the IT industry such as online sales, online education and training, product white papers, demos and trials.

Figure 4.3.3.a. The usage rates of e-business applications used by the medium and leading regional companies

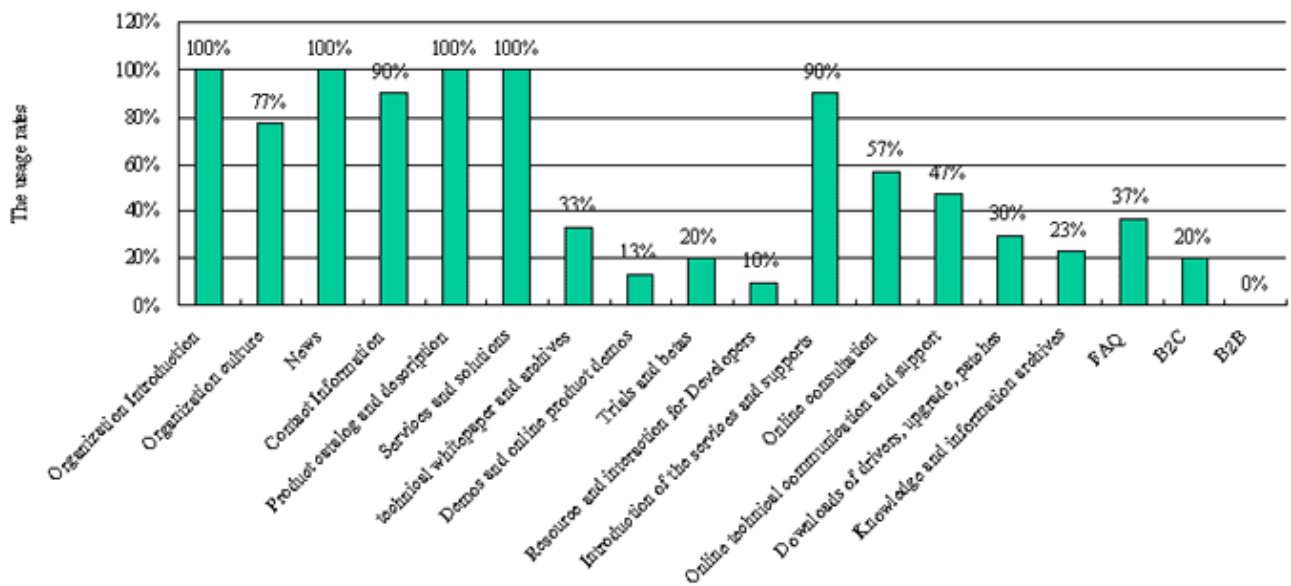


Figure 4.3.3.b. The usage rates of e-business applications used by the medium and leading regional companies

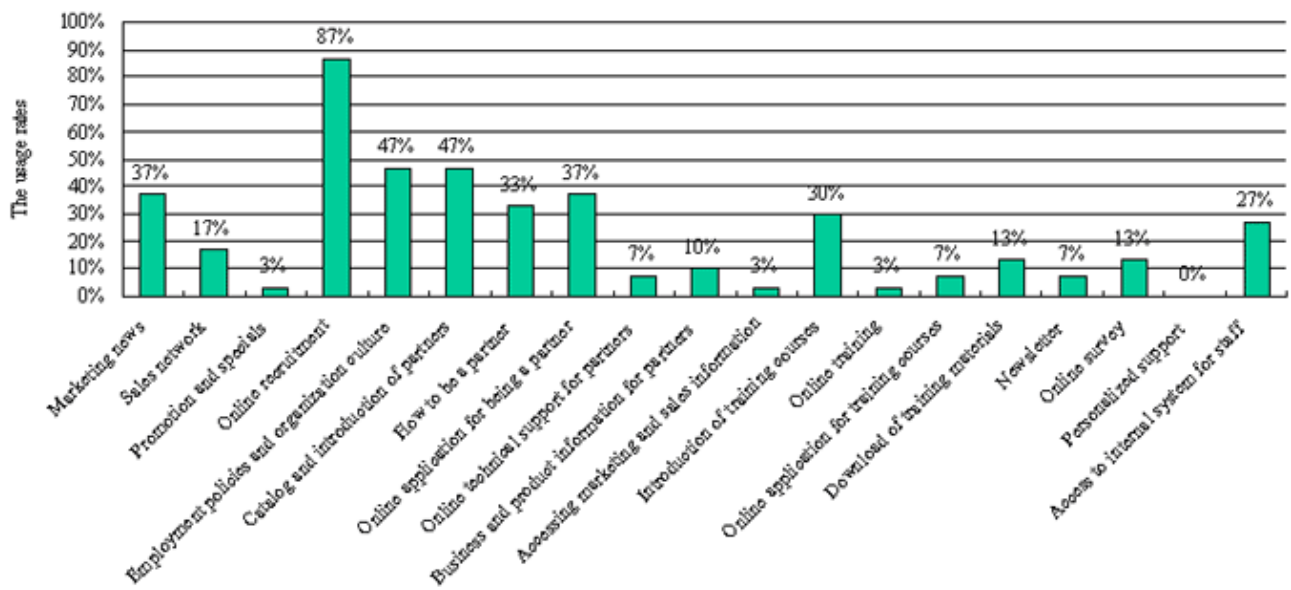


Figure 4.3.3a and Figure 4.3.3b display the usage rates of e-business applications by medium and leading regional companies. The applications with high usage rates are those on introducing the organizations, marketing, product catalogs, solutions, customer services and human resources. Applications for product white papers, demos, trials, online sales, marketing management, education and training have low usage rates. The usage rate of personalized support is zero. Only about 25% of applications have a usage rate higher than 50%.

Figure 4.3.4.a. The usage rates of e-business applications used by medium and small companies

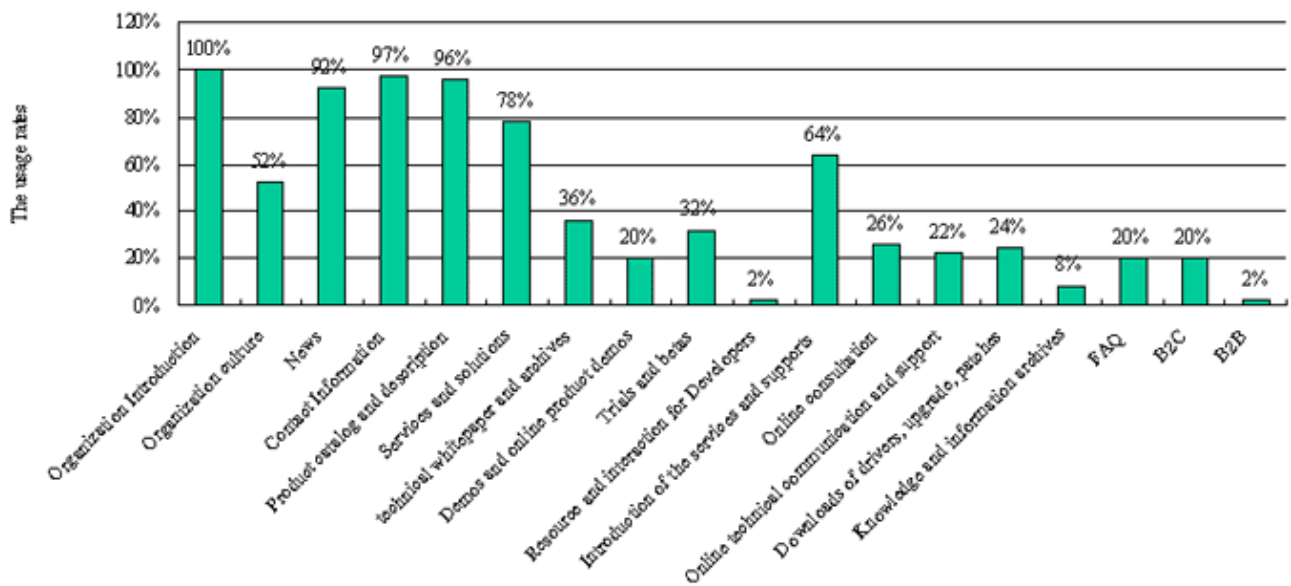


Figure 4.3.4.b. The usage rates of e-business applications used by medium and small companies

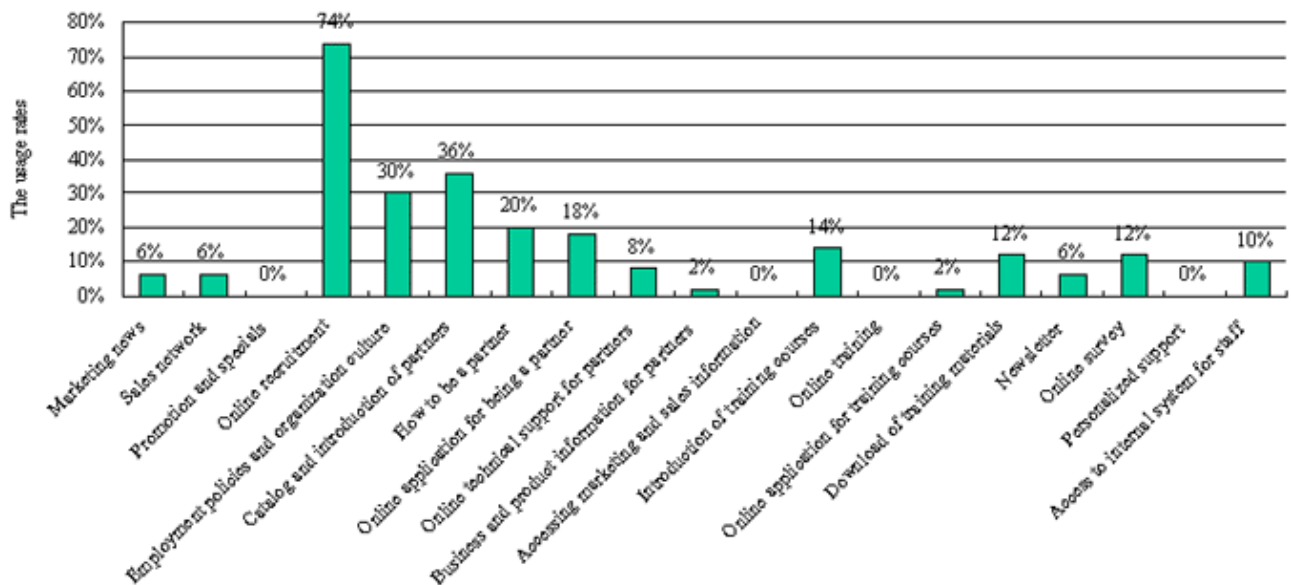


Figure 4.3.4a and Figure 4.3.4b show the usage rates of e-business applications by medium and small companies. Only a few of e-business applications have a satisfactory usage rate, while others have very low usage rates. Applications with high usage rates are organization introduction, product catalogue and solutions. Some applications have zero usage rate: promotion specials, accessing marketing and sales information, online training, personalized support. More applications have less than 10% usage rate: resource and interaction for developers, B2B, knowledge and information archives, marketing news, sales network, online technical support for partners, business and product information for partners, online application for training courses, newsletter.

4.2.2 Comparisons of the usage rates of e-business applications of international companies and overall domestic companies

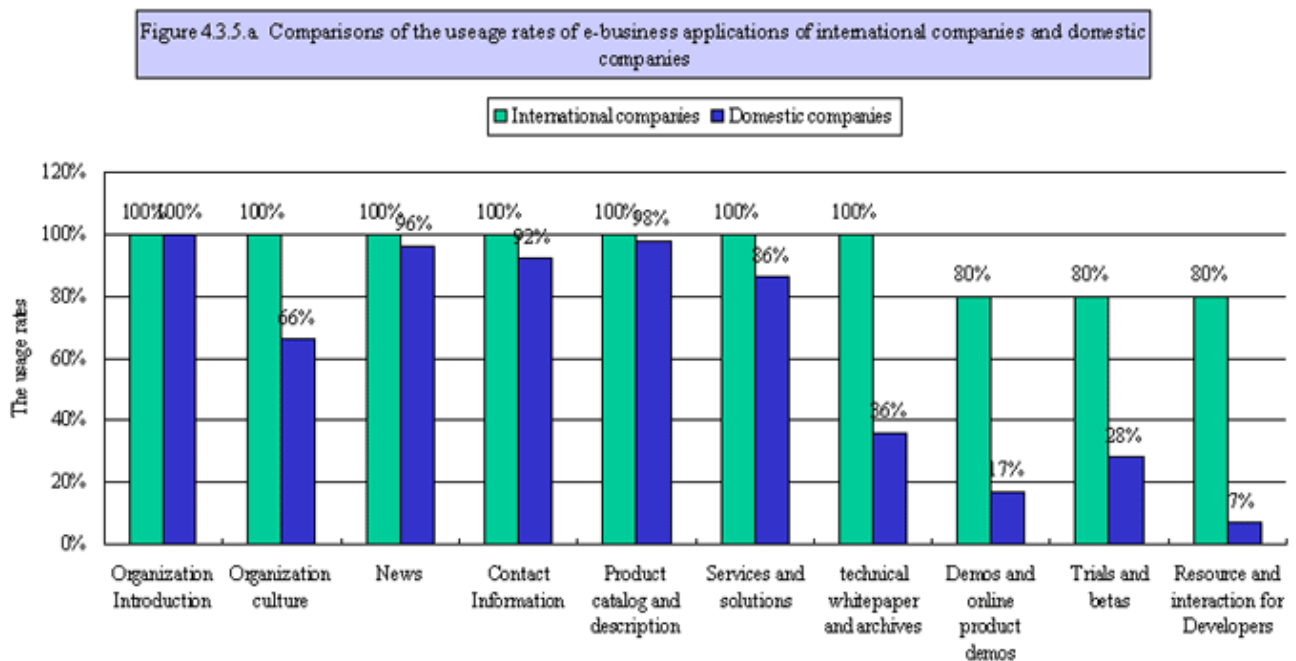


Figure 4.3.5.b Comparisons of the usage rates of e-business applications of international companies and domestic companies

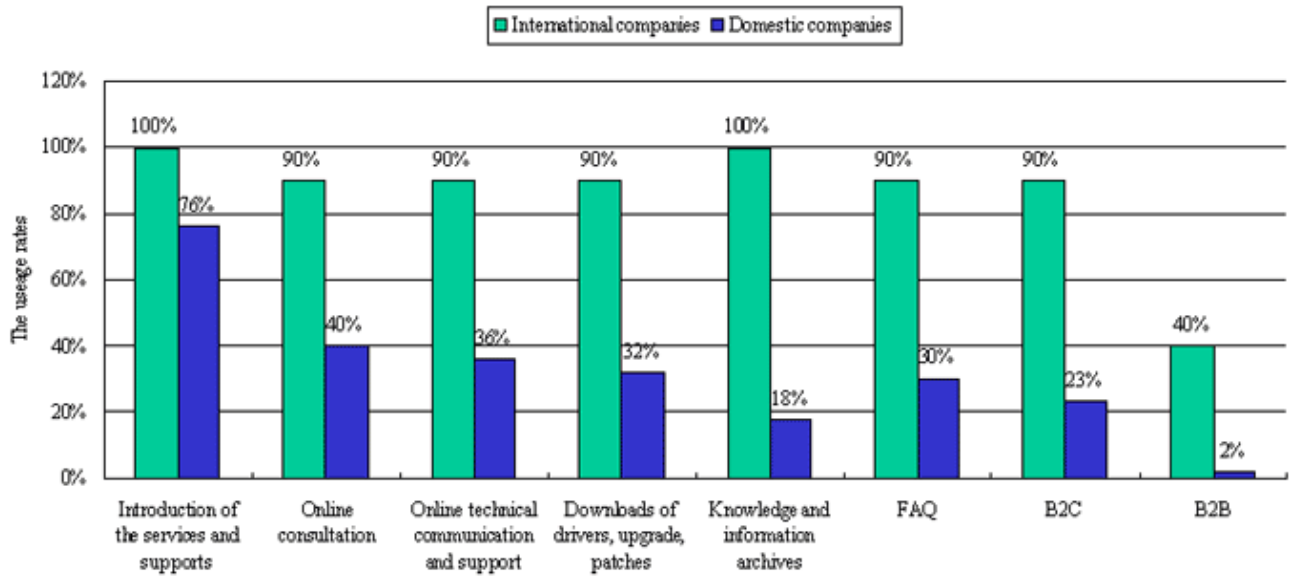


Figure 4.3.5.c Comparisons of the usage rates of e-business applications of international companies and domestic companies

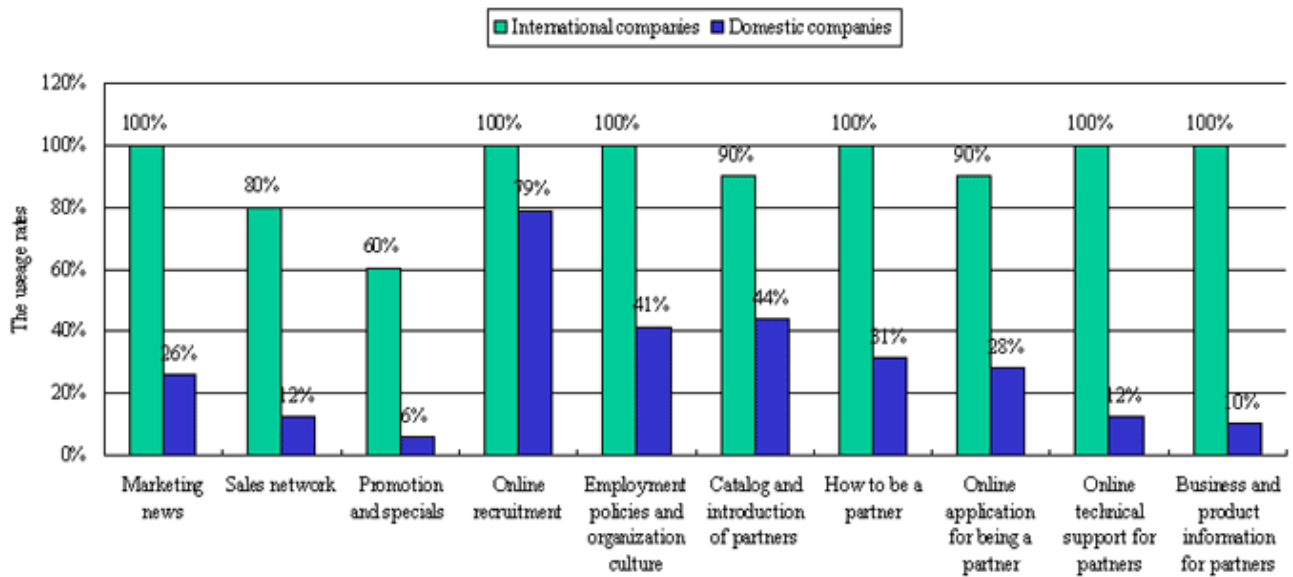
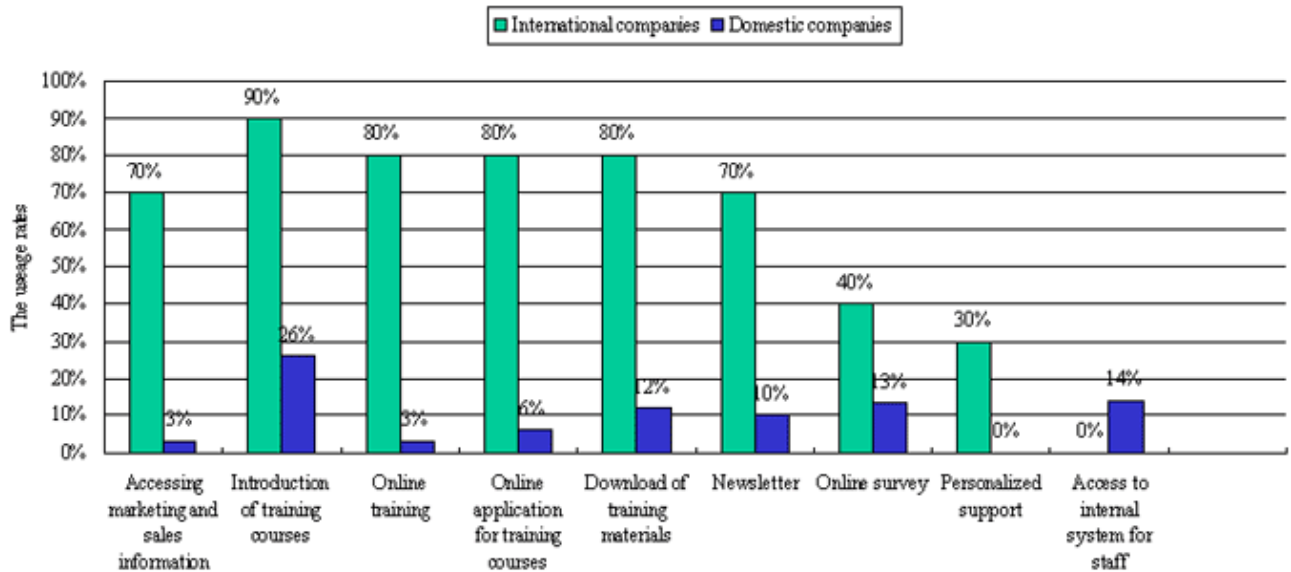


Figure 4.3.5.d. Comparisons of the usage rates of e-business applications of international companies and domestic companies



Figures 4.3.5a, 4.3.5b, 4.3.5c, and 4.3.5d compare e-business applications of international companies and domestic companies. It is clear that on most e-business applications, domestic companies have a much lower usage rate compared with international companies. Only a few essential e-business applications show relatively smaller differences: introduction of products and services, products and solutions.

Those with big differences are: technical support for developers, technical support for customers, online sales, marketing, technical and network support for partners, education and trainings.

Only about 20% of e-business applications have more than 50% usage rate by domestic companies.

It is noticeable that domestic companies have a 14% usage rate on access to internal system for staff, while the international benchmark companies we choose have zero usage rate.

4.2.3 Comparisons of the usage rates of e-business applications of international companies and three kinds of domestic companies based on their size

Figure 4.3.6.a. Comparisons of the usage rates of e-business applications of international companies, domestic large and public companies, regions leading companies, medium and small companies

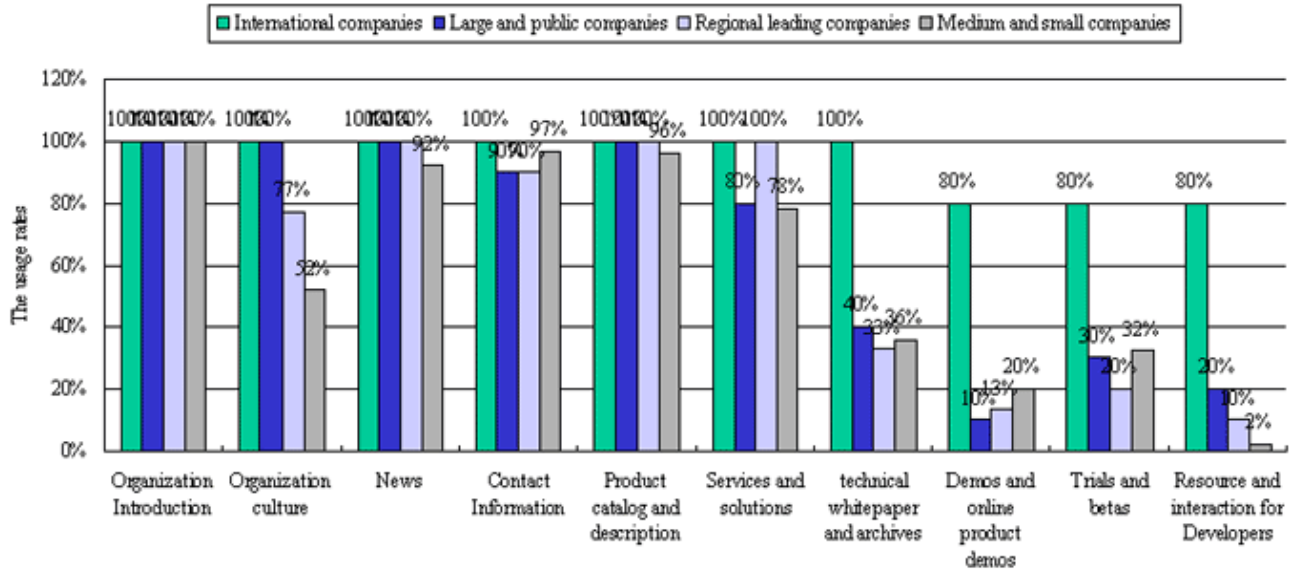


Figure 4.3.6.b. Comparisons of the usage rates of e-business applications of international companies, domestic large and public companies, regions leading companies, medium and small companies

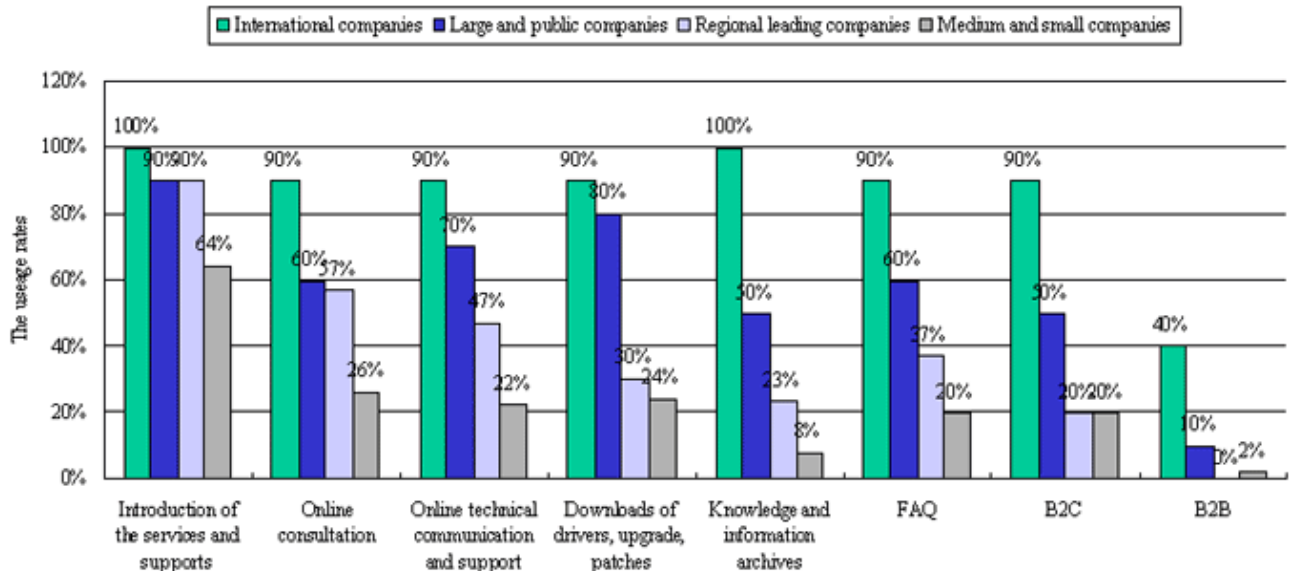


Figure 4.3.6.c. Comparisons of the usage rates of e-business applications of international companies, domestic large and public companies, regional leading companies, medium and small companies

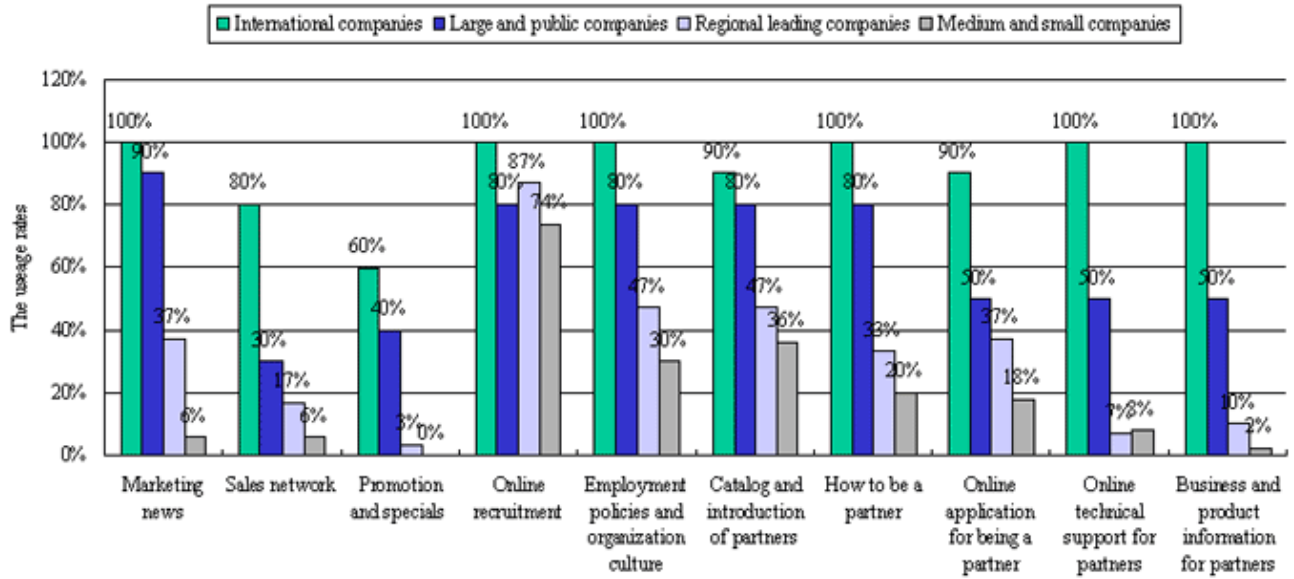
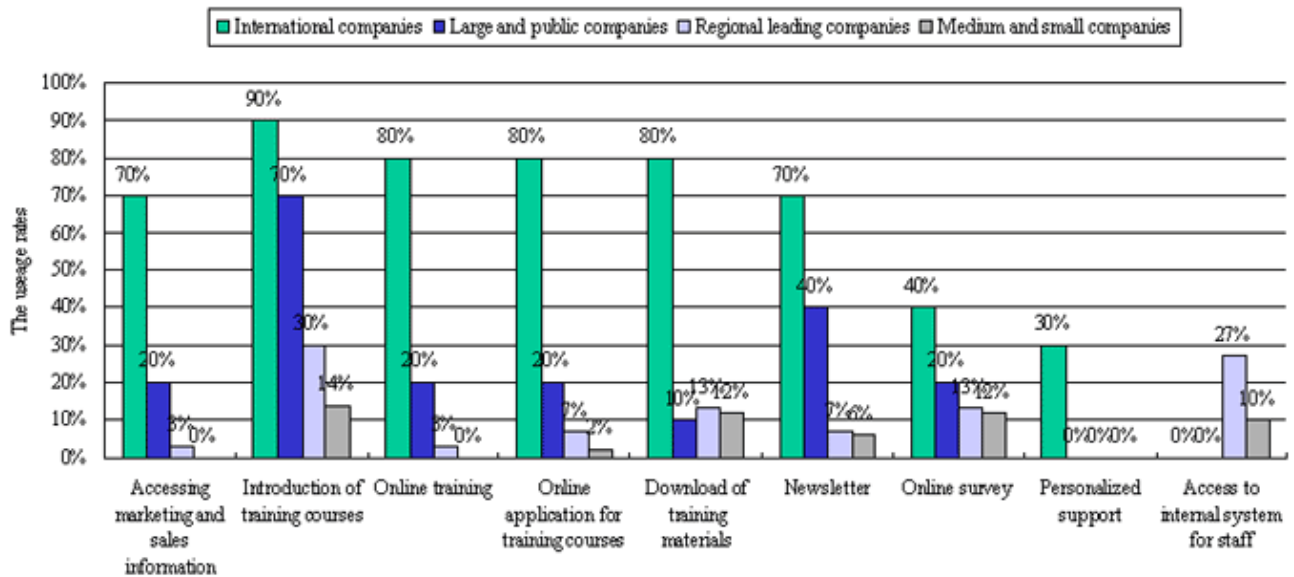


Figure 4.3.6.d. Comparisons of the usage rates of e-business applications of international companies, domestic large and public companies, regional leading companies, medium and small companies



Figures 4.3.6a, 4.3.6b, 4.3.6c and 4.3.6d compare e-business applications of international companies, domestic large and public companies, regional leading companies, medium and small companies.

We can see domestic companies are well below the rate of international companies. At the same time, we can also see that comparing three different kinds of domestic companies in terms of their size, the pattern that large and public companies have higher rates than those of regional leading companies and the regional leading companies are higher than the rates of medium and small companies.

They are however some exceptions, for example access to internal systems for staff. The usage rates of international companies, domestic large and public companies are

both zero, while regional leading companies, medium and small companies are 27% and 10% respectively. One explanation for this exception is that international companies and domestic large companies do not provide the application through their public enterprise portals for safety reasons. Some regional leading companies may also not use the application for the same reason. For those medium and small companies that do not use the applications, some of them may also for the same reason. On the other hand, many medium and small companies may not be able to set up a proper internal system for daily operation yet. This might be due to the fact that many medium and small companies are too small and not capable or do not deem it necessary to have such internal systems.

Another exception is demos and online product demos. The usage rate (20%) of medium and small companies is little higher than the rates of regional leading companies (13%) and large companies (10%). It is clear that medium and small companies are more willing to use the applications while it would normally cost more to use the conventional approach. However, compared with the usage rate (80%) of international companies, the difference between domestic companies and international companies is still huge.

The third exception is with services and solutions. Domestic regional leading companies have a high usage rate 100% the same as that of international companies, while domestic large and public companies have a lower rate 80%. On the application of online recruitment, regional leading companies also have a little higher rate 87% than the rate (80%) of domestic large companies. The exceptions could be explained by the idea that regional leading companies are quicker to adopt new technologies than large and public companies.

From those figures, we can also have the following conclusions:

- Domestic companies, especially those medium and small companies, are still at the stage of using basic e-business applications. Such applications are: organization introduction, news, contact information, product catalog and description, services and solutions, online recruitment.
- More advanced and in fact more effective e-business applications are still not normally used by domestic companies. This is actually a distinguishing difference between domestic and international companies in applying e-business technologies.
- Relatively speaking, domestic large and public companies have higher usage rates than those of other domestic companies. The difference between domestic large companies and international companies is smaller. More specifically the applications that show small differences for domestic large companies are: organization culture, introduction of the service and supports, online technical communication and support, downloads of drivers, upgrade, patches, marketing news, catalog and introduction of partners, how to be a partner, introduction of training courses, newsletters. This indicates that domestic large companies start to apply more advanced e-business applications in their operations.

On personalized support for e-business application, domestic companies have a zero usage rate. In fact the usage rate (30%) of international companies on this application is not high either. Although such applications enable customers to determine the content, outlook and their personal information as they like and hence to improve the usability and effectiveness, implementing such an application is still typically an advanced technical issue. This is the main reason why both international companies and domestic

companies have a low usage rate. On the other hand, for regional leading companies and other smaller domestic companies, the high technical difficulty and lack of rich information and services on their enterprise portals are the main reason for not using the applications.

Another noticeable e-business application that has a low usage rate internationally and locally is online surveys. International companies have a low rate 40%, while domestic companies have a lower rate. The main reason would be such online methods for collecting information from customers or potential customers in mainland China is not as effective as in other regions of the world. Also such an approach is still not as effective as conventional approaches such as telephone interview.

The biggest difference between international companies and domestic companies occurs in the area of education and training, including introduction of training courses, online training, online application for training courses, downloads of training materials. From above figures, we can see that international companies are all very keen on using online education and training. They have a very high usage rate 80%. On the hand, domestic, even domestic large companies, have a below 30% usage rate while medium and small companies have a even lower usage rate close to zero. One reason is that domestic companies are still not able to adopt the new online training technology in their operations. Another reason would be due to the fact that most domestic companies traditionally do not pay much attention on training. The third reason would be because most domestic companies have a much shorter operation history, therefore they have not been able to build up a sound training system. This reason can be indicated by the higher usage rate of large companies.

Another distinguished application is in product related applications, including technical white papers and archives, demos and online product demos, trials and betas, resource and interaction for developer. International companies score a high usage rate (over 80%), while domestic companies all score below 40%. Especially on resources and interaction mechanisms for developers, medium and small companies have only a 2% usage rate. In fact, those e-business applications do not need advanced technology but would be very useful to help customers and potential customers. We can only explain the big difference as that many domestic companies do not have the understanding of the effect of applying those e-business applications.

We also notice that international companies provide their partners with related technical support and collaboration e-business application, including catalogues and partner introductions, how to be a partner, online application for being a partner, online technical support for partners, business and product information for partners, accessing marketing and sales information for partners. The usage rate of those e-business applications is all over 90%. Although domestic large companies have over 50% usage rate on the first five applications, the usage rate of medium and small companies is very low. There are two possible reasons to explain the difference. Firstly, international companies are normally very large companies and their partner community is also quite large, therefore their partners might have a good understanding of e-business applications and be able to adopt to the approach. Secondly, developing and maintaining a partner network requires a large number of partners and more resources; medium and small companies may not have such a need or be able to support it.

We should also notice that most international companies in our benchmark use a partner network as main business model in Mainland China. This would be also a contribution factor to the big difference. This is indicated by the fact that even domestic large companies have only a low usage rate 20% on accessing marketing and sales information for partners.

On e-business application online sales, most international companies (90%) use B2C. However more than half of the international companies provide such a service only to developed countries and regions but not in Mainland China. Domestic large and public companies have a usage rate 50% on B2C, while other domestic companies have only 20% usage rate. Among domestic companies using B2C, very few have a complete B2C online system. Most of such applications by domestic companies are merely providing support for online requiring and online purchase document. The sales process cannot be all done online. Software is commonly regarded as one of few products whose sales can all be done online. Such a low use of online sales of software products occurred in Mainland China has several possible reasons. The first reason is that customers who purchase software especially with a high cost is not easy to be accepted at this stage in China. The second reason is due to the fact that online payment is not developed well at the moment in China. The third reason is that many domestic companies provide applications software and require further development in order to meet uses specific requirement. This makes the online purchase of software not applicable.

On e-business application B2B, international companies do not have a high usage rate. The usage rate is only 40%. A possible reason is that those international companies are still running conventional partner network. Another possible reason is that B2B applications in IT industry are still in its early stage. The third reason would be that international companies do not use their public enterprise portals to provide the application. Domestic companies have a much lower usage rate, all below 10%. The similar reason might apply to domestic companies. However the clear difference between international companies and domestic companies still indicates the level of applications in this area by domestic companies is much lower than that of international companies.

Also from the above figures, we can see international companies are all pay much attention to online marketing, while domestic companies are behind. International companies have a usage rate 100% on marketing news, rate 80% on sales network, 60% on providing promotion and specials on their portals. Except domestic large companies have a 90% usage rate no marketing news, domestic companies have very low usage rates on other e-business applications related to online marketing activities. It is clear that many domestic companies still do not understand the advantages of online marketing.

In conclusion, domestic companies have distinguishing differences in applying e-business technologies compared with the benchmark international companies. Although most domestic companies realize the need and importance having their enterprise portals, from as simple as a basic website to as complicated as a system including many applications, they are still well behind on a good understanding of e-business applications. Most domestic companies still remain in the stage where their portals only provide basic information on the business and products. Many of domestic companies have not yet realized that they can use enterprise portals to better promote their products and services, to better support customer services, and to better support their partners.

The IT industry, especially the software industry as a whole is still not well developed in Mainland China. This would be another reason for domestic companies not being able to use effective and appropriate e-business applications.

4.2.4 Comparisons of the usage rates of e-business applications of the domestic companies in three regions

Figure 4.3.7.a. Comparisons of the usage rates of e-business applications of the domestic companies in three regions

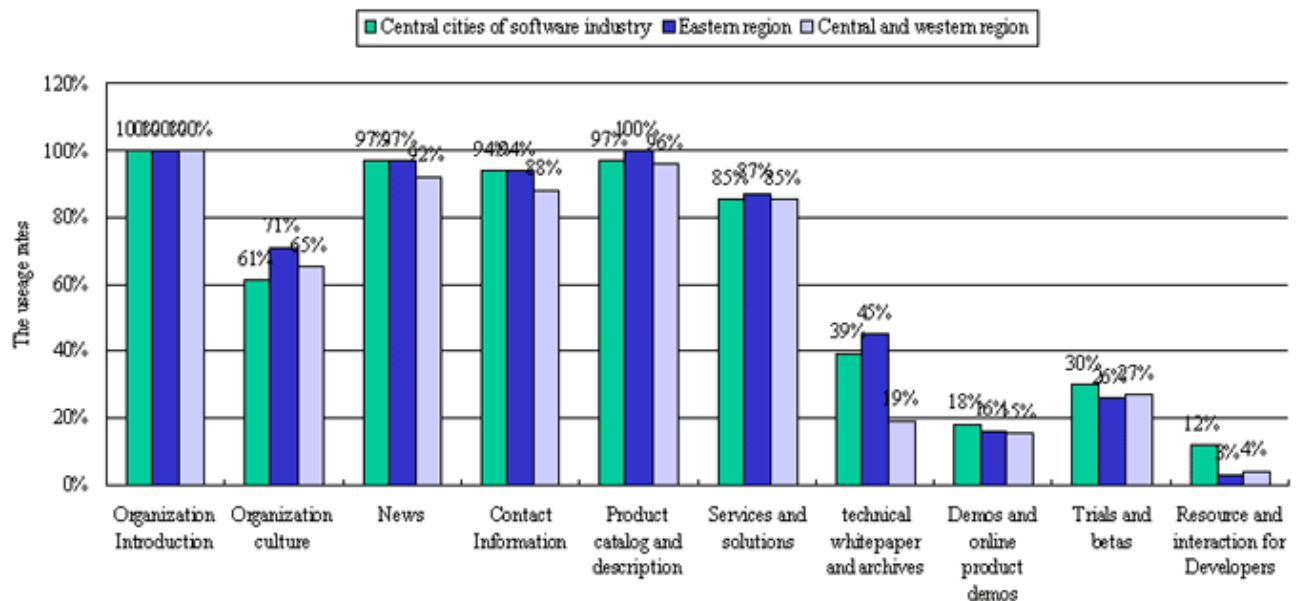


Figure 4.3.7.b. Comparisons of the usage rates of e-business applications of the domestic companies in three regions

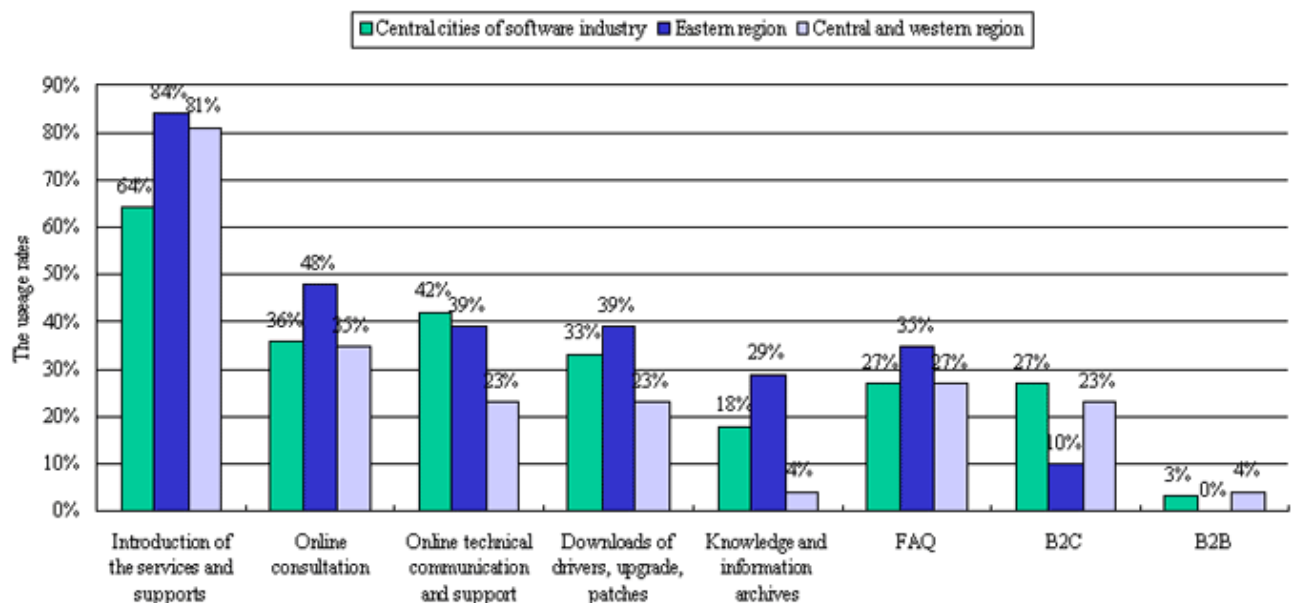


Figure 4.3.7.c. Comparisons of the usage rates of e-business applications of the domestic companies in three regions

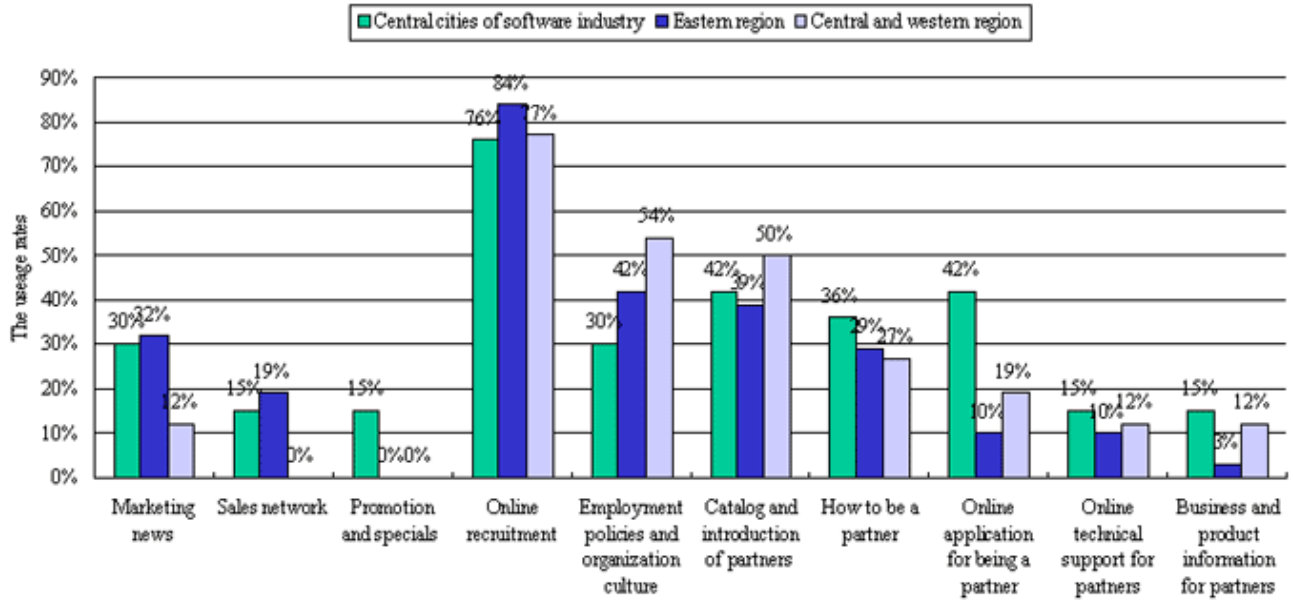
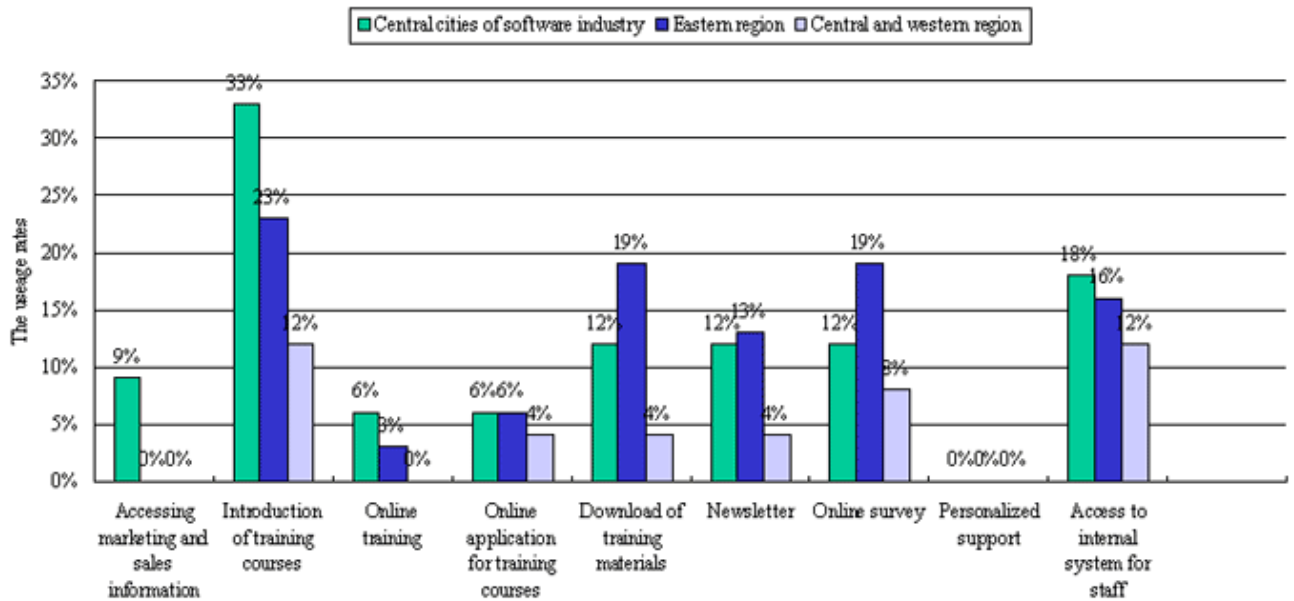


Figure 4.3.7.d. Comparisons of the usage rates of e-business applications of the domestic companies in three regions



Figures 4.3.7a, 4.3.7b, 4.3.7c and 4.3.7d show the comparisons of the usage rates of e-business applications of the domestic companies in central cities of software industry, the eastern region, and central and western region. The followings are some conclusions from the comparison:

- Although there are some differences between different regions, the differences are not big.

- Companies from the eastern region commonly have higher usage rates in the following e-business applications: products and solutions, customer services and supports, online education and trainings.
- Companies in central cities of software industry do not have overall advantage compared with companies from the eastern region. In fact, companies from the eastern region have more e-business applications evaluated with higher usage rates than that of companies from the central cities of software industry. Some examples are:
 - Organization culture: 71% (eastern region) and 61% (central cities);
 - Technical white paper and archives: 45% (eastern region) and 39% (central cities);
 - Introduction of the services and supports: 84% (eastern region) and 64% (central cities); in fact, companies in central and western region also have a high usage rate 81%, well above the usage rate of companies in central cities.
 - Online consultation: 48% (eastern region) and 36% (central cities);
 - Knowledge and information archives: 29% (eastern region) and 18% (central cities).
- Companies in central and western region have overall lowest usage rates in most e-business applications evaluated. However the difference normally are not big, except the following aspects: knowledge and information archives (4%) , online technical communication and support (23%) , promotion and specials (0%) , download of training materials (4%) , introduction of training courses (12%) .
- Overall, the most common used e-business applications are concentrated in the following three aspects: introduction of organizations, products and solutions description, and online recruitment.

4.2.5 Comparisons of the usage rates of e-business applications of the four types of domestic companies

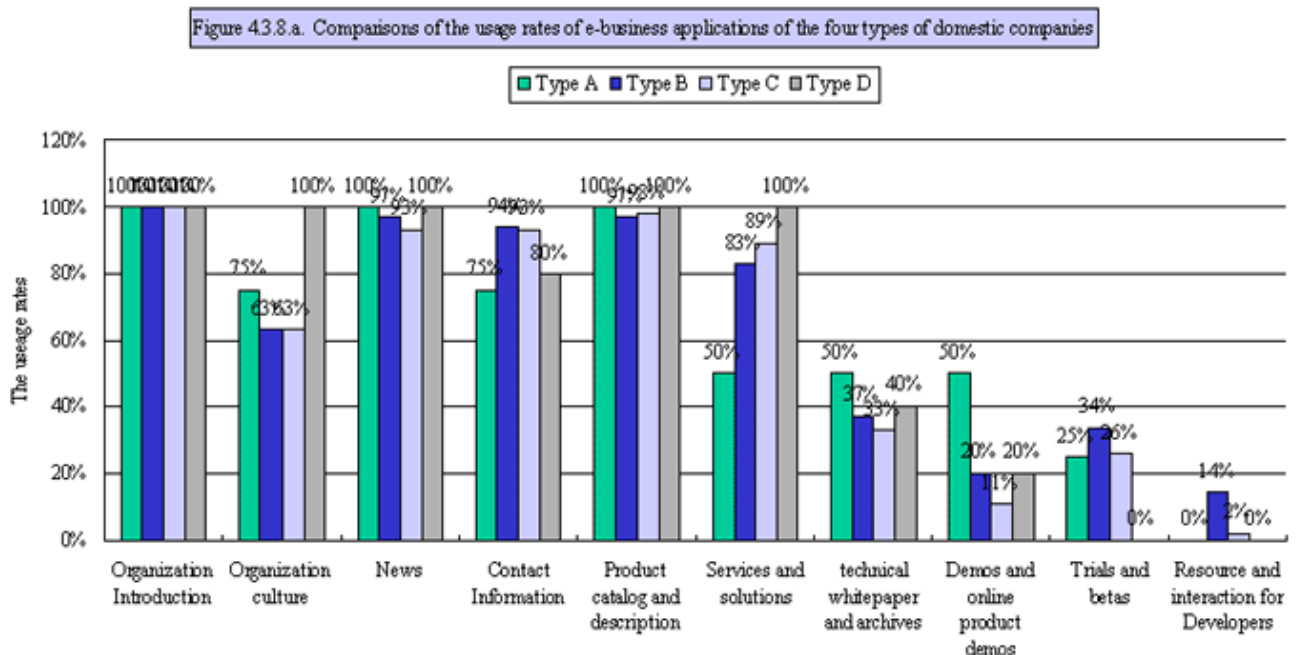


Figure 43.8.b. Comparisons of the usage rates of e-business applications of the four types of domestic companies

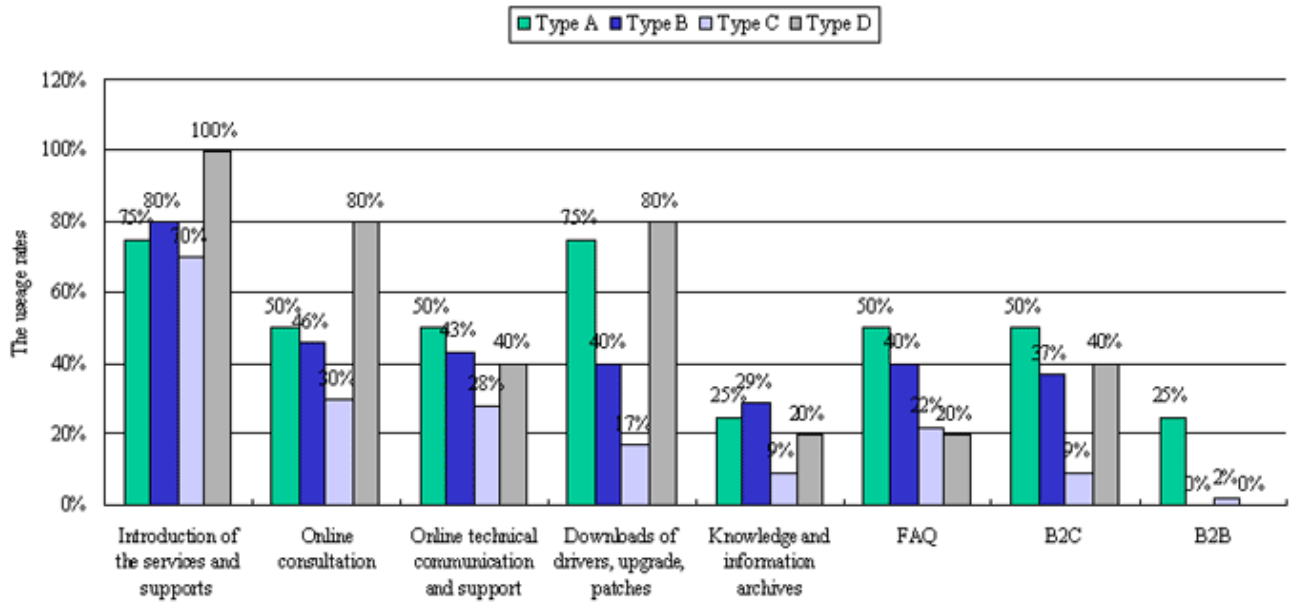


Figure 43.8.c. Comparisons of the usage rates of e-business applications of the four types of domestic companies

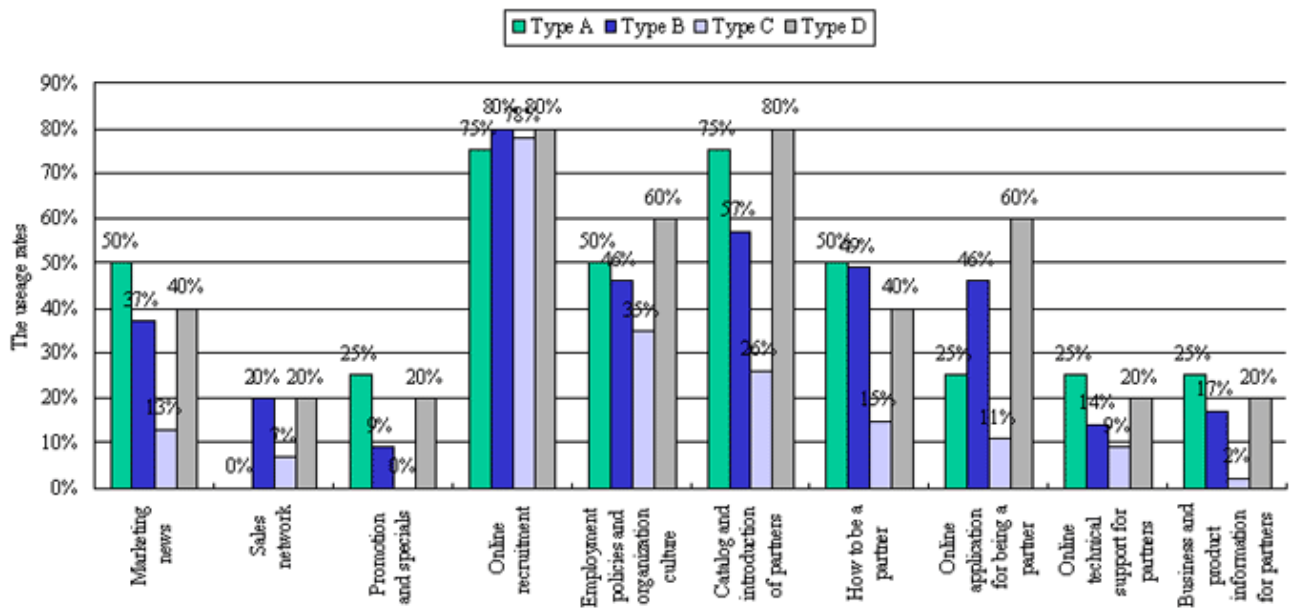
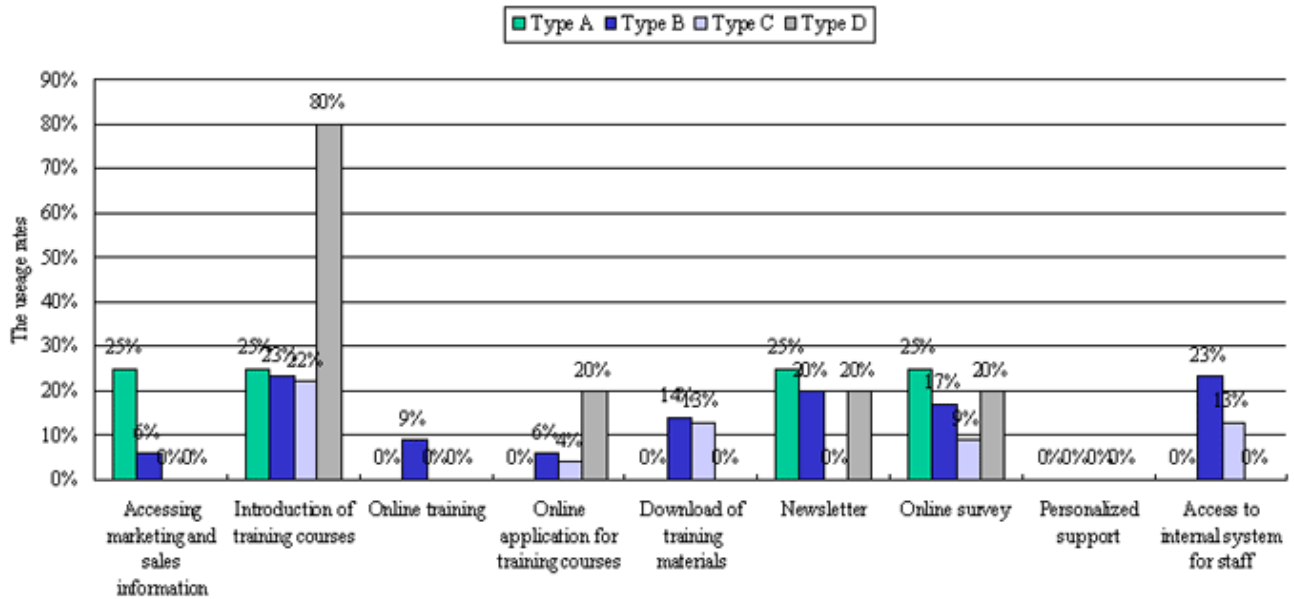


Figure 43.8.d. Comparisons of the usage rates of e-business applications of the four types of domestic companies



Figures 4.3.8a, 4.3.8b, 4.3.8c and 4.3.8d display the comparison of e-business applications by the four types of domestic IT companies. They are:

Type A: general purpose software development and services;

Type B: application software development and services;

Type C: domain-specific application development and services;

Type D: systems, communication system development, related software development and services.

The followings are some conclusions from the comparison:

- Domestic companies in all four types have high usage rates in introduction of organization, introduction of products and services, solution descriptions, and online recruitment. The difference between different types is small.
- It is noticeable that companies in type D has 100% usage rate in organization culture. Companies in type D have higher usage rates in other three e-business applications: introduction of the services and supports (100%), online consultation (80%), downloads of drivers, upgrade, patches (80%).
- Comparatively, companies in types A and D have higher overall usage rates than companies in types B and C. Companies in type C has the lowest usage rates in almost all the e-business applications we evaluate. Specifically, companies in type C have very low usage rate in customer services and support, B2C, marketing promotion, collaboration support for partners, online education and training

4.3 Level of applications and their effectiveness of e-business applications on enterprise portals

This section presents and compares the actual effectiveness of e-business applications of all selected companies. The effectiveness evaluation is by using the evaluation method and process developed in the evaluation of benchmark international companies.

The rest of the section is organized as follows:

- We first compare the overall evaluation of individual companies' portal against the e-business application items.
- Then we present the average evaluation results of international companies, domestic large companies, domestic regional leading companies, domestic medium and small companies, separately.
- The comparison is first on international companies and domestic companies as a whole, followed by a more detailed comparison of international companies, domestic large companies, domestic regional leading companies, domestic medium and small companies.
- We then compare the effectiveness of e-business applications of domestic companies of three regions: central cities of software industry, eastern region, central and western region.
- Finally we compare the effectiveness of e-business applications of four types of domestic companies based on their business.

4.3.1 Presentation of the evaluation results of e-business applications of international companies and domestic companies

Figure 4.5. Overall result of evaluation of all e-business applications for international companies, domestic large companies, domestic regional leading companies, and medium and small companies

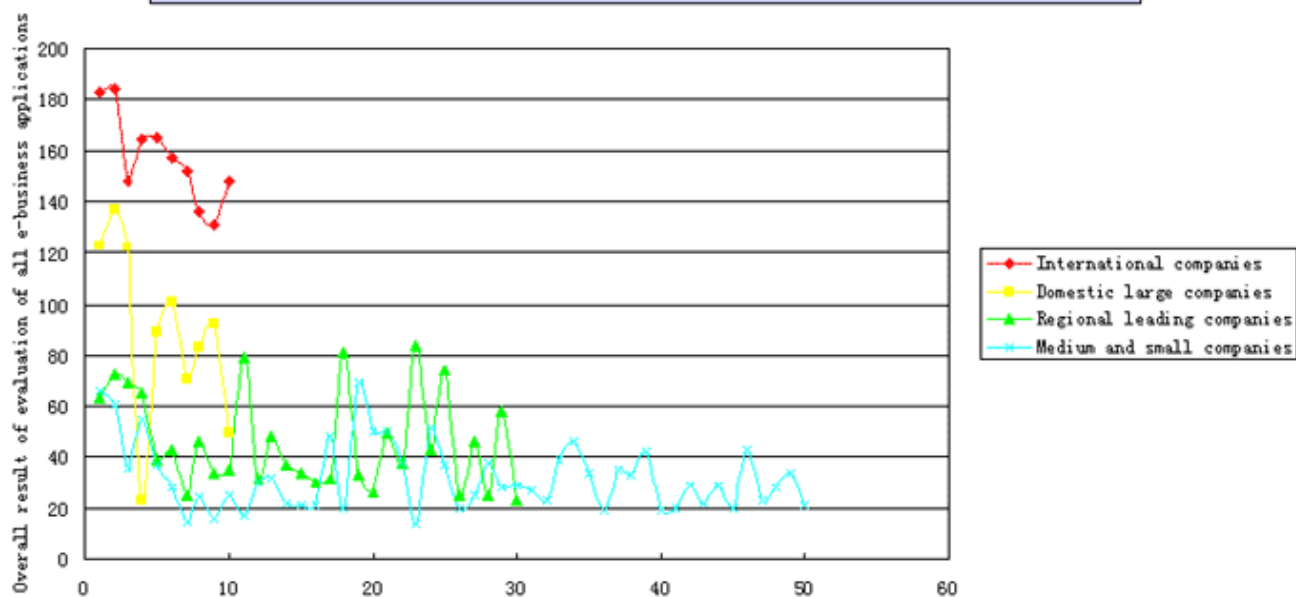


Figure 4.5 shows the overall result of evaluation of all e-business applications for international companies, domestic large companies, domestic regional leading companies, and medium and small companies. The result indicates the overall effectiveness of such applications as well.

The figure is produced by the following method:

- The vertical direction is the sum of evaluation scores of all e-business application items to be evaluated.
- The horizontal direction is the number of companies. Therefore there are 10 international companies, 10 domestic large companies, and so on.

- Each category of companies evaluated will be represented by a specific colour. Companies in the same category will be connected by a same coloured line. Red is for international companies; yellow is for domestic large companies; green is for domestic regional leading companies; and light blue for domestic medium and small companies.

It is clear from the comparison, international companies have the highest application effect. Domestic companies have quite big difference with international companies. Domestic large companies are better than regional leading companies; and regional leading companies are better than medium and small companies. The differences between different groups of domestic companies are not big compared the difference with international companies.

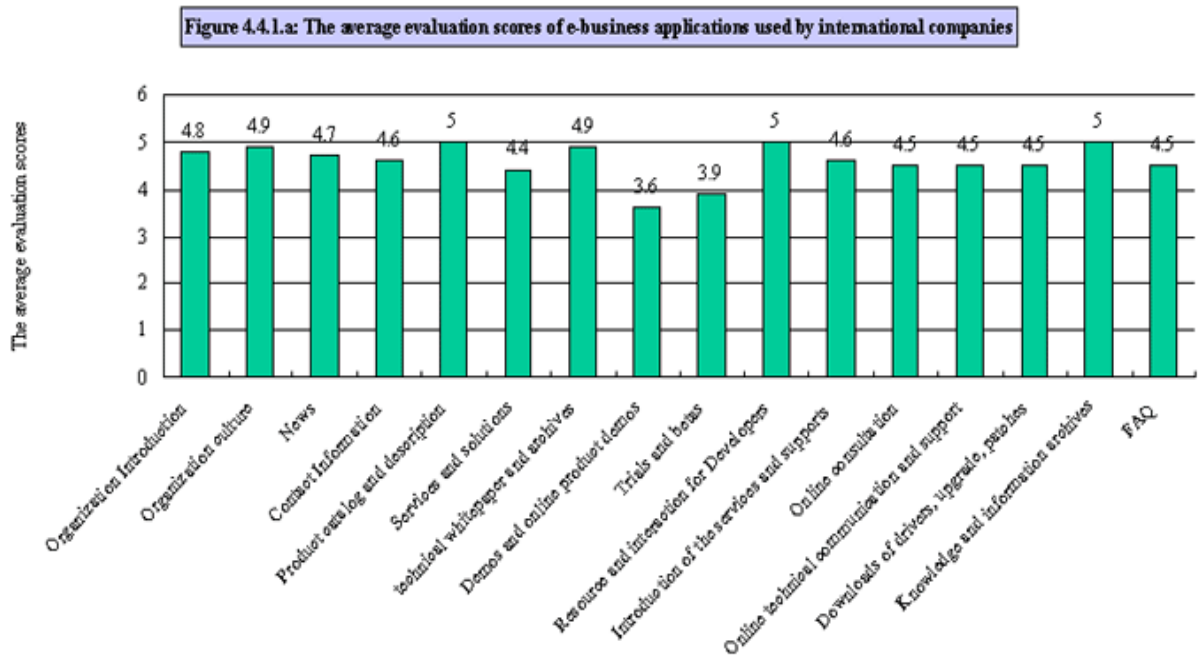
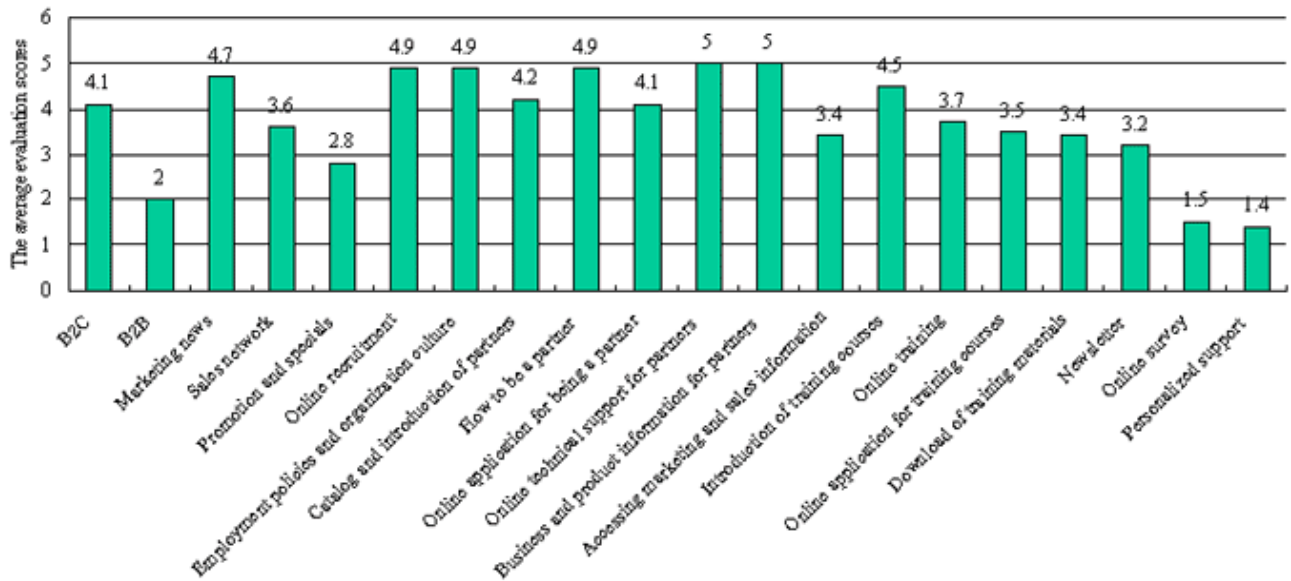


Figure 4.4.1.b: The average evaluation scores of e-business applications used by international companies



Figures 4.4.1a and 4.4.1b displays the level and effectiveness of e-business applications of international companies. Based on the figures we have the following conclusions:

- The overall level and effectiveness of applications of international companies are very high. Most applications have 4 or above evaluation results.
- Taking evaluation result 3 as pass mark, only four applications have a below 3 evaluation results. Those are: B2B, promotion and specials, online survey, personalized support. As we discussed earlier, the main reason for the low results in B2B and promotion and specials is that some international companies may not use the applications on their enterprise portals and use separate systems for the purpose. This put down the average evaluation scores. Another possible reason is that some international companies are running the similar conventional partner network. One other two applications, online survey and personalized supports, the reason is that either because the online applications are not effective, or because the technology is still new and difficult to adopt.
- More than half of the e-business applications have 4.5 or above evaluation.

Figure 4.4.2.a: The average evaluation scores of e-business applications used by domestic large companies

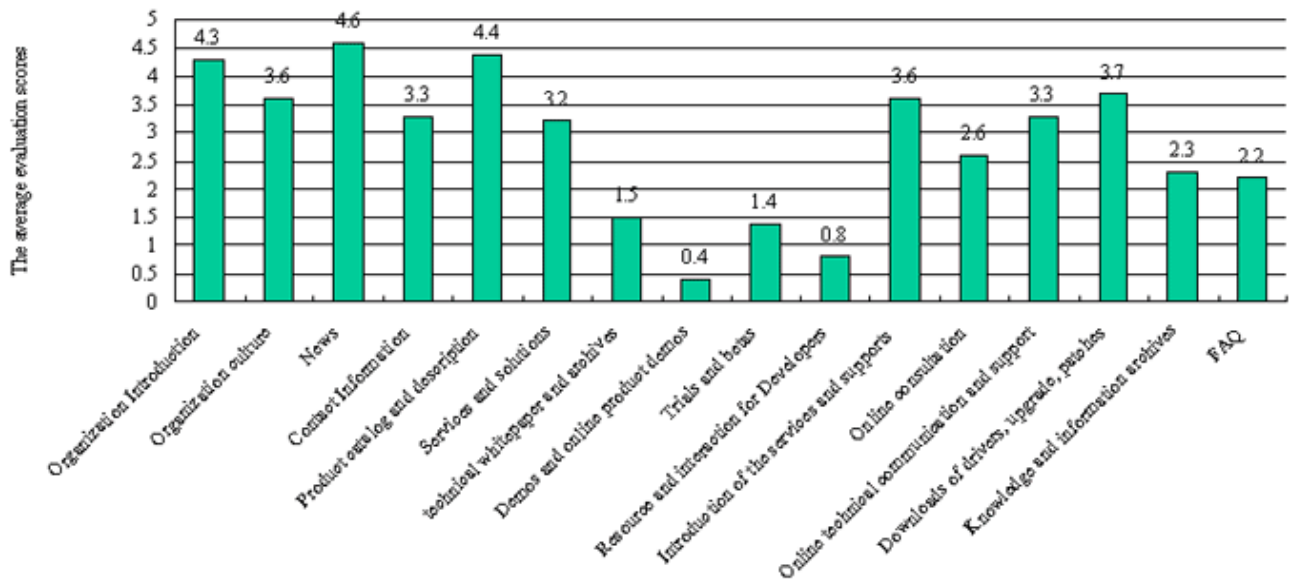
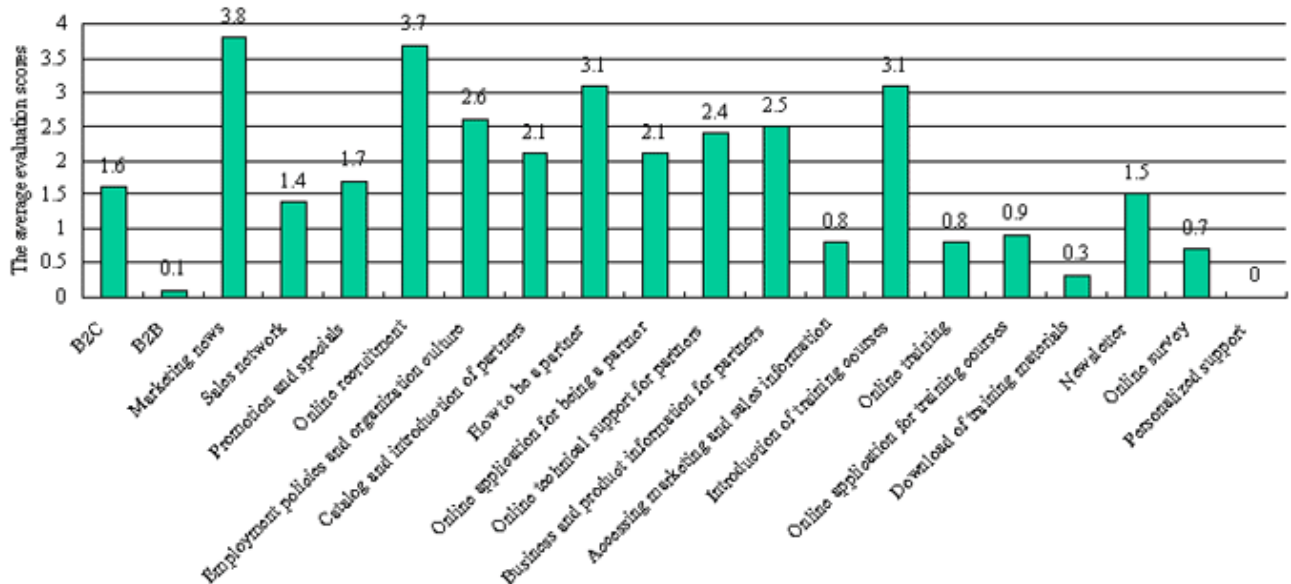


Figure 4.4.2.b: The average evaluation scores of e-business applications used by domestic large companies



Figures 4.4.2a and 4.4.2b shows the average evaluation scores of e-business applications used by domestic large companies. Through the analysis we have the following conclusions:

- Less than 40% of e-business applications have a pass or above average evaluation scores for domestic large companies.
- The e-business applications with low average evaluation scores are concentrated in aspects such as product white paper and archives, demos and trials, technical support for developers, online sales, online education and trainings, etc.
- Applications with very low average evaluation scores are: demos and online product demos (0.4), resource and interaction for developers (0.8), B2B (0.1), accessing

marketing and sales information for partners (0.8), online training (0.8), online application for training courses (0.9), download of training materials (0.3), online survey (0.7), personalized support (0).

- The same low evaluation results apply to domestic large companies.
- There are three applications have over 4 evaluation scores: organization introduction, news, product catalog and description.
- The applications with over 3 evaluation scores are: organization culture, contact information, services and solutions, introduction of the services and supports, online technical communication and support, downloads of drivers, upgrade, patches, marketing news, online recruitment, how to be a partner, introduction of training courses.

Overall, domestic large companies perform well in some basic e-business applications, including organization introduction, products and solutions, customer services and supports, and human resources. On aspects such as partner collaboration, online training, online sales, and marketing promotion, domestic large companies usually give basic and general information. They merely apply the network technology to make the applications more useful and effective.

Figure 4.4.3.a: The average evaluation scores of e-business applications used by domestic regional leading companies

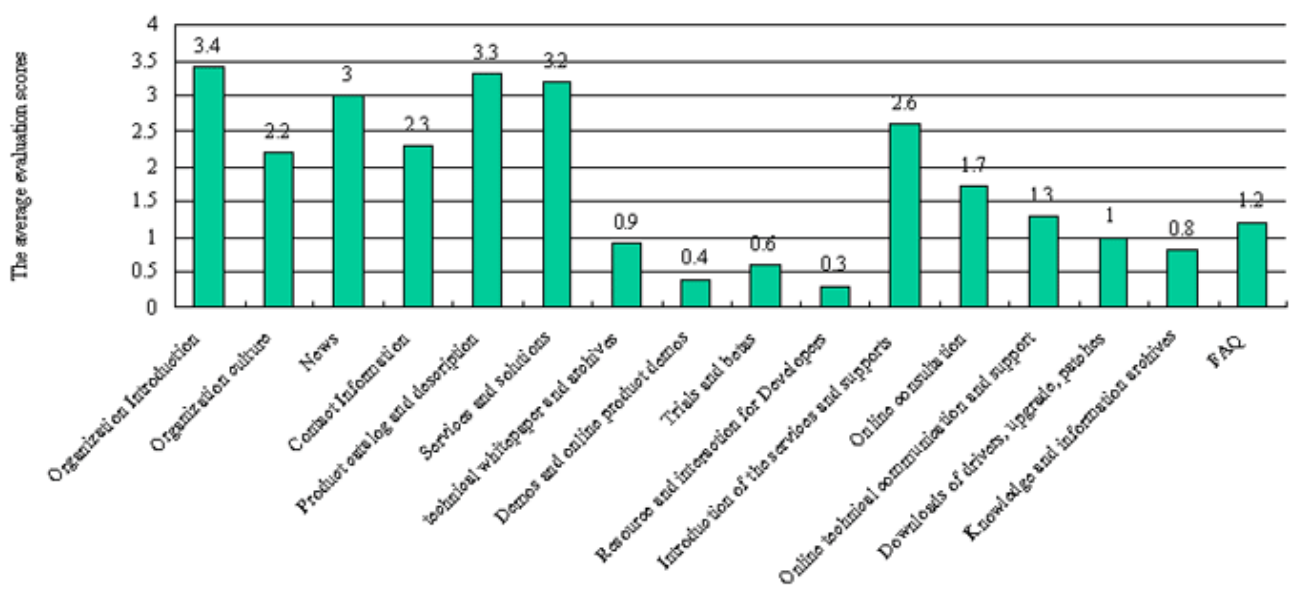
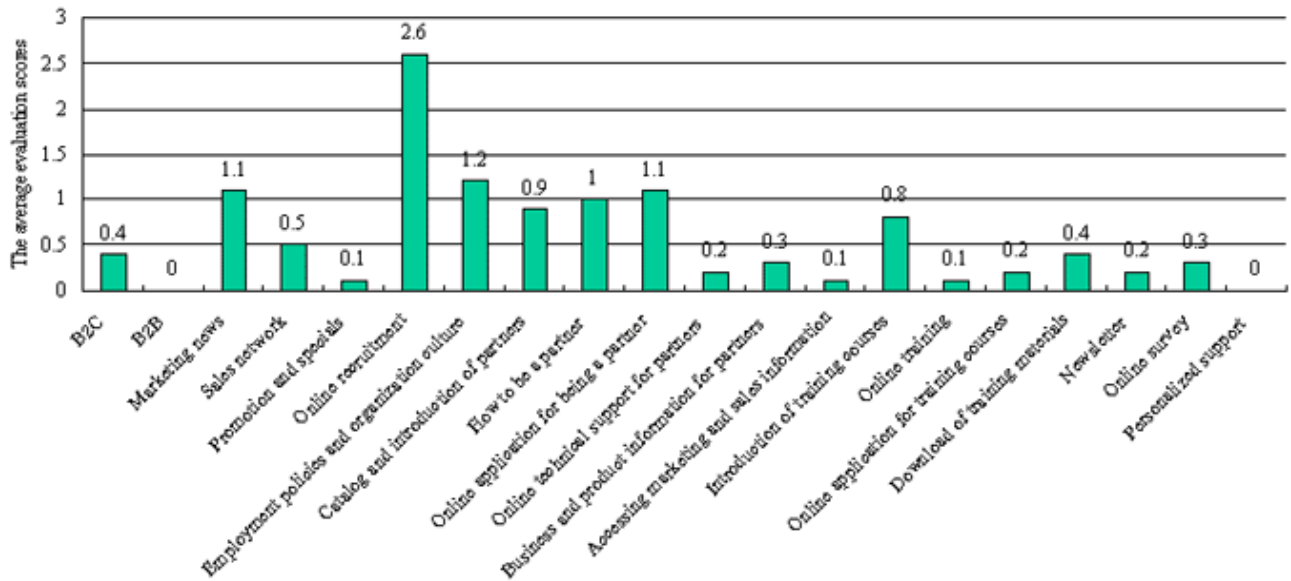


Figure 4.4.3.b: The average evaluation scores of e-business applications used by domestic regional leading companies



Figures 4.4.3a and 4.4.3b show the average evaluation scores of e-business applications by domestic regional leading companies.

The analysis of the evaluation is as follows:

- There are only four applications have 3 or above average evaluation scores: organization introduction, news, product catalog and description, services and solutions. Such e-business applications are among the most primitive e-business applications.
- More than half e-business applications have average evaluation scores less than 1, i.e. very basic and usually do not work at all.
- Compared with the average usage rates of the same e-business applications, some applications in fact have high usage rate. This means that the effectiveness of such applications is very low. The results indicate that some applications are well regarded by companies but not being able to be developed properly and/or be used effectively. A possible reason is that there is not sufficient capability of developing such applications in Mainland China. But a more possible reason is the companies do not put in sufficient resources to support the applications. For example, more than 57% regional leading companies use "online consultation" but the average evaluation score is only 1.7. This is because although many companies provide the applications through their portals, they merely response the requests properly or quickly. Many such applications are only there but do not work at all. Two other similar applications, "catalog and introduction of partners" and "how to be a partner", have the same high usage rate 47% but very low evaluation scores, 0.9 and 1, respectively. Many companies provide the applications on their portals, but provide only little information. Some of them simply put logos of some of their partners and nothing more than that.

Figure 4.4.4.a: The average evaluation scores of e-business applications used by domestic medium and small companies

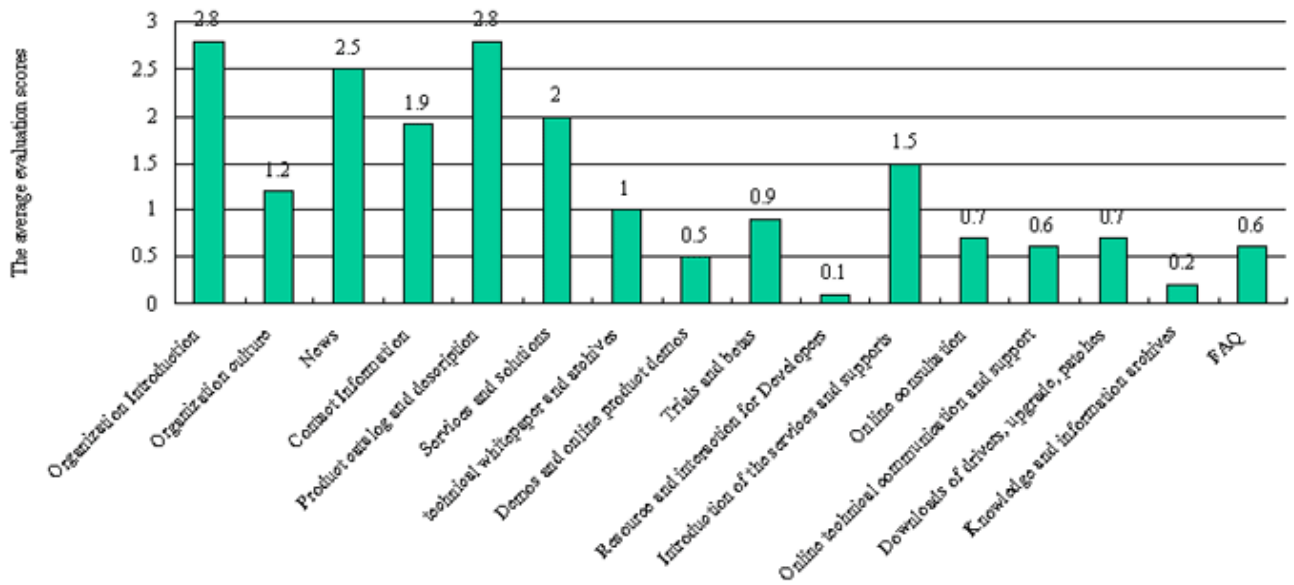
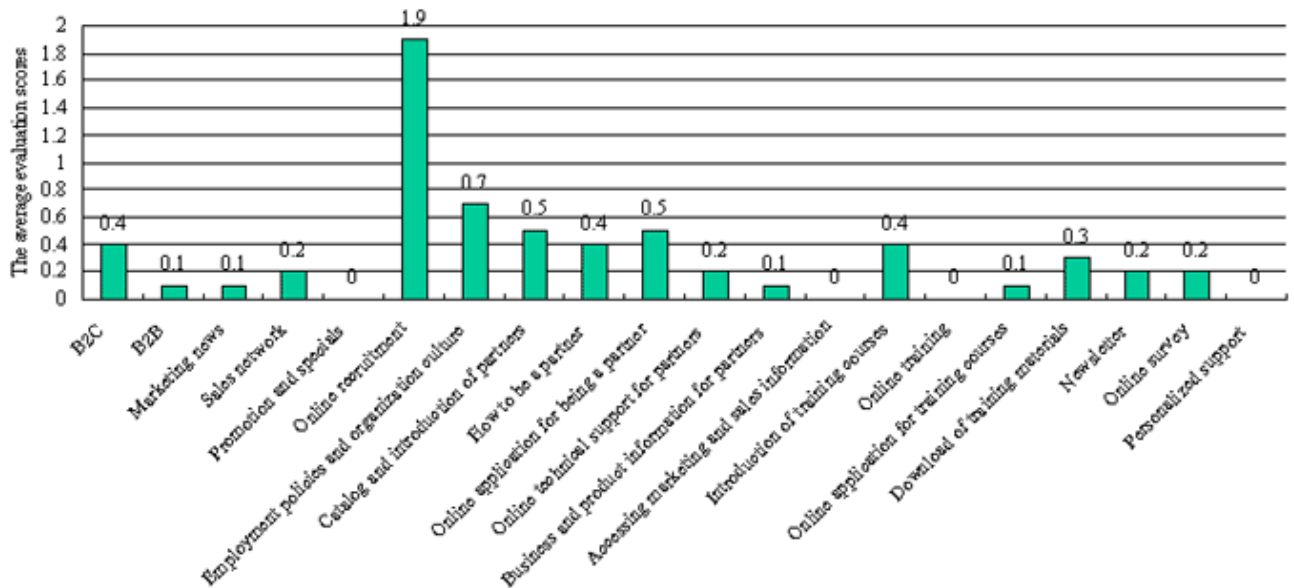


Figure 4.4.4.b: The average evaluation scores of e-business applications used by domestic medium and small companies



Figures 4.4.4a and 4.4.4b display the average evaluation results of e-business applications of domestic medium and small companies.

The following are the analysis:

- The average evaluation score for each of e-business applications of the companies is below 3, i.e. the pass mark. Even for those usually widely used with high usage rate such as "organization introduction", "news", "contact information", "product catalog

and description”, services and solutions”, the average evaluation score of each of them is still below the pass mark 3.

- More than 75% of e-business applications have less than 1 average evaluation result.
- Most portals of medium and small companies normally provide brief information on their portals. Very little more advanced e-business applications are used.
- Many portals of medium and small companies lack of maintenance and proper update.

4.3.2 Comparison of the effectiveness of e-business applications of international companies and overall domestic companies

Figure 44.5.a. Comparisons of the average evaluation scores of e-business applications of international companies and domestic companies

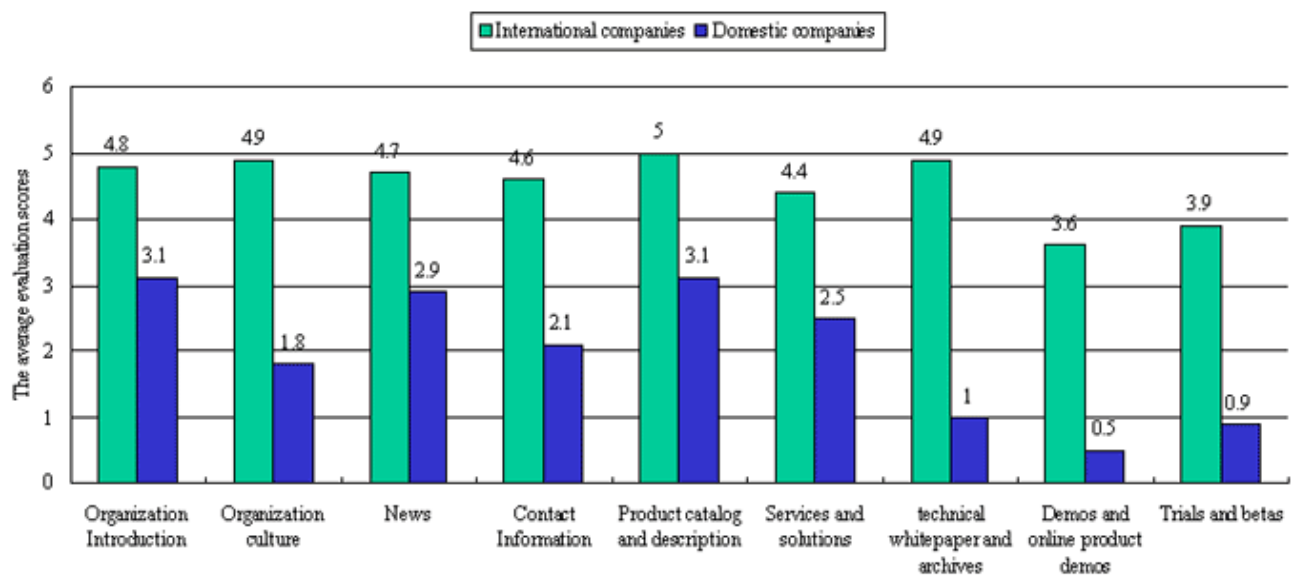


Figure 44.5.b. Comparisons of the average evaluation scores of e-business applications of international companies and domestic companies

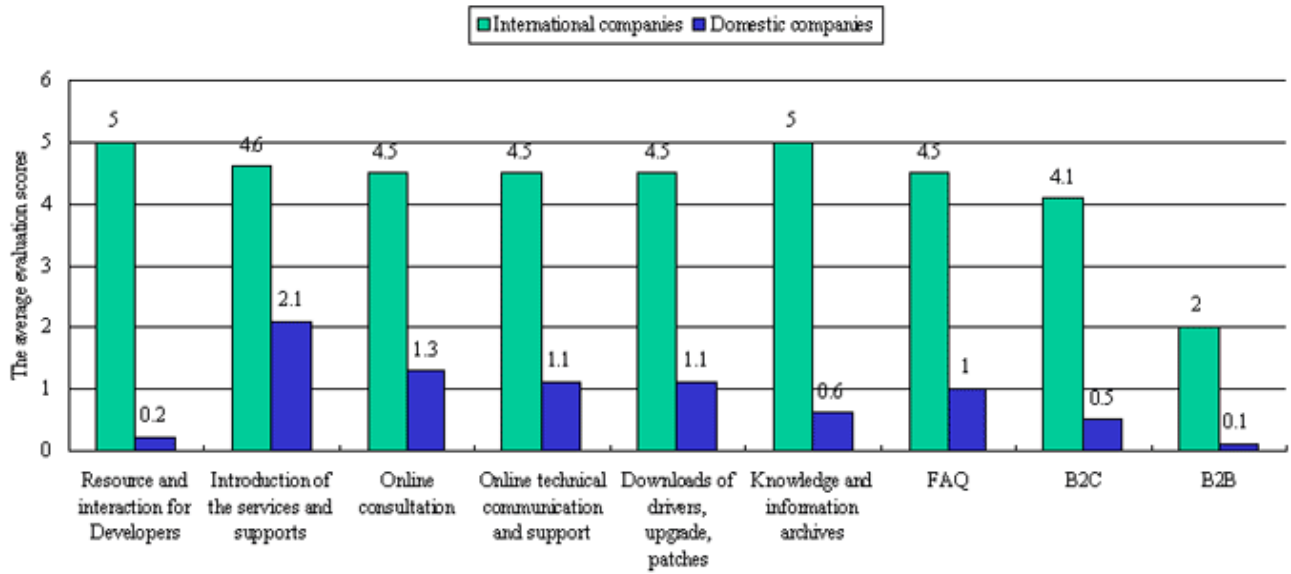


Figure 44.5.c. Comparisons of the average evaluation scores of e-business applications of international companies and domestic companies

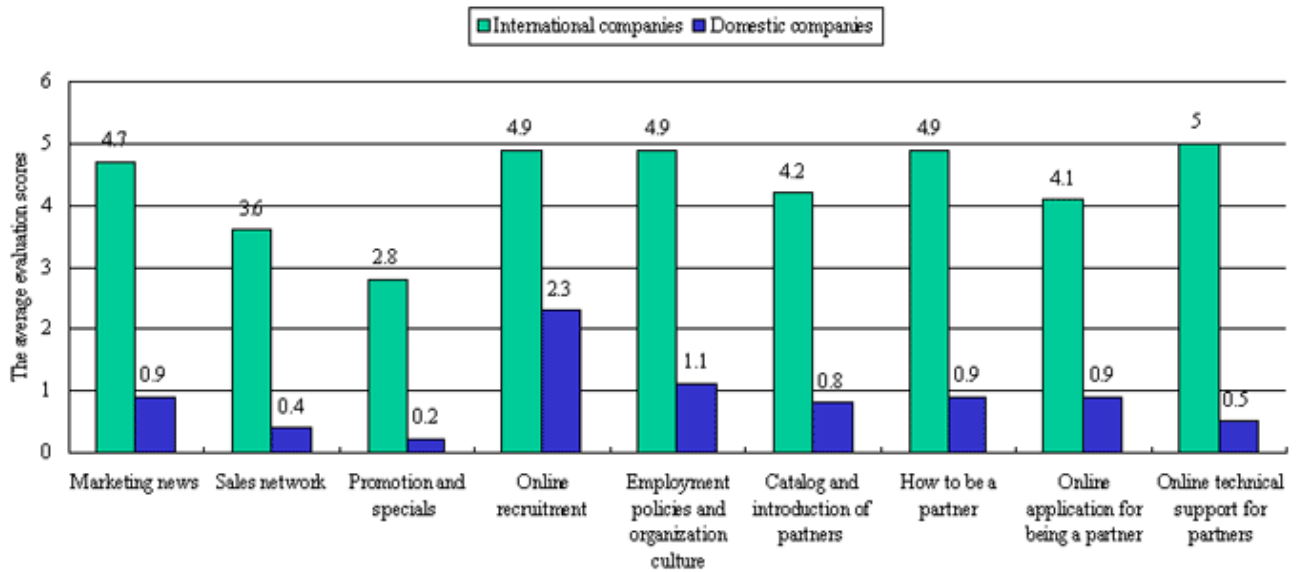
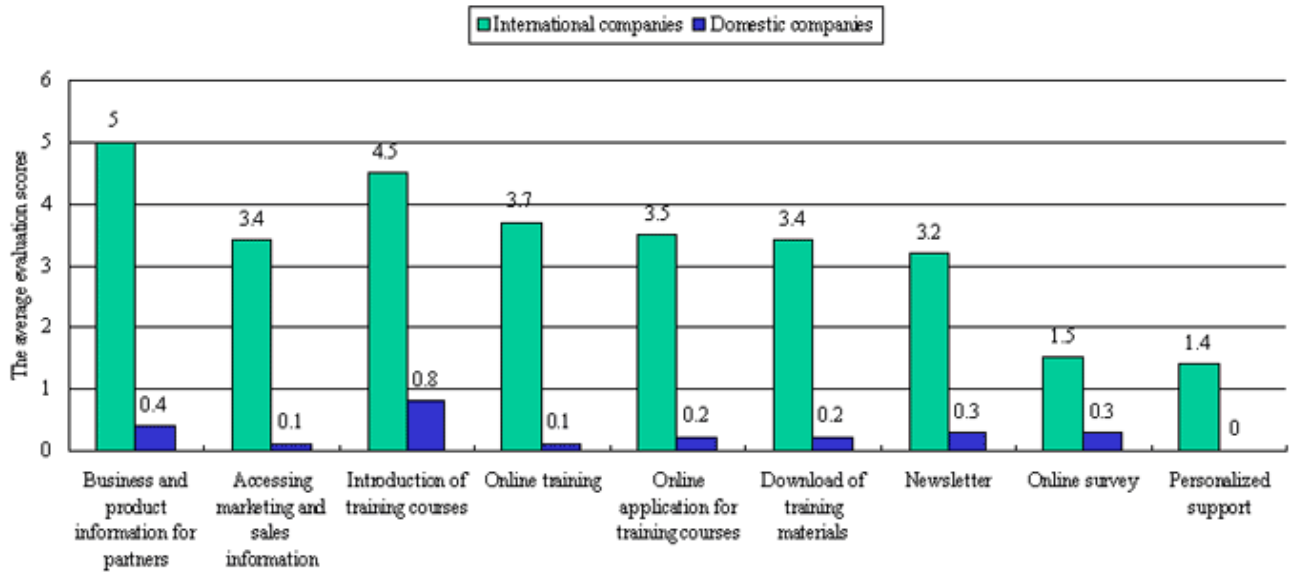


Figure 4.4.5.d. Comparisons of the average evaluation scores of e-business applications of international companies and domestic companies



Figures 4.4.5a, 4.4.5b, 4.4.5c and 4.4.5d compare the average evaluation scores of e-business applications of international companies and domestic companies.

The following are the analysis of the comparison:

- There is a huge difference in the effect of e-business application between international companies and domestic companies. The difference is even bigger than the difference in average usage rates.
- Domestic companies only have average evaluation score over the pass mark (3) in two primitive e-business applications: organization introduction and product catalog and description.
- Although we understand that there should be some difference in overall average evaluation scores due to the fact we select only leading international companies while we have many small domestic companies selected, the bigger difference in application effect than the difference in usage rate is alerting. For example, on "organization introduction" where both international companies and domestic companies have 100% usage rate, the average evaluations are 4.8 and 3.1 respectively. Another application "news" where the two groups have close usage rate, have average evaluation scores 4.7 and 2.9 respectively. Another application "product catalog and description" with close usage rate have average evaluation scores 5 and 3.1 respectively. This indicates that even for those widely used and requiring little technical supports, the effect of using the applications by domestic companies have usually is two levels lower than that of international companies.

4.3.3 Comparison of the effectiveness of e-business applications of international companies and three kinds of domestic companies based on their size

Figure 4.4.6. a Comparisons of the average evaluation scores of e-business applications of international companies, domestic large companies, domestic regional leading companies, and domestic medium and small companies

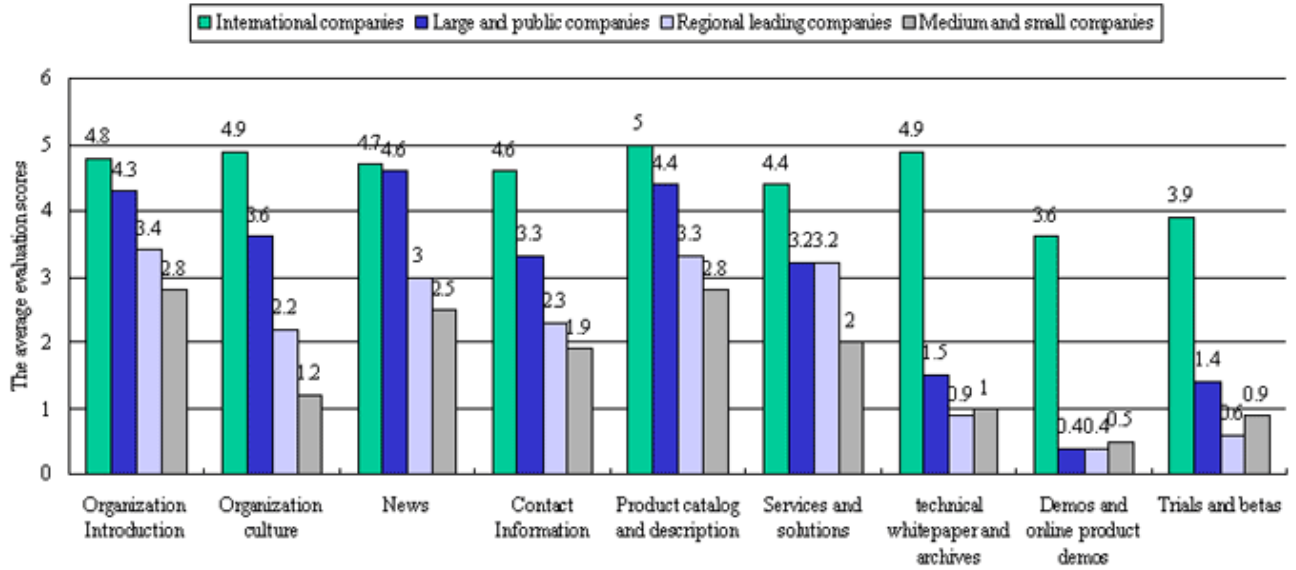


Figure 4.4.6. b Comparisons of the average evaluation scores of e-business applications of international companies, domestic large companies, domestic regional leading companies, and domestic medium and small companies

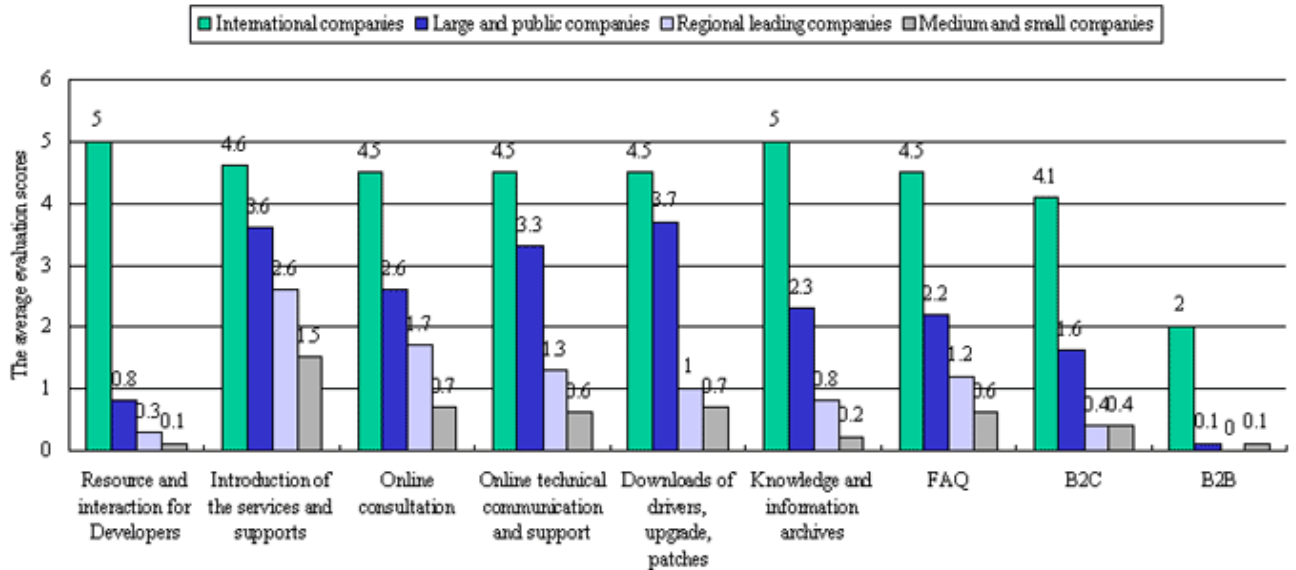


Figure 4.4.6.c. Comparisons of the average evaluation scores of e-business applications of international companies, domestic large companies, domestic regional leading companies, and domestic medium and small companies

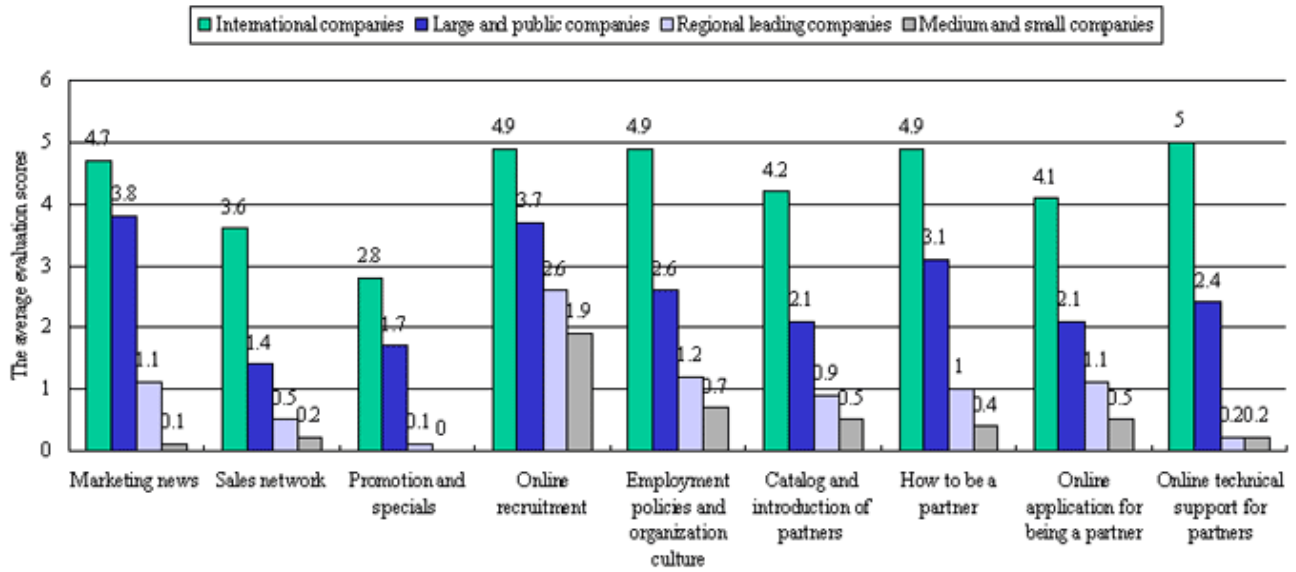
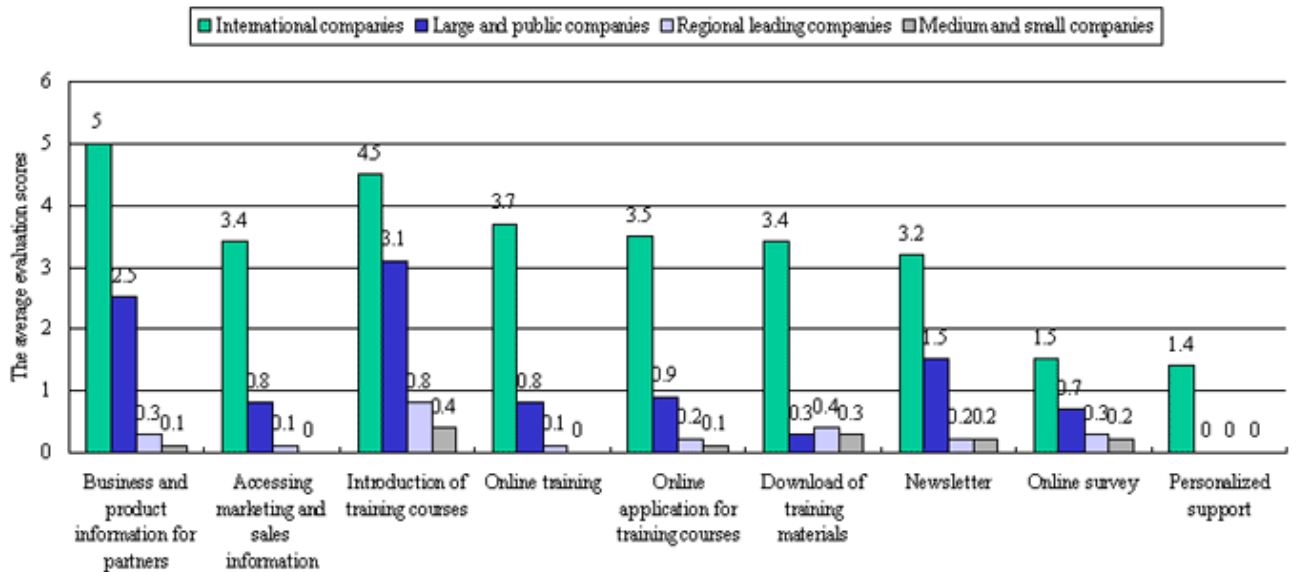


Figure 4.4.6.d. Comparisons of the average evaluation scores of e-business applications of international companies, domestic large companies, domestic regional leading companies, and domestic medium and small companies



Figures 4.4.6a, 4.4.6b, 4.4.6c and 4.4.6d compare the average evaluation results of e-business applications of international companies, domestic large companies, domestic regional leading companies, and domestic medium and small companies.

The followings are the analysis of the comparison:

- Domestic large companies have the smallest difference compared with international companies in e-business application effect. However the difference compared with international companies is still big.
- Except on "organization introduction" and "products and solutions" where the application effect is very close to that of international companies, domestic large

companies have distinct higher evaluation results, compared with other domestic companies, in the following four aspects of e-business applications: customer services and supports, marketing promotion, collaboration with partners, and online trainings. However the difference with international companies on the four aspects is still big.

- There are still some aspects of e-business applications where all three groups of domestic companies score very low without clear difference. Such aspects of e-business applications include: technical white paper and archives, demos and online product demos, trials, and betas, resource and interaction for developers, B2B, accessing marketing and sales information for partners, online training, online application for training courses, download of training materials, online survey, personalized support.

4.3.4 Comparisons of the effectiveness of e-business applications of the domestic companies in three regions

Figure 4.4.7.a. Comparisons of the average evaluation scores of e-business applications of the domestic companies in three regions

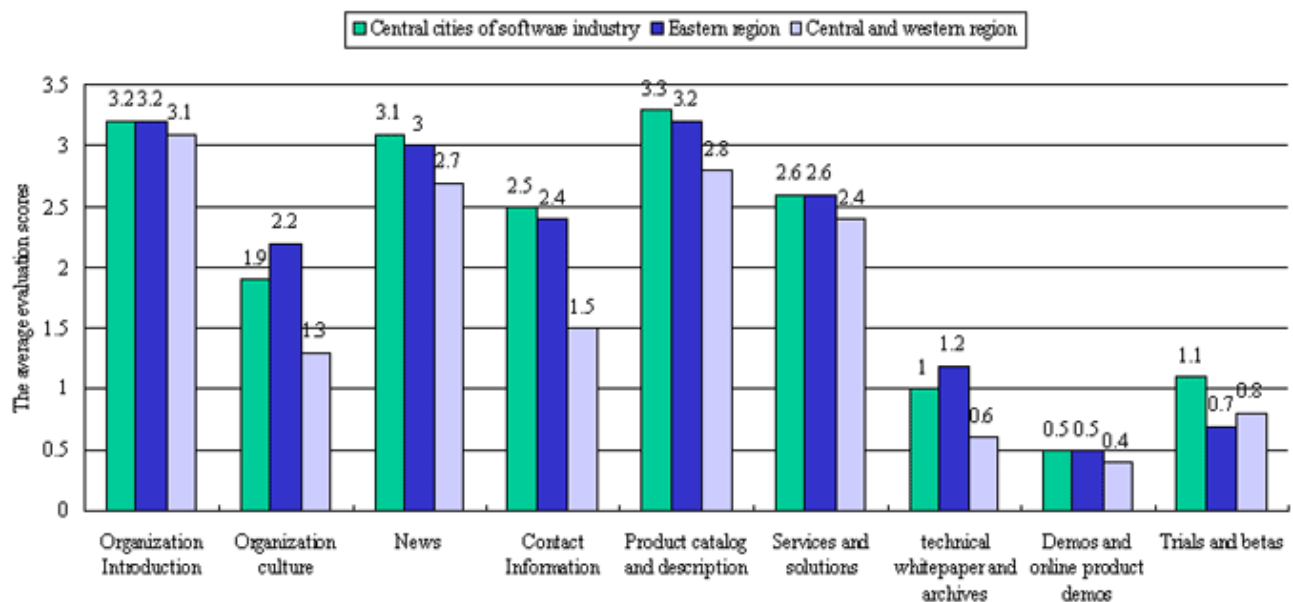


Figure 44.7.b. Comparisons of the average evaluation scores of e-business applications of the domestic companies in three regions

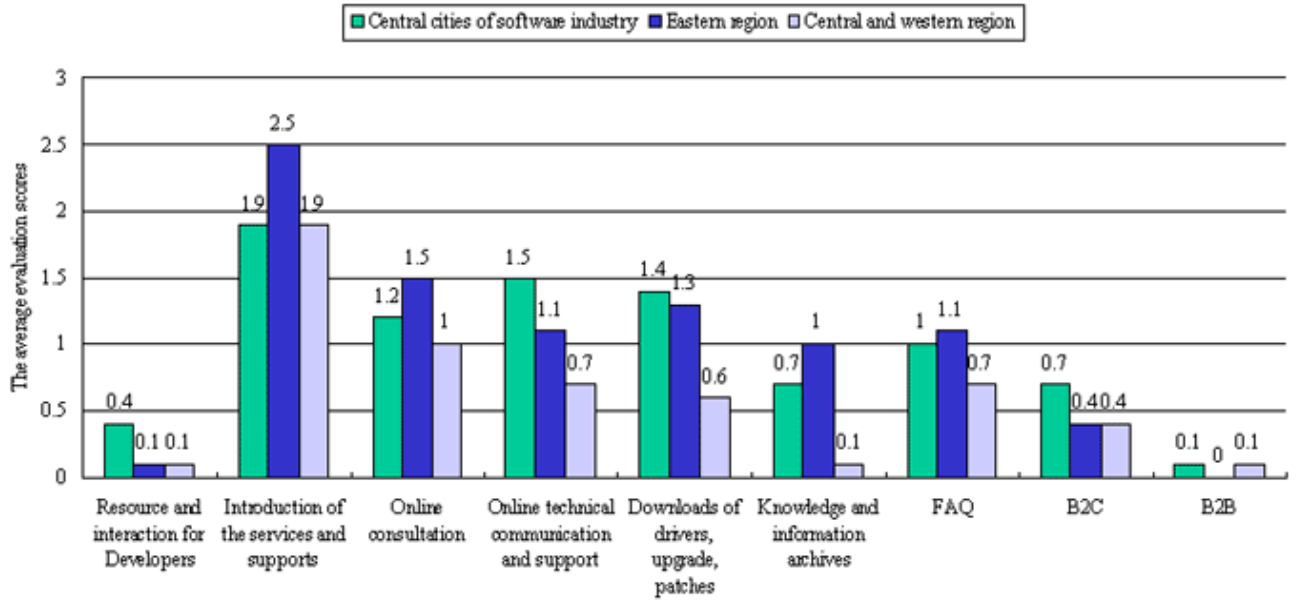


Figure 44.7.c. Comparisons of the average evaluation scores of e-business applications of the domestic companies in three regions

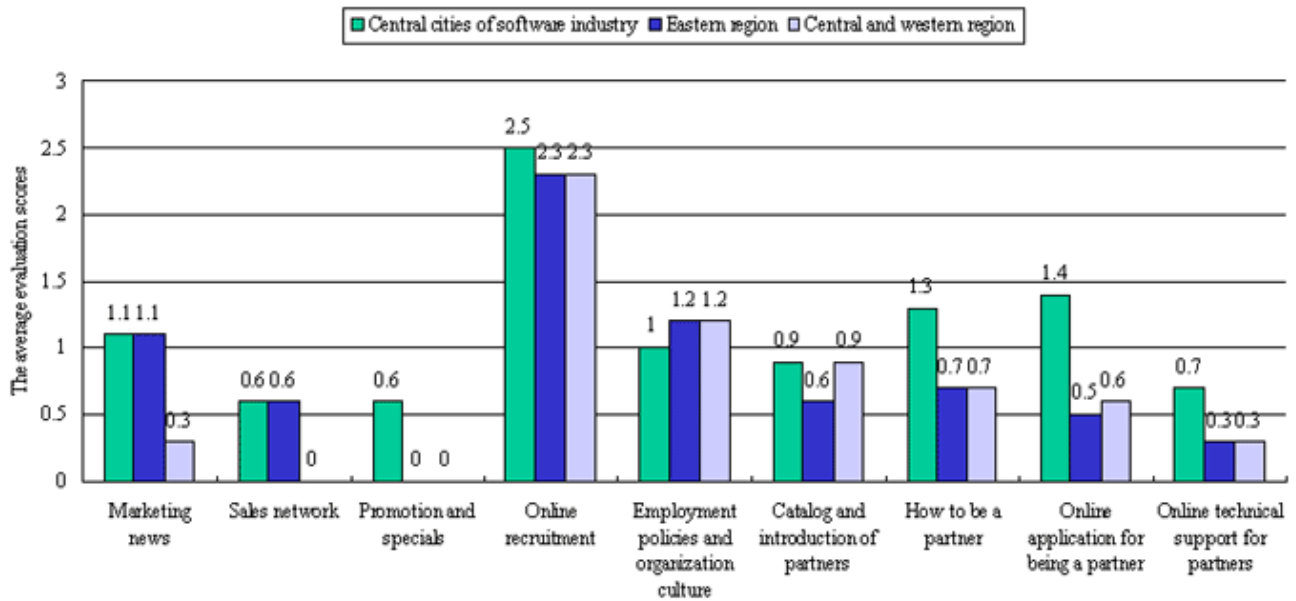
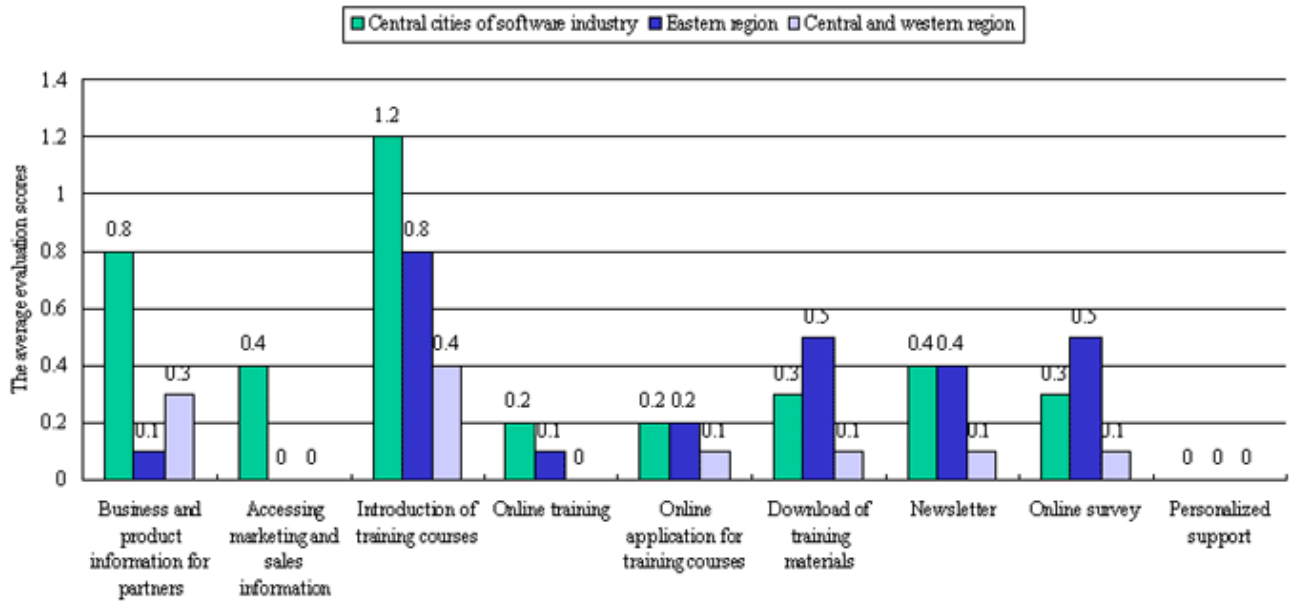


Figure 4.4.7.d. Comparisons of the average evaluation scores of e-business applications of the domestic companies in three regions



Figures 4.4.7a, 4.4.7b, 4.4.7c and 4.4.7d compare the average evaluation results of domestic companies in three regions: central cities of software industry, eastern region, central and western region.

The followings are the analysis results based on the comparison:

- The differences between regions are not big.
- Overall, the average evaluation results of central cities are a little higher than those of eastern region; the average evaluation results of eastern region are a little higher than those of central and western region.
- There are, however, some applications where companies in eastern region have relatively higher average evaluation scores of companies in central cities. Such applications include: organization culture, technical white paper and archives, introduction of the services and supports, online consultation, knowledge and information archives, FAQ, download of training materials, online survey. This indicates that companies in eastern region have better use and effect in customer service and online information providing.

4.3.5 Comparison of the effectiveness of e-business applications of the four types of domestic companies

Figure 4.4.8.a. Comparisons of the average evaluation scores of e-business applications of the four types of domestic companies

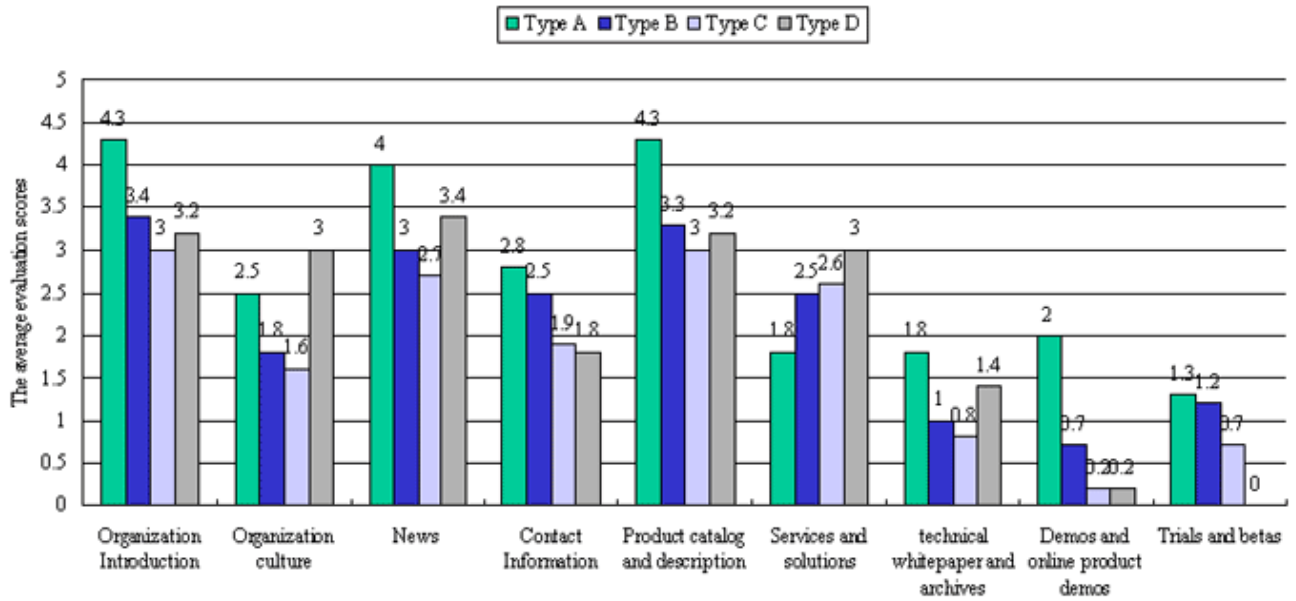


Figure 4.4.8.b. Comparisons of the average evaluation scores of e-business applications of the four types of domestic companies

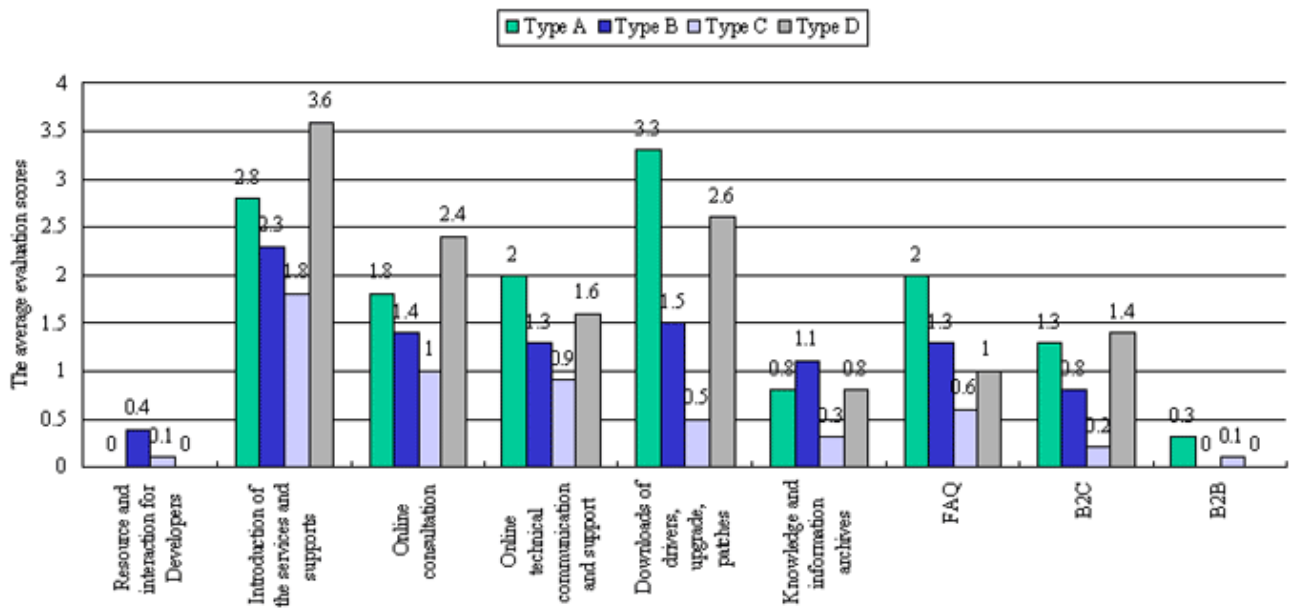


Figure 4.4.8.c. Comparisons of the average evaluation scores of e-business applications of the four types of domestic companies

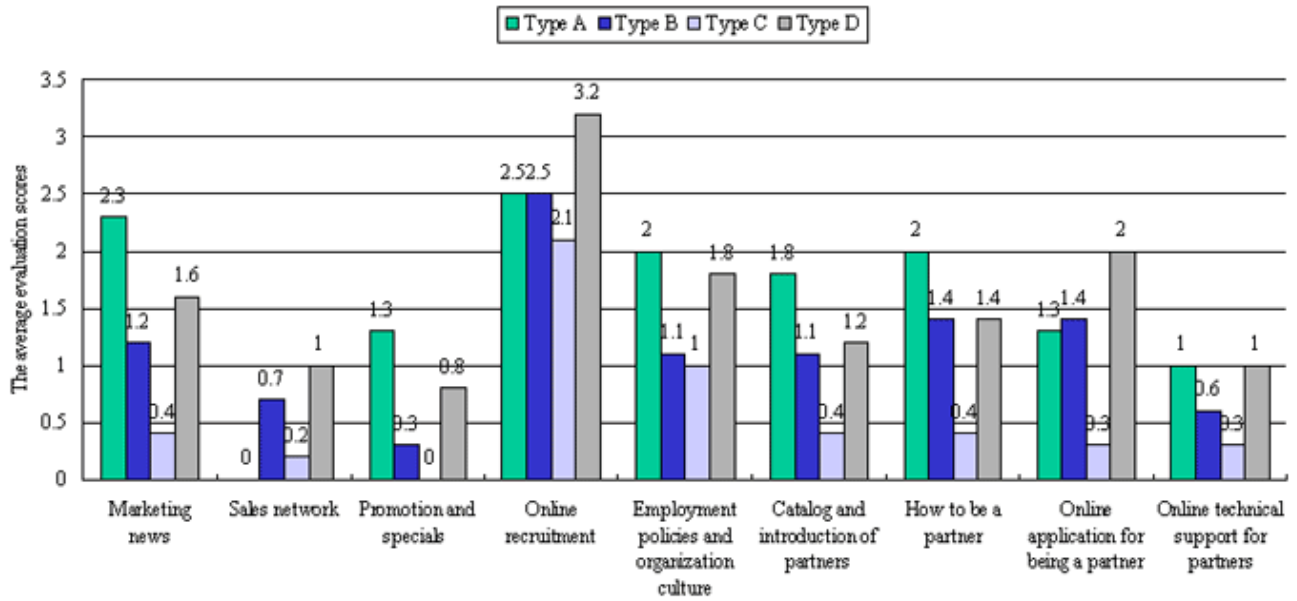
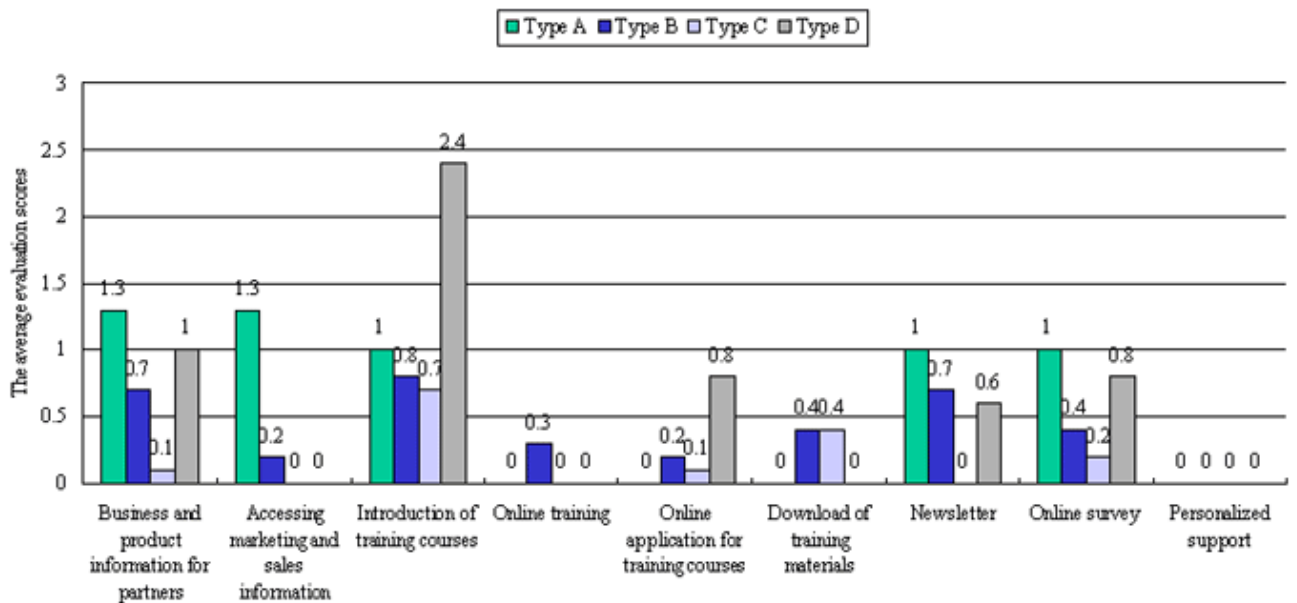


Figure 4.4.8.d. Comparisons of the average evaluation scores of e-business applications of the four types of domestic companies



Figures 4.4.8a, 4.4.8b, 4.4.8c and 4.4.8d compare the average evaluation results of e-business applications of the four types of domestic IT companies: type A: general purpose software development and services; type B: application software development and services; type C: domain-specific application development and services; and type D: systems, communication system development, related software development and services.

Following is the analysis of the comparison:

- Overall, companies of type A and type D have higher application effect than companies of other two types.

- Companies of type C have the lowest application effect.
- Companies of type A have higher evaluation results in the following applications: organization introduction, products and solutions, online customer services and supports, and download technical archives. This indicates general purpose software companies regard products and customer support very high in their business.
- Companies of type D have higher evaluation results in the following applications: introduction of the services and supports, online consultation, online recruitment, introduction of training courses. This indicates that companies in this type regard service more than other companies.
- Companies in type B and type C have the lowest average evaluation results. Many in the two types are medium and small companies and usually invest not as high as companies in other two types.

4.4 Concluding Remarks on the Comparative Analysis

According to the analysis of the evaluation results, we can see that domestic companies are far behind international companies on e-business applications via enterprise portals on the web. Among domestic companies, large and public companies have relative smaller difference with international companies, while the huge differences are mainly those medium and small domestic companies.

Compared domestic companies in different regions, central cities of software industry and eastern developed region have relative similar level of e-business applications. Companies in central and western under developed region are more behind in e-business applications.

Compared e-business applications by different types of domestic IT companies, general purpose software companies and system companies have similar higher usage rates and level of applications. Domain application companies have the lowest application level.

Medium and small companies and companies in central and western under developed regions have very low level of e-business applications. Their e-business applications are still concentrated in a few basic e-business applications: introduction products and services, products and solutions, and recruitment. On those more effective but more complicated and requires higher level technology supports, medium and small companies and companies in central and western region have very low usage rate and low level of applications.

The following table shows more clearly the current status of e-business applications of domestic companies.

Table 4.1. E-business applications and level of those applications by domestic IT companies (items marked in gray are those usage rate is higher than 50% and the average evaluation is 3 or more)

	Applications with 50% or higher usage rate	Applications with average score of 3 or higher (3 is the satisfactory mark)	Number of satisfactory applications
Large and public companies	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (100%) ● News (100%) ● Contact Information (90%) ● Product catalog and description (100%) ● Services and solutions (80%) ● Introduction of the services and supports (90%) ● Online consultation (60%) ● Online technical communication and support (70%) ● Downloads of drivers, upgrade, patches (80%) ● Knowledge and information archives (50%) ● Frequently asked questions (60%) ● B2C (50%) ● Marketing news (90%) ● Online recruitment (80%) ● Employment policies and organization culture (80%) ● Catalog and introduction of partners (80%) ● How to be a partner (80%) ● Online application for being a partner (50%) ● Online technical support for partners (50%) ● Business and product information for partners (50%) ● Introduction of training courses (70%) 	<ul style="list-style-type: none"> ● Organization Introduction (4.3) ● Organization culture (3.6) ● News (4.6) ● Contact Information (3.3) ● Product catalog and description (4.4) ● Services and solutions (3.2) ● Introduction of the services and supports (3.6) ● Online consultation (2.6) ● Online technical communication and support (3.3) ● Downloads of drivers, upgrade, patches (3.7) ● Knowledge and information archives (2.3) ● Frequently asked questions (2.2) ● B2C (1.6) ● Marketing news (3.8) ● Online recruitment (3.7) ● Employment policies and organization culture (2.6) ● Catalog and introduction of partners (2.1) ● How to be a partner (3.1) ● Online application for being a partner (2.1) ● Online technical support for partners (2.4) ● Business and product information for partners (2.5) ● Introduction of training courses (3.1) 	13
Medium and regional leading companies	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (77%) ● News (100%) ● Contact Information (90%) ● Product catalog and description (100%) ● Services and solutions (100%) ● Introduction of the services and supports (90%) ● Online consultation (57%) 	<ul style="list-style-type: none"> ● Organization Introduction (3.4) ● Organization culture (2.2) ● News (3) ● Contact Information (2.3) ● Product catalog and description (3.3) ● Services and solutions (3.2) ● Introduction of the services and supports (2.6) ● Online consultation (1.7) 	4

	<ul style="list-style-type: none"> ● Online recruitment (87%) 	<ul style="list-style-type: none"> ● Online recruitment (2.6) 	
Medium and small companies	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (52%) ● News (92%) ● Contact Information (97%) ● Product catalog and description (96%) ● Services and solutions (78%) ● Introduction of the services and supports (64%) ● Online recruitment (74%) 	<ul style="list-style-type: none"> ● Organization Introduction (2.8) ● Organization culture (1.2) ● News (2.5) ● Contact Information (1.9) ● Product catalog and description (2.8) ● Services and solutions (2) ● Introduction of the services and supports (1.5) ● Online recruitment (1.9) 	0
All domestic companies	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (66%) ● News (96%) ● Contact Information (92%) ● Product catalog and description (98%) ● Services and solutions (86%) ● Introduction of the services and supports (76%) ● Online recruitment (79%) 	<ul style="list-style-type: none"> ● Organization Introduction (3.1) ● Organization culture (1.8) ● News (2.9) ● Contact Information (2.1) ● Product catalog and description (3.1) ● Services and solutions (2.5) ● Introduction of the services and supports (2.1) ● Online recruitment (2.3) 	2
Central cities of software industry	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (61%) ● News (97%) ● Contact Information (94%) ● Product catalog and description (97%) ● Services and solutions (85%) ● Introduction of the services and supports (64%) ● Online recruitment (76%) 	<ul style="list-style-type: none"> ● Organization Introduction (3.2) ● Organization culture (1.9) ● News (3.1) ● Contact Information (2.5) ● Product catalog and description (3.3) ● Services and solutions (2.6) ● Introduction of the services and supports (1.9) ● Online recruitment (2.5) 	3
Eastern region	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (71%) ● News (97%) ● Contact Information (94%) ● Product catalog and description (100%) ● Services and solutions (87%) ● Introduction of the services and supports (84%) ● Online recruitment (84%) 	<ul style="list-style-type: none"> ● Organization Introduction (3.2) ● Organization culture (2.2) ● News (3) ● Contact Information (2.4) ● Product catalog and description (3.2) ● Services and solutions (2.6) ● Introduction of the services and supports (2.5) ● Online recruitment (2.3) 	3
Central and west region	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (65%) ● News (92%) ● Contact Information (88%) ● Product catalog and description (96%) ● Services and solutions (85%) ● Introduction of the services and supports (81%) ● Online recruitment (77%) ● Employment policies and 	<ul style="list-style-type: none"> ● Organization Introduction (3.1) ● Organization culture (1.3) ● News (2.7) ● Contact Information (1.5) ● Product catalog and description (2.8) ● Services and solutions (2.4) ● Introduction of the services and supports (1.9) ● Online recruitment (2.3) 	1

	<ul style="list-style-type: none"> organization culture (54%) ● Catalog and introduction of partners (50%) 	<ul style="list-style-type: none"> ● Employment policies and organization culture (1.2) ● Catalog and introduction of partners (0.9) 	
Type A companies	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (75%) ● News (100%) ● Contact Information (75%) ● Product catalog and description (100%) ● Services and solutions (50%) ● Technical white paper and archives (50%) ● Demos and online product demos (50%) ● Introduction of the services and supports (75%) ● Online consultation (50%) ● Online technical communication and support (50%) ● Downloads of drivers, upgrade, patches (75%) ● Frequently asked questions (50%) ● B2C (50%) ● Marketing news (50%) ● Online recruitment (75%) ● Employment policies and organization culture (50%) ● Catalog and introduction of partners (75%) ● How to be a partner (50%) 	<ul style="list-style-type: none"> ● Organization Introduction (4.3) ● Organization culture (2.5) ● News (4) ● Contact Information (2.8) ● Product catalog and description (4.3) ● Services and solutions (1.8) ● Technical white paper and archives (1.8) ● Demos and online product demos (2) ● Introduction of the services and supports (2.8) ● Online consultation (1.8) ● Online technical communication and support (2) ● Downloads of drivers, upgrade, patches (3.3) ● Frequently asked questions (2) ● B2C (1.3) ● Marketing news (2.3) ● Online recruitment (2.5) ● Employment policies and organization culture (2) ● Catalog and introduction of partners (1.8) ● How to be a partner (2) 	4
Type B companies	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (63%) ● News (97%) ● Contact Information (94%) ● Product catalog and description (97%) ● Services and solutions (83%) ● Introduction of the services and supports (80%) ● Online recruitment (80%) ● Catalog and introduction of partners (57%) 	<ul style="list-style-type: none"> ● Organization Introduction (3.4) ● Organization culture (1.8) ● News (3) ● Contact Information (2.5) ● Product catalog and description (3.3) ● Services and solutions (2.5) ● Introduction of the services and supports (2.3) ● Online recruitment (2.5) ● Catalog and introduction of partners (1.1) 	3
Type C companies	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (63%) ● News (93%) ● Contact Information (93%) ● Product catalog and description (98%) ● Services and solutions (89%) ● Introduction of the services and supports (70%) ● Online recruitment (78%) 	<ul style="list-style-type: none"> ● Organization Introduction (3) ● Organization culture (1.6) ● News (2.7) ● Contact Information (1.9) ● Product catalog and description (3) ● Services and solutions (2.6) ● Introduction of the services and supports (1.8) 	2

Type D companies	<ul style="list-style-type: none"> ● Organization Introduction (100%) ● Organization culture (100%) ● News (100%) ● Contact Information (80%) ● Product catalog and description (100%) ● Services and solutions (100%) ● Introduction of the services and supports (100%) ● Online consultation (80%) ● Downloads of drivers, upgrade, patches (80%) ● Online recruitment (80%) ● Employment policies and organization culture (60%) ● Catalog and introduction of partners (80%) ● Online application for being a partner (60%) ● Introduction of training courses (80%) 	<ul style="list-style-type: none"> ● Online recruitment (2.1) ● Organization Introduction (3.2) ● Organization culture (3) ● News (3.4) ● Contact Information (1.8) ● Product catalog and description (3.2) ● Services and solutions (3) ● Introduction of the services and supports (3.6) ● Online consultation (2.4) ● Downloads of drivers, upgrade, patches (2.6) ● Online recruitment (3.2) ● Employment policies and organization culture (1.8) ● Catalog and introduction of partners (1.2) ● Online application for being a partner (2) ● Introduction of training courses (2.4) 	7
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We summarize the evaluation and analysis and based on the above table:

- Domestic companies have satisfactory performance on interface design and website technology on their enterprise portals. This indicates that domestic companies regard the factors high and have capability to achieve a satisfactory result. On the other hand, the wide use of Internet and technology on the two factors are more common nowadays.
- On more effective e-business applications, domestic companies have big difference compared with the use by international companies. Especially on the level of applications and the effectiveness of applications, domestic companies are well behind.
- Applications that are used widely and relatively more effective are those common e-business applications without requiring higher level technical supports. Such applications are: introduction of products and services, news, product catalog and description, service and solution introduction, basic description of customer service and support, product white paper, software upgrade and patches downloads, and online recruitment. Although domestic large and public companies start to use applications such as online partner collaboration, online marketing, online education and training, the level and effectiveness of such applications are still low.
- Table 4.1 also shows there are some e-business applications with high usage rate but poor effectiveness (items not marked with gray color are those usage rate is higher than 50% but the average evaluation is below 3). For domestic large and public companies, such items are mainly more advanced e-business applications, such as customer support related applications, B2C, partner related applications. It indicates that such applications are well regarded by domestic large companies but not being able to be developed properly and/or be used effectively. For medium and small companies, and central and western region companies, such items are merely those common e-business applications, such as product related applications, organization

information related applications and online recruitment. The level and effectiveness of the essential e-business applications of those companies are still low.

- Compared with different companies size, large and public companies have the highest level of e-business applications. Also general purpose software companies and service oriented companies have higher level of applications.
- Medium and small companies and companies in central and western region have the lowest level of e-business applications.
- Compared with other type of IT companies, companies in domain application development and service type have the lowest e-business application level.

5 Conclusions and Future Work

This report outlines our research on the current status of e-business applications by Mainland Chinese software companies. Our research is a comparative analysis of the effectiveness of e-business applications of domestic software companies.

The main contributions of our research are as follows:

- Select a set of international leading software companies who also have major operations in Mainland China to be the benchmark for the comparative study.
- Based on the benchmark companies, we determine a set of e-business applications applicable to all software companies. In addition, we establish the corresponding effectiveness evaluation framework and criteria.
- We select a set of 90 domestic software companies to be the representative samples of Mainland Chinese software industry to be evaluated. The evaluation not only demonstrates the e-business applications level of those chosen companies, but also demonstrates the overall e-business applications of Mainland Chinese software industry.
- We carry out the evaluation of the effectiveness of e-business applications by Mainland Chinese software companies. The results are used for a number of comparative analyses.
- Based on more comprehensive evaluation by using a panel of experts, the research method and process can be used for a more systematic study. The method and process can also be used in combination with our effectiveness evaluations such as surveys and interviews.
- We can use the method and process, with small modifications based on different industry sectors, to other industry sectors to evaluate the effectiveness of e-business applications in those sectors.

The main findings of our research are:

- We confirm that the effectiveness of e-business applications of the overall domestic software industry has a big difference compared with that of leading international companies, i.e. the best practice companies. The difference is often of two levels.
- We confirm the common understanding that large domestic companies usually have better performance in e-business applications compared with other medium and small companies. However the difference is not as significant as the difference of large companies with international companies.
- We confirm the common understanding that medium but regional leading companies have better performance than that of medium and small companies. Again, the

difference is not as big as comparing international companies and regional leading companies.

- We find that centrally located software companies are not necessarily better in e-business applications than those of eastern regions. In some applications, companies of eastern region perform better than those of central cities.
- We find out that, overall, companies of central and western region have the lowest e-business application performance.
- We also find out that companies in domain specific application businesses perform the worst in e-business applications, compared with companies in other three types of business.

Future directions and future work to be done:

- With proper collaborations such as with the National Software Association and sufficient funding, we can carry out our research by using a group of experts and consultants in e-business applications, in combination with other survey and interview methods. Such a process can result a more authoritative evaluation, while we believe the results would be similar to what we present in this thesis.
- We can apply the method and process to other industry sectors as well.
- More factors can be included into the evaluation method and process in order to have more accurate and subjective results. For example, the volume of page views of a specifically enterprise portals in addition to other evaluation criteria.

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Appendix A List of chosen domestic companies

Table A-1 Large, mostly public companies of software in Mainland China 10

	Region	Companies Name	URL of the Website of the Enterprise Portal	Main Business*
1	Beijing	UFIDA Software Co., Ltd.	http://www.ufsoft.com.cn/	B
2	Shenzhen	Kingdee International Software Group	http://www.kingdee.com/	B
3	Beijing	Kingsoft Corporation	http://www.kingsoft.net/	A
4	Beijing	China National Computer Software and Technology Service Corporation	http://www.css.com.cn/	A
5	Beijing	Digital China Holdings Co., Ltd.	http://www.digitalchina.com/	D
6	Beijing	Beijing Founder Electronics Co., Ltd.	http://www.founder.com.cn	B
7	Shenyang	Neusoft Group Ltd.	http://www.neusoft.com/	A
8	Beijing	AsiaInfo Holdings, Inc.	http://www.asiainfo.com.cn	C
9	Jinan	Langchao Group Ltd.	http://www.langchao.com/	D
10	Changsha	Powerise Group.	http://www.powerise.com.cn/	B

Table A-2 Medium but leading enterprises in their business and/or regions

	Region	Companies Name	URL of the Website of the Enterprise Portal	Main Business*
1	Shanghai	Dyneinfo Co., Ltd.	http://www.dyneinfo.com/	C
2	Shanghai	Shanghai Baosight Software Co., Ltd.	http://www.baosight.com/	C
3	Shanghai	Fudan GrandHorizon Information Technology, Inc.	http://www.guanghua.sh.cn	D
4	Shanghai	Venus Software Corporation	http://www.vsc.com/	C
5	Shanghai	Wonders Information Co., Ltd.	http://www.wondersgroup.com/	C
6	Guangzhou	Superdata Software Technology(Guangzhou) Limited	http://www.superdata.com.cn/	B
7	Guangzhou	Suntek Technology Corporation, Ltd.	http://www.suntektech.com	B
8	Hangzhou	Hangzhou Sunyard System Engineering Co.,Ltd.	http://www.sunyard.com/	B

9	Hangzhou	NEWGRAND Software Co., Ltd.	http://www.ngsoft.com/	B
10	Hangzhou	Sinostride Science & Technology Co., Ltd.	http://www.sinostride.com/	C
11	Hangzhou	Hangzhou Wesklake Soft Co., Ltd.	http://www.foxhis.com/	C
12	Nanjing	Linkage Technology Co., Ltd.	http://www.lianchuang.com/	D
13	Nanjing	Wiscom System co., Ltd.	http://www.wiscom.com.cn/	C
14	Beijing	Beijing Brilliance Technology Co., Ltd.	http://www.brilliance.com.cn/	B
15	Beijing	Advanced Digital Technology Co.,Ltd.	http://www.adtec.com.cn	C
16	Yinan	CVIC Software Engineering Co., Ltd.	http://www.cvicse.com/	B
17	Shenzhen	Excenon Technologies Co., Ltd.	http://www.excenon.com/	B
18	Shenzhen	Shenzhen Modern Computer Manufacturer Co., Ltd.	http://www.mcm.com.cn/	C
19	Dalian	IDT software Corporation	http://www.idt.com.cn/	B
20	Fuzhou	Apex Software Co., Ltd.	http://www.apexsoft.com.cn/	C
21	Xiamen	Dragon Software Engineering Co., Ltd.	http://www.dragonsoft.com.cn/	C
22	Zhuhai	MasterService Group.	http://www.masterservice.com.cn/	B
23	Suzhou	Oceansoft Company	http://www.oceansoft.com.cn/	C
24	Xian	Netec Co., Ltd.	http://www.netecweb.com	B
25	Xian	Synchrobit Co.,Ltd.	http://www.synchrobit.com/	B
26	Xian	Xi'an Jiada Butone holding Co., Ltd.	http://www.butone.com/	C
27	Xian	Xi'an Jointsky Software Holding Co., Ltd.	http://www.jointsky.com	C
28	Chengdu	Cas-Neton Software Co.,Ltd.	http://www.casneton.com/	C
29	Chongqing	Goldabacus Software Co., Ltd.	http://www.gasoft.com.cn/	C
30	Lanzhou	FeiTianWangJing Information Industry Co., Ltd.	http://www.legend-net.com/	C

Table A-3 Small and medium enterprises in China 50

	Region	Companies Name	URL of the Website of the Enterprise Portal	Main Business*
1	Beijing	Dianji	http://www.goto2008.com/	B

		Technology Co., Ltd.		
2	Beijing	Sursen Corporation	http://www.shusheng.net/	B
3	Beijing	United Innovation Technology Co., Ltd.	http://www.uitec.com.cn/	C
4	Beijing	SuperMap GIS Technologies, Inc.	http://www.supermap.com.cn/	C
5	Shanghai	Bit Software Co., Ltd.	http://www.bitsoft.com.cn/	B
6	Shanghai	Shanghai Orientel Technology Co., Ltd	http://www.orientel.com.cn/	C
7	Shanghai	Shanghai Newlion Software Co., Ltd.	http://www.newlionsoft.com/	B
8	Shanghai	eSpaceSoft Co.,Ltd.	http://www.espacesoft.com/	B
9	Shanghai	Shanghai JiaDi Software Co., Ltd.	http://www.ims-international.com/	C
10	Guangzhou	Istone Software Technology Co., Ltd.	http://www.istone.com.cn/	B
11	Guangzhou	Guangzhou Jiatai Software Co., Ltd.	http://www.jiatai.net/	C
12	Guangzhou	Guangzhou Guangruan Technology Co., Ltd	http://www.gzgrkj.com/	B
13	Zhuhai	Zhuhai GPC Software Technology Co., Ltd	http://www.gpcsoft.com/	C
14	Shenzhen	Shenzhen Tinysoft Science & Technology Co., Ltd.	http://www.tinysoft.com.cn/	C
15	Shenzhen	Shenzhen Taiji Software Co., Ltd.	http://www.sztaiji.com/	B
16	Shenzhen	BOC Software Co., Ltd.	http://www.bocsoft.com.cn/	C
17	Hangzhou	Hangzhou EOS Software Co., Ltd.	http://www.eossoft.com.cn/	B
18	Hangzhou	Free Software Co.,ltd.	http://www.free-softs.com/	C
19	Hangzhou	Zhejiang Lanbase Infotech Corporation	http://www.zjlanbase.com/	B
20	Hangzhou	Singlee Software	http://www.singlee.com.cn/	C

		(Group) Limited		
21	Hangzhou	Jiaoda Longshan Software Co., Ltd.	http://www.jdlsoft.com.cn/	B
22	Hangzhou	Hangzhou Fast Software Co., Ltd.	http://www.fast.com.cn/	A
23	Dalian	Dalian Huashi Software Technology Co., Ltd.	http://www.huashi.com.cn/	C
24	Dalian	Webstock Co., Ltd.	http://www.webstock.com.cn	C
25	Dalian	Dalian Xinhua Infotech Co., Ltd.	http://www.digittime.com/	C
26	Dalian	Dalian Comeback Database Engineering Co., Ltd.	http://www.dalian-comeback.com/	B
27	Nanjing	Century IT Co., Ltd.	http://www.centit.com/	B
28	Nanjing	Nanjing Explore Software Co.,Ltd.	http://www.tssoft.com.cn/	C
29	Nanjing	Nanjing Jnet Software Co., Ltd.	http://www.jnet.com.cn/	C
30	Fuzhou	Fujian Trosun Software Co., Ltd.	http://www.trosun.com/	B
31	Xiamen	Xiamen Efound Software Co., Ltd.	http://www.efound.com.cn	C
32	Suzhou	Suzhou UniMap Software Co., Ltd.	http://www.unimap.com.cn/	C
33	Xian	Xi'an Xinli Software Technology Co., Ltd.	http://www.xinli.com.cn/	C
34	Xian	West Century Software Co., Ltd.	http://www.westerasoft.com/	C
35	Xian	Huanyu Software Co., Ltd.	http://www.huanyusoft.com/	D
36	Xian	Calikai Software International Co. Ltd.	http://www.calikai.com/	B
37	Xian	Sunny Science Technology Co., Ltd.	http://www.sunnyit.com/	C
38	Xian	Xi'an Future International Software Co., Ltd.	http://www.future-software.com.cn/	B
39	Chengdu	Westar Software Co., Ltd.	http://www.westarssoft.com/	B
40	Chengdu	LinJing Software	http://www.legine.com/	C

		Co., Ltd.		
41	Chengdu	Chengdu Summit Software Co.,Ltd.	http://www.sofmit.com/	C
42	Chengdu	Yinhai Software Co., Ltd.	http://www.yinhai.com/	C
43	Chongqing	Century Tele Software Develop Co., Ltd.	http://www.ctele.com.cn/	C
44	Chongqing	Haoyuan Software Co., Ltd.	http://www.hysoftware.com/	C
45	Chongqing	Chongqing Cybercity Sci-Tech Co., Ltd.	http://www.geoinfo.cn/	B
46	Chongqing	Chongqing Cqsunway Holding Co., Ltd.	http://www.cqsunway.com/	B
47	Zhengzhou	Henan Kaixiang Science & Technology Holding Co., Ltd.	http://www.kxkj.com.cn/	C
48	Changsha	Changsha Timesun Science & Technology Co., Ltd.	http://www.timeson.com//	C
49	Kunming	Kunming STT Info-Tech Co., Ltd.	http://www.kmstt.com/	C
50	Lanzhou	Wanwei Info-Tech Co., Ltd.	http://www.wanwei.com.cn/	B

* Main business

A: General purpose software development and services;

B: Application software development and services;

C: Domain-specific application development and services;

Appendix B Evaluation scores of e-business applications of each chosen company

Table B-1 International enterprise

Table B-4-1 Small and medium enterprises in China I

		Dianji	Sursen	United Innovati on	SuperMa p	Bit	Oriental	Newlion	eSpaceS oft	JiaDi	Istone
Overall evaluation of enterprise information portals											
	Interface design	4	3	3	4	3	3	2	3	3	3
	Website technology	4	3	3	4	3	3	2	3	1	3
	Main business *	B	B	C	C	B	C	B	B	C	B
E-business applications via website											
About the organization											
	Organization introduction	4	3	3	3	4	2	1	3	2	2
	Organization culture	0	4	2	3	2	0	0	0	0	0
	News	3	3	3	3	3	3	1	3	0	2
	Contact Information	3	2	2	2	3	2	2	3	2	3
Products, Services and solutions											
	Product catalog and description	4	4	2	4	4	3	0	3	2	2
	Services and solutions	3	0	2	3	1	3	3	3	2	3
	Technical whitepaper and archives	2	3	0	2	3	4	0	2	0	0
	Demos and online product demos	3	0	0	3	3	0	0	0	0	0
	Trials and betas	3	3	0	3	0	0	0	0	0	4
	Resource and interaction for Developers	0	2	0	0	0	0	0	0	0	0
Customer service and technical support											
	Introduction of the services and supports	3	3	2	3	0	2	1	1	0	0
	Online consultation	3	0	0	3	0	0	0	0	0	0
	Online technical communication	3	3	0	3	0	0	0	0	0	0

	and support										
	Downloads of drivers, upgrade, patches	0	3	0	3	0	0	0	0	0	0
	Knowledge and information archives	0	0	0	0	0	3	0	0	2	0
	Frequently asked questions	3	3	0	0	0	0	0	0	0	0
Online selling											
	B2C	1	4	0	0	0	0	0	0	0	0
	B2B	0	0	0	0	0	0	0	0	0	0
Marketing											
	Marketing news	0	0	0	0	0	0	0	0	0	0
	Sales network	3	0	0	0	0	0	0	0	0	0
	Promotion and specials	0	0	0	0	0	0	0	0	0	0
Human resources											
	Online recruitment	3	3	4	3	3	0	3	0	0	0
	Employment policies and organization culture	0	1	3	0	0	0	0	0	0	0
Partners and collaborations											
	Catalog and introduction of partners	0	2	0	0	2	0	0	0	0	1
	How to be a partner	2	3	0	0	0	0	0	0	0	0
	Online application for being a partner	3	3	0	0	3	0	0	0	0	2
	Online technical support for partners	0	0	0	0	0	0	0	0	0	0
	Business and product information for partners	0	0	0	0	0	0	0	0	0	0
	Accessing marketing and sales information for partners	0	0	0	0	0	0	0	0	0	0
Online education and training											
	Introduction of training courses	3	0	4	3	0	0	0	0	0	0
	Online training	0	0	0	0	0	0	0	0	0	0
	Online application for training courses	0	0	3	0	0	0	0	0	0	0
	Download of training materials	3	0	0	3	0	0	0	0	2	0

	Newsletter	3	3	0	0	0	0	0	0	0	0
	Online survey	0	0	0	0	0	0	0	0	0	0
	Personalized support	0	0	0	0	0	0	0	0	0	0
	Access to internal system for staff	N	Y	N	N	Y	N	N	N	N	N

* Main business

A: General purpose software development and services;

B: Application software development and services;

C: Domain-specific application development and services;

D: Systems, communication system development, related software development and services

Table B-4-2 Small and medium enterprises in China II

		Jiatai	Guangruan	GPC	Tinysoft	Taiji	BOC	Free	Lanbase	Longshan	Fast
Overall evaluation of enterprise information portals											
	Interface design	2	4	4	3	3	3	3	2	4	4
	Website technology	2	3	4	3	3	3	3	3	4	4
	Main business *	C	B	C	C	B	C	C	B	B	A
E-business applications via website											
About the organization											
	Organization introduction	2	3	4	2	3	2	2	2	4	3
	Organization culture	0	0	4	0	0	0	3	2	4	0
	News	2	3	3	2	4	2	4	1	3	3
	Contact Information	2	2	3	2	2	2	3	2	3	3
Products, Services and solutions											
	Product catalog and description	2	3	3	2	3	4	4	2	3	4
	Services and solutions	2	0	3	3	1	0	3	2	3	0
	Technical whitepaper and archives	0	0	0	2	0	0	2	0	3	2
	Demos and online product demos	1	0	0	0	0	0	2	0	0	4
	Trials and betas	2	0	0	3	0	0	0	0	4	0
	Resource and interaction for Developers	0	0	0	0	0	0	0	0	0	0
Customer service and technical support											
	Introduction of the services and	0	0	3	0	0	0	3	2	3	3

	supports										
	Online consultation	0	3	0	0	0	0	3	0	3	2
	Online technical communication and support	0	0	0	0	0	0	2	0	3	3
	Downloads of drivers, upgrade, patches	0	0	0	0	0	0	3	0	3	4
	Knowledge and information archives	0	0	0	0	0	0	0	0	0	3
	Frequently asked questions	0	0	0	0	0	0	0	0	3	3
Online selling											
	B2C	0	1	0	0	0	0	2	0	0	2
	B2B	0	0	0	0	0	0	0	0	0	0
Marketing											
	Marketing news	0	1	0	0	0	0	3	0	3	0
	Sales network	0	0	0	0	0	0	0	0	3	0
	Promotion and specials	0	0	0	0	0	0	0	0	0	0
Human resources											
	Online recruitment	0	3	1	0	2	3	1	1	3	2
	Employment policies and organization culture	0	2	0	0	0	0	0	0	3	0
Partners and collaborations											
	Catalog and introduction of partners	0	0	0	0	0	0	0	1	2	1
	How to be a partner	0	0	0	0	0	0	0	0	2	0
	Online application for being a partner	0	0	0	0	0	0	0	0	3	0
	Online technical support for partners	0	0	0	0	0	0	0	0	0	0
	Business and product information for partners	0	0	0	0	0	0	0	0	0	0
	Accessing marketing and sales information for partners	0	0	0	0	0	0	0	0	0	0
Online education and training											
	Introduction of training courses	0	0	0	0	0	0	0	0	0	0
	Online training	0	0	0	0	0	0	0	0	0	0
	Online application	0	0	0	0	0	0	0	0	0	0

	for training courses										
	Download of training materials	0	0	0	0	0	0	2	0	0	0
	Newsletter	0	0	0	0	0	0	0	0	0	0
	Online survey	0	2	0	0	0	2	0	0	0	0
	Personalized support	0	0	0	0	0	0	0	0	0	0
	Access to internal system for staff	N	N	N	N	N	N	Y	N	Y	N

* Main business

A: General purpose software development and services;

B: Application software development and services;

C: Domain-specific application development and services;

D: Systems, communication system development, related software development and services

Table B-4-3 Small and medium enterprises in China III

		EOS	Singlee	Huashi	Webstoc k	Xinhua	Comebac k	Century IT	Explore	Jnet	Trosun
Overall evaluation of enterprise information portals											
	Interface design	4	3	2	3	2	3	3	4	3	2
	Website technology	4	3	2	4	2	3	3	3	3	2
	Main business *	B	C	C	C	C	B	B	C	C	B
E-business applications via website											
About the organization											
	Organization introduction	4	3	2	4	3	3	3	2	1	3
	Organization culture	0	4	0	2	2	3	2	0	0	0
	News	2	3	0	3	4	3	3	2	3	3
	Contact Information	3	3	0	2	3	2	1	2	1	2
Products, Services and solutions											
	Product catalog and description	3	3	3	3	2	2	1	3	3	3
	Services and solutions	3	0	3	4	3	0	3	2	1	0
	Technical whitepaper and archives	0	0	0	3	0	0	0	3	2	3
	Demos and online product demos	0	0	0	2	0	0	0	0	0	0
	Trials and betas	0	0	0	4	0	0	0	1	3	0
	Resource and interaction for Developers	0	0	0	0	0	0	0	0	0	0

Customer service and technical support											
	Introduction of the services and supports	3	3	0	3	0	0	3	0	2	3
	Online consultation	0	0	0	3	0	0	0	3	0	2
	Online technical communication and support	0	3	0	0	0	0	0	0	0	0
	Downloads of drivers, upgrade, patches	0	0	0	3	0	0	0	2	3	0
	Knowledge and information archives	3	0	0	0	0	0	0	0	0	0
	Frequently asked questions	2	0	0	4	0	0	0	0	2	3
Online selling											
	B2C	2	0	0	0	0	0	0	0	0	0
	B2B	0	0	0	0	0	0	0	0	0	0
Marketing											
	Marketing news	0	0	0	0	0	0	0	0	0	0
	Sales network	0	0	0	0	0	0	0	3	0	0
	Promotion and specials	0	0	0	0	0	0	0	0	0	0
Human resources											
	Online recruitment	3	3	2	2	3	1	0	2	0	3
	Employment policies and organization culture	0	3	0	0	3	0	0	0	0	0
Partners and collaborations											
	Catalog and introduction of partners	0	1	0	2	0	0	0	0	1	0
	How to be a partner	2	0	0	0	0	0	1	3	0	0
	Online application for being a partner	3	0	0	0	0	0	0	0	0	0
	Online technical support for partners	3	0	0	0	0	0	0	3	0	0
	Business and product information for partners	0	0	0	0	0	0	0	0	0	0
	Accessing marketing and sales information for partners	0	0	0	0	0	0	0	0	0	0
Online education and training											

	Introduction of training courses	0	0	0	0	5	0	0	0	0	0
	Online training	0	0	0	0	0	0	0	0	0	0
	Online application for training courses	0	0	0	0	0	0	0	0	0	0
	Download of training materials	0	3	0	0	4	0				
	Newsletter	3	0	0	0	0	0	0	0	0	0
	Online survey	3	0	0	0	1	0	2	0	0	0
	Personalized support	0	0	0	0	0	0	0	0	0	0
	Access to internal system for staff	N	Y	N	N	N	N	N	N	N	N

* Main business

A: General purpose software development and services;

B: Application software development and services;

C: Domain-specific application development and services;

D: Systems, communication system development, related software development and services

Table B-4-4 Small and medium enterprises in China IV

		Efound	UniMap	Xinli	West Century	Huanyu	Calikai	Sunny	Future International	Westar	LinJing
Overall evaluation of enterprise information portals											
	Interface design	2	3	3	3	2	3	3	3	3	3
	Website technology	3	3	3	3	2	2	3	3	2	3
	Main business *	C	C	C	C	D	B	C	B	B	C
E-business applications via website											
About the organization											
	Organization introduction	3	2	3	3	2	3	3	3	3	2
	Organization culture	1	0	2	0	1	2	4	2	2	0
	News	2	3	3	4	2	1	3	3	3	0
	Contact Information	1	2	2	3	1	1	1	0	1	1
Products, Services and solutions											
	Product catalog and description	3	2	2	4	2	2	2	3	3	3
	Services and solutions	2	2	3	3	2	3	2	2	3	0
	Technical whitepaper and	0	2	0	0	0	0	3	0	0	4

	archives										
	Demos and online product demos	0	0	0	0	1	0	0	0	3	0
	Trials and betas	3	2	2	3	0	0	0	0	0	0
	Resource and interaction for Developers		0	0	0	0	0	0	0	0	0
Customer service and technical support											
	Introduction of the services and supports	2	0	3	3	2	1	2	4	3	1
	Online consultation	0	0	0	2	2	0	0	3	0	0
	Online technical communication and support	2	0	0	0	0	0	0	0	0	0
	Downloads of drivers, upgrade, patches	0	0	0	0	1	0	0	0	3	0
	Knowledge and information archives	0	0	0	0	0	0	0	0	0	0
	Frequently asked questions	0	0	2	0	0	0	0	0	0	0
Online selling											
	B2C	0	0	0	0	0	0	0	0	2	0
	B2B	0	0	0	3	0	0	0	0	0	0
Marketing											
	Marketing news	0	0	0	0	0	0	0	0	0	0
	Sales network	0	0	0	0	0	0	0	0	0	0
	Promotion and specials	0	0	0	0	0	0	0	0	0	0
Human resources											
	Online recruitment	2	0	3	3	3	0	4	3	3	2
	Employment policies and organization culture	0	0	3	1	3	0	5	2	1	0
Partners and collaborations											
	Catalog and introduction of partners	1	0	0	1	1	1	0	2	2	0
	How to be a partner	0	0	2	2	3	0	0	0	2	0
	Online application for being a partner	0	0	3	0	3	0	0	0	3	0
	Online technical support for partners	0	0	0	3	0	0	0	0	0	0
	Business and product information for	0	0	0	0	0	0	0	0	0	0

	partners										
	Accessing marketing and sales information for partners	0	0	0	0	0	0	0	0	0	0
Online education and training											
	Introduction of training courses	0	2	0	2	1	0	0	0	0	0
	Online training	0	0	0	0	0	0	0	0	0	0
	Online application for training courses	0	0	0	0	0	0	0	0	0	0
	Download of training materials	0	0	0	0	0	0	0	0	0	0
	Newsletter	0	0	0	0	0	0	0	0	0	0
	Online survey	0	0	0	0	0	0	0	0	0	0
	Personalized support	0	0	0	0	0	0	0	0	0	0
	Access to internal system for staff	N	N	N	Y	N	N	N	N	N	N

* Main business

A: General purpose software development and services;

B: Application software development and services;

C: Domain-specific application development and services;

D: Systems, communication system development, related software development and services

Table B-4-5 Small and medium enterprises in China V

		Summit	Yinhai	Century Tele	Haoyuan	Cybercity	Cqsunway	Kaixiang	Timesun	STT	Wanwei
Overall evaluation of enterprise information portals											
	Interface design	3	3	3	3	3	4	3	3	3	3
	Website technology	3	3	2	3	3	3	3	3	3	3
	Main business *	C	C	C	C	B	B	C	C	C	B
E-business applications via website											
About the organization											
	Organization introduction	3	3	3	3	3	4	4	4	3	3
	Organization culture	1	1	2	2	0	1	2	0	0	0
	News	3	3	3	3	2	0	2	3	3	4
	Contact Information	1	3	1	1	1	1	1	0	3	2
Products, Services and solutions											
	Product catalog and description	3	0	3	3	3	4	3	3	4	3

	Services and solutions	0	3	2	0	0	1	3	3	4	2
	Technical whitepaper and archives	0	0	0	1	0	0	0	0	0	0
	Demos and online product demos	0	0	0	0	0	5	0	0	0	0
	Trials and betas	0	0	0	2	0	4	0	0	0	0
	Resource and interaction for Developers	0	0	0	0	0	0	0	0	0	0
Customer service and technical support											
	Introduction of the services and supports	0	2	1	0	1	0	0	3	0	1
	Online consultation	0	0	0	0	0	3	0	0	0	0
	Online technical communication and support	0	0	0	3	0	0	0	3	3	0
	Downloads of drivers, upgrade, patches	0	3	0	0	0	3	0	0	0	0
	Knowledge and information archives	0	0	0	0	0	0	0	0	0	0
	Frequently asked questions	0	0	0	0	0	0	0	0	3	0
Online selling											
	B2C	0	0	0	2	0	2	0	0	1	0
	B2B	0	0	0	0	0	0	0	0	0	0
Marketing											
	Marketing news	0	0	0	0	0	0	0	0	0	0
	Sales network	0	0	0	0	0	0	0	0	0	0
	Promotion and specials	0	0	0	0	0	0	0	0	0	0
Human resources											
	Online recruitment	1	3	2	3	3	3	0	2	0	0
	Employment policies and organization culture	2	0	0	0	0	2	2	0	0	0
Partners and collaborations											
	Catalog and introduction of partners	0	2	0	0	1	0	0	0	1	0
	How to be a partner	0	0	0	0	0	0	0	0	0	0
	Online application for being a partner	0	0	0	0	0	0	0	0	0	0
	Online technical support for	0	0	0	0	0	0	0	0	3	0

	partners										
	Business and product information for partners	0	0	0	0	0	3	0	0	0	0
	Accessing marketing and sales information for partners	0	0	0	0	0	0	0	0	0	0
Online education and training											
	Introduction of training courses	0	0	0	0	0	0	0	0	0	0
	Online training	0	0	0	0	0	0	0	0	0	0
	Online application for training courses	0	0	0	0	0	0	0	0	0	0
	Download of training materials	0	0	0	0	0	0	0	0	0	0
	Newsletter	0	0	0	0	0	0	0	0	0	0
	Online survey	0	0	0	0	0	0	0	1	0	0
	Personalized support	0	0	0	0	0	0	0	0	0	0
	Access to internal system for staff	N	N	N	N	N	N	N	N	N	N

* Main business

A: General purpose software development and services;

B: Application software development and services;

C: Domain-specific application development and services;

D: Systems, communication system development, related software development and services