Actual State of and Trend in the Application of Information Systems of Vietnamese Agencies and Enterprises

Ha Thi Thuy Van   Dam Bich Ha

Department of Accounting-Auditing, Vietnam University of Commerce, Hanoi, Vietnam

Abstract

In recent years, the demand for receiving, processing and managing information flows and documents of administrative units, state agencies and enterprises in Vietnam is very high. This task requires timely and accurate resolution time with the efficient and effective support of information technology systems. Therefore, the application of management information systems has given organizations and enterprises a continuous and accurate control and management of internal information, thus helping managers make decisions. Accurate, accurate, optimistic and increase work efficiency. They contribute to the operation of the business goes into order.Application of management information systems in enterprises is always a concern because IT plays a very important role in economic activities, business production, sales, trade promotion, business management. .However, there are still many issues surrounding the application.The problem is: Actual state of and Trend in the application of information systems of Vietnamese agencies and enterprises now?

Keywords: actual state of, trend in, information systems.

1. INTRODUCTION

In fact, investment in information technology (IT) is a currently permanent item on the agenda of Vietnamese enterprises, which mostly have perceived the role of IT and have invested in this type of application. Survey results on IT application conducted at 507 enterprises nationwide by the National Steering Committee on IT, and at 206 small and medium-sized enterprises of VNCI (Vietnamese Competitiveness Enhancement Project), showed that about 90% of Vietnamese enterprises had sense of the importance of IT in supporting the management, manufacturing, sales and service activities. IT application has become an indispensable part in the operation of any enterprises. In addition to technical applications, such as design, estimation, calculation, etc., e-commerce forms have been initially applied to actively support the operations of many enterprises. Types of "electronized" information have begun to have positive effects in economic and social activities.

However, most the new applications are universal, office and internet applications for advertisement and information searching. The use of IT in corporate operations and management is insignificant. Many enterprises are very confused in organizing IT application in their practical activities. Therefore, many applications are not created new resources of information or if yes, it is not standardized that leads to the difficulty in integrating, sharing, and using the information for management and social activities.

The problem is how the investment and deployment of IT are application in tune with the development and effectively used for the business of enterprises.

There are three systems developed in an enterprise are the management systems, information systems and manipulation systems. Those systems play the intermediate role of the main function in collecting, processing and transmitting information. The goal of computerizing the management of enterprises is to computerize the management functions of enterprises aimed to improve the economic efficiency and management. A comprehensive information system that is analyzed and designed as a whole will meet the needs of the enterprise.

2. ACTUAL STATE OF THE APPLICATION OF MANAGEMENT INFORMATION SYSTEMS OF VIETNAMESE ENTERPRISES

2.1. Situation of the application of management information systems of Vietnamese enterprises

Management IT application has become popular in Vietnam. Recently, many organizations and companies applies IT in various operations, such as management of dispatches; documents - records; accounting - finance; HR; customers; properties and equipment, etc.

Enterprises treat the ERP (Enterprise resource planning) as a tool and solution to effectively improve product quality, save costs, increase profitability, enhance competitiveness and develop brand name, as well as minimize risks, warn risks of losses due to the data and business data are updated timely and ensure financial publicity and transparency. As President of FPT IS, Mr. Do Cao Bao suggested that it is required to invest only VND1,000 billion in IT systems to support corporate finance, but Vinashin and Vinalines only spent VND92,000 billion.

It was known that SAP ERP system of Petrolimex was taken three years for development (2010 - 2012), with value of USD12,6 million, was the largest ERP system in Vietnam, officially operated on 1/1/2013. It was

connected the petrol management from parent company - Petrolimex to 42 companies, 21 branches, 11 enterprises, and 44 warehouses and general petroleum depots, 118 locations, integrated with management systems in more than 2,200 gasoline stores nationwide. Petrolimex was also the one of enterprises publishing information about the ERP application in most powerful and rampant way.

Vietsovpetro has targeted on Oracle's ERP solution since 2003. Until 2006, ERP system helped the company to modernize its entire management process to world standards, from purchase, warehouse, delivery, material management to commercial, financial accounting and human resources; reduce duplication and ensure a highly consistent process over 15 units of the whole enterprise.

From early 2009, EVN announced the implementation of Oracle ERP software system project with finance, materials, assets, human resources - salary subsystems for the power industry.

Moreover, the enterprises only deployed a part of functional subsystems of ERP, like Refrigeration Electrical Engineering Corporation REE, Toan My group, VNSTEEL, Saigon Paper Corporation, who only deployed production subsystem, warehouse management subsystem, and purchase and sales subsystem to create a consistent data chain from buying raw materials and accessories to selling the final products. This was to ensure that the information sources within the enterprise are processed effectively. Alternatively, with distribution channel management subsystem, the enterprises producing and trading consumer goods and garments, were Dai Viet Beer Company, Garment 10 Corporation - Joint Stock Company, Ha Long Development Investment (BIM) etc.

According to information provide by Vietnam Software Association (VINASA), the number of enterprises and groups actually deploying the ERP may be larger than the number of enterprises announcing the implementation of ERP. Because ERP implementation is not simple. Many projects collapsed or failed to achieve the expected success when it could not be changed the traditional management, which made the enterprises did not want to promote or propagandize the implementation of ERP.

2.2. The factors effecting the application of management information systems of Vietnamese enterprises.
2.2.1. Objective factors
2.2.1.1. Regulations and policies of the State
In past, the State issued many appropriate policies, regulations and measures to promote the IT application and development for industrialization and modernization. By this way, identified IT as one of the important motivations to ensure the sustainable growth and development of the country, enhanced the transparency of activities of the public agencies, saved time, funds for agencies, organizations, enterprises and people.

On 29/07/2005, the Prime Minister issued Decision No. 191/2005/QDD-TTg approving the scheme "to support the enterprises applying IT for integration and development in period 2005-2010" (Scheme 191). This was the most specific and direct policy of the State so far for enterprises to support IT application.

On 22/9/2010, the Prime Minister signed Decision No. 1755/QD-TTg approving the scheme "to early make Vietnam a country strong in information and communication technologies". The scheme identifies and implements programs, scheme, projects and policies of promoting investment in information technology application and development in enterprises is one of the important tasks to achieve the objectives. To effectively apply IT in all fields of economy, society, national defense and security.

However, until now, we still lack direct policies and programs to support enterprises to apply IT in their management and production activities to improve management capacity, labor productivity and business efficiency of enterprises.
2.2.1.2. Economic context
2014 witnessed the sluggish development of the global economy with the initial recovery of the US economy and the deceleration of growth of European, Japanese and Chinese economies. In that context, the Vietnamese economy archived some positive results, including GDP increased by 5,98% and was expected to hit to 6,2% in 2015. Compared to the growth rate of the years in 2013 (5,4%) and 2012 (5,2%), this was a positive sign of the next development. CPI rose at 4%, lower than the target of 7% showed the progress in stabilizing the macro environment.

In 2014, Vietnam had nearly 75,000 new founded enterprises, fell by 2.7%, and more than 68,000 enterprises dissolved or stopped their operations. This showed that the business community was still in a difficult period. Recovery and growth in the coming time could not be sudden. The positive results were still very fragile. The low inflation rate was largely due to the fall in world oil price and the growth of GDP was remaining largely dependent on the contribution of the FDI sector. In addition, performance of SOEs was low. Private enterprises was remain weak, especially their management capacity and access to finance.

In 2015, the economy was forecasted to continue to grow at a better rate. However, stability could be maintained to ensure the sustainable growth and overcome the shortcomings. Major directions the macroeconomic policies continue to focus on are banking sector restructuring to improve system capacity and improve bad debts, equitize state-owned enterprises, and encourage internal enterprises to development. Aiming

to equitize 432 SOEs in two years 2014-2015, the Prime Minister affirmed.

Besides, the macroeconomic stability created in 2014 could enable a monetary policy easy in the coming years to encourage the enterprises' investment growth and development. In 2015, it could be also marked the time when Vietnam reached bilateral and multilateral trade agreements, such as FTA with EU, Republic of Korea, the European Union Customs Union and especially the TPP. These agreements may open the way to attract more investments from foreign companies and create more competiveness for domestic companies.

2.2.1.3. Solution providers

IT products and services in the market for enterprises, especially for small and medium-sized enterprises were not diversified and close to the needs of enterprises. The reality was that IT solution providers targeted large enterprise customers because they had larger budgets and were willing to pay for more sophisticated IT services. Such products were too expensive and too complicated for small and medium enterprise users.

Currently, many providers, both domestic and foreign, provided enterprise with management information system solutions. In Vietnam, FPT was an IT enterprise with a large number of the biggest customers with Enterprise Recourse Planning (According to statistics VINASA announced in Feb 2010, 103 Vietnamese enterprises deployed ERP, of which 52 were supported by FPT). Besides FPT, there were some other names, such as SSG (Sunshine Gimasys), Lac Viet, Pythis (Kim Tu Thap), TVE, CSC (Global SyberSoft), CMC, HPT, PVTech, Tectura etc. with many technologies applied such as:

- Social. It allows the enterprise to connect with customers, with communities easier and more popular. The ability to connect to social networks shortens the distance between systems and humans, enabling users and customers to interact conveniently. Mobility trend allows the users to operate the system anytime and anywhere through a mobile device. Analytics improves the system's intelligent processing capability, allowing for more efficient use of the large amounts of data the enterprise obtains.

- Cloud. It becomes a popular model for investing in information systems. Accordingly, instead of buying a system with the full range of hardware, software and services attached, such as administration, operation, the enterprises will invest in the form of subscribers. Cloud helps customers to simplify the procurement and ownership of information systems. Customers will be less constrained on hardware and software systems and only pay the right amount of use. The investment in large systems previously beyond the reach of many enterprises/organizations. With the Cloud, it will gradually become more realistic.

It can be seen that the opportunity to choose solutions and units deploying ERP is increasingly richen and diverse. The problem is if enterprises and corporations are determined to "change blood" for ERP application.

2.2.2. Subjective factor

The objective factors help enterprises to have more opportunities and choices in deploying management information systems. However, the reality is that the majority of Vietnamese enterprises deploying management information systems and ERP are getting fall than success or extending their plans but not effective due to many reasons. There are following causes:

- There was not enough attention of the management. Most enterprises had no any person in charge and leader to be responsible for applying IT in the organization. In general, there was not plan and roadmap for long-term application. It was at the level of departments within an enterprise, mainly spontaneous, small and non-synchronous investment. Therefore, it was not effectively in promotion. The enterprises only paid attention to hardware investment (computer, printer, etc.) but to consulting, training, investment in IT solutions.

- Unaware of the financial and working difficulties. The total cost of a large investment in an enterprise management information systems usually included consultancy; copyright, infrastructure; application deployment; labor; opportunity; maintenance, upgrades, expansion etc. The processes of an enterprise were very complex and the application of each process could raise new inclusions the enterprises and providers may not fully expect. With those incidents, the enterprise may bear the variable cost but not enough resources to pursue the project, leading to the status "between the devil and the deep blue sea". In addition, long time was be taken for project implementation so that the enterprises discouraged or changed their original goals and scope of the request; according to study results, among the ERP projects, the number of projects lasting from 1 to 2 years accounted for 37.78%; six-month and one-year projects accounted for 33.13% and only a very small number (6.67%) of projects lasted less than 6 months and 22.44% with the non-well defined implementation time.

- Disregarded personnel factor and promoted technology too much, thought that technology might replace personnel. Depended on technology and disregarded regulations and responsibilities of technology users, as well as the implementation of procedures. In practice, ERP does not reduced HR but helps to simplify the procedures and management. Personnel focus on the right business and supported for quick document recognition. The personnel factor is the most important determinant of the success.

- The perception of enterprises about the use of external IT services, such as consulting, website design, services using IT systems, etc. was quite limited. Computer and internet skills of human resources of enterprises

was improved significantly, but there were still many embarrassing things and worries when deploying and exploiting highly sophisticated systems, leading to impacts on the operation process of enterprises.

3.TREND IN THE APPLICATION OF MANAGEMENT INFORMATION SYSTEMS OF VIETNAMESE ENTERPRISES

With a unified and multifunctional software system, used for from planning, statistics, auditing, analysis and administration, the management information systems will help the monitor and management throughout the operation of enterprises, increasing dynamism, flexibility, as well as ensuring timely response to continuous change.

In 2016, with positive signals of the economy, many opportunities and challenges were created for enterprises. Competitiveness was a motivation for all enterprises towards, in which management information systems, especially ERP system, were treated as a key to create a revolutionary change of management capacity. Recognizing the true development trend of the solutions, the technology helped the managers to select the right investment in developing the ERP system.

The recovery but cautious of the economy also reflected the ERP market where customers were mostly enterprises. The number of ERP projects in 2015 was still relatively modest, with the most concentration in the banking and construction - real estate sectors. Typically, in the banking sector, there were projects for the State Bank, Deposit Insurance, BIDV, Bank for Industry and Trade, and Phong Dong Bank launched in the year. The banks continued their modernization roadmap and improvement of performance to enhance the stability and capacity of the entire system.

The real estate and construction sectors also made a makeable break in the ERP market with big projects of Vingroup and FECON. The enterprises had right vision, right strategies and high determination to develop the management system for a long-term development platform. Through the "clinical death" stage, the real estate market was gradually stood up and taken the first steps. Real estate inventory dropped sharply. As of the end of November 2015, the value of real estate inventory fell by nearly 40% compared to the first quarter of 2014, according to the report by the Ministry of Construction. The favorable conditions of the coming year would allow enterprises to have good preparation to break through and motivate more enterprises to invest in ERP.

The number of Vietnamese enterprises who are interested in deploying management information systems, especially ERP, is increasing. Most still target two ERP solutions that dominate the Vietnamese market - SAP ERP and Oracle ERP (ready to meet the needs of large IT systems). Some other with no enough budgets is looking for "internal" solutions with smaller scope and scale of implementation.

Enterprises are increasingly looking at the best ERP supporting solution for their business. The biggest value ERP solutions bring to an enterprise is management process, experience and best-practices. In addition to technological capabilities, such as operation capacity, security, and interoperability with information systems in general, practice capability is a must-considered factor when an enterprise wants to apply ERP. There is not a common ERP model for every enterprise. Each ERP system should be developed on the basis of industry, specific conditions and difficulties, organizational structure, size and business plan of the enterprise.

According to experts, ERP application today is an indispensable trend for enterprises. The trend itself is an inevitable consequence of five other important trends. The right understanding of modern trends and timely change in consistent with such trends are the most important parts of the strategic planning of individual enterprise.

The first trend. The internet is changing the world every day and hours. If the highways can only shorten the geographic distance, the internet actually removes it. In other words, in the future all enterprises use the internet as a tool for image and trade promotion.

The second trend. Globalization, this is the active tendency of the developed countries, which forces the backward countries to follow. In the globalization process, the domestic competition will be gradually replaced with international competition. The enterprises no longer have the patronage of the State. In the near future, a company that is not competitive will lose in the domestic market.

The third trend. The speed of change is getting higher and higher. It is easy to observe the dizzying changes in product designs and the technology that makes them. If the characteristics of the 80s are quality and the 1990s are refactoring, the characteristic of the decade we live in is speed. Accessing to more information has changed profoundly the lifestyle of consumers. If the market-oriented business has to reach a very high speed, the business itself will change. In the future, only companies with ability to respond quickly to market changes will be able to survive and grow.

The fourth trend. The customers' interests are becoming more and more important. Consumers are more knowledgeable with more and more needs and have more choices of products and services. In the future, only companies that understand the needs and customers' interests will be able to survive and grow.

The fifth trend. The formation of the information society. Recently, we often hear the phrase

"knowledge economy". This economy also has another name, called information socialization. From the viewpoint of market, IT era has changed the consumers deeply and comprehensively. Consumers not only have information about the price, products of a familiar brand, but also enough information about the products of the competitors. Accessing to more information opens to new business opportunities for enterprises. Information becomes a competitive advantage. So in this context, the enterprises may not survive and develop if it itself lacks of information.

Therefore, according to experts and IT, in order to adapt to the above trends, ERP is one of the most important things that enterprises have to do. An online ERP system allows enterprises to have multiple locations to effectively tap into the global connectivity system and allows the leaders to control their enterprise even they are far away (the first trend). ERP really helps enterprises to ready to join the globalization with an advanced management system according to international standards. ERP also helps enterprises to react quickly to market changes, and improve customer services. ERP helps the enterprise's information systems to survive and thrive in the information society.

Essentially, an ERP system typically includes practice, operation, control, monitoring and decision-making applications. It can bring the enterprises with many benefits like faster and more exactly operation, saving the cost of information collection; more completed and timely information to reduce debt as well as timely measures to better support the sales, create synergy between plan, production and consumption; increase profits for the enterprises; well meet the needs of customers. Analyzing data in relation to norms helps the leaders in adjusting and planning information for the next time. In addition, the implementation of ERP also gives the enterprises with a very important benefit that is to access to professionalism and science. More important, it is difficult for an enterprise to see its strengths without ERP, so it is less likely to improve and enhance its competitiveness.

Today, the difference between the two leading enterprises is no longer raw materials, manufacturing processes, or manufacturing technology because almost follow a common international standard. Therefore, success factor leading to the difference in running competition between enterprises is the ERP system the enterprise deploys. "In the future, companies with excellent management information systems will be able to survive and grow".

4. DEVELOPMENT MEDEL OF INFORMATION SYSTEMS - ISS FOR VIETNAMESE ENTERPRISES

Information systems - ISs currently is very rich and diverse. For different enterprises. ISs will be developed differently due to the specific characteristics of each enterprise, depending on the purpose of application, scale of operation and other conditions of each decision. When we have a complete information system that accurately reflects what is happening in the enterprise, especially the production processes, we can accurately state the issues to be computerized at the enterprise and divide the problems into integrated groups (interrelated in terms of storage and information exchange) - called information subsystems.

In general, when developing and using information systems, the enterprises are aiming at supporting the operational activities, supporting the management decision-making and supporting the development of strategies to gain competitive advantages.

According to the knowledge-intensive experts who develop the ISs projects, the information system of an e-commerce-oriented enterprise (production-business) consists of the following information subsystems:

(1) Operational management information subsystems,
(2) Internal management information subsystems,
(3) Production automation (for manufacturing enterprises) information subsystems,
(4) Marketing, advertisement, product distribution and customer services information subsystems.
(5) Specialized databases.

This set of information subsystems mentioned above will form a business information system. We can deploy many services for management computerization, business, and especially e-commerce based on the information of such information systems. We would like to briefly introduce the information subsystems that need to be developed in a business enterprise:

4.1. Enterprise operation management subsystems
These subsystems support the management activity, business operation and decision-making, including:
(1) General information and quick report output subsystem
In order to develop standard reporting systems for all units in the enterprise, provide data on production and business conditions of the whole enterprise, this can be used to support the production and business planning in the next period, develop dedicated data warehouses to meet the requirements for decision-making support, production, and reporting to superiors.

(2) Email and documents and work profile management subsystem
This subsystem provides the ability to electronically transact with partners and the ability to transact internally for serving of production management. Computerization of the management of records, documents of all management units of enterprises. Improve the efficiency of archiving, especially the dispatch sends to places. Toward the construction of electronic dispatch systems and electronic storage

(3) Working schedule management subsystem
Support scheduling and working schedule management. Provide the ability to create and observe working schedules from the macro level (whole enterprise, member units per year, quarter) to the micro level (monthly and weekly schedule of group and individual), help leaders of enterprises have accurate and comprehensive information on the working situation of the whole enterprise from time to time to improve management effectiveness and operation of enterfprise leaders.

(4) Planning and production schedule management information subsystem
Support the business and production planning from planning level of whole enterprise, member units per year, quarterly to level of allocation, management the planning and monitoring progress of workshops, production groups by month, week, day.

(5) Website for professional operation
Create a Website that provides all the information for everyone. This website contains information of databases belonging to the operating subsystem, ie databases of gazettes, dispatches, working schedules, work profiles, officers and a part of the specialized databases.

Be only electronic portal that users need to know to access, exploit information and use services of the entire information subsystem of enterprise to exploit information on the general database storage including important databases of enterprises.

4.2. Internal management subsystems

(1) Human resources management information subsystem
Include statistics, reports on the number of personnel to be given by day on personnel management, labor contracts, wages, social insurance.

(2) Accounting management information subsystem
This subsystem must be designed with communication with the subsystems of contract management, warehouse management, and fixed asset managemen, including all the functionalities of entering and managing business documents (including: accounting for fixed assets, supplies, sales), statistics, periodic accounting of supplies, sales, banks, taxes, funds, payments, pricing.

(3) Materials and products warehouse management information subsystem
This subsystem must communicate with subsystem of production and business planning and assist in planning the additional purchase of materials to computerize the material management, inventory management and export and import management. The information that needs to be managed is: providing necessary equipment, developing an export and import database, developing and implementing programs for archiving of import and export bills, programs of mining, synthesizing and reporting

(4) Import - export information subsystem
To computerize the management of import and export to be able to work automatically with system of the General Department of Vietnam Customs in the future. Objectives: reduce the difficulty in inventory statistics, export and import goods, improve the efficiency of material management, goods storage, archiving and management of import orders of materials and orders to easily make lists, total table, etc.

(5) (Debt) agents and customers management information subsystem
To manage the list of customers and agents, debts (due date, overdue debts, bad debts,...): receivable debts of customers, agents, payable debts of customers, agents.

(6) Transporation management information subsystem
To closely control the running process, the timetable of the means of transport, the efficiency of the means of transport. From that make the right and suitable decision, whether to continue to invest in new means of transport or upgrade the available means of transport. Management requirements include: vehicle records, timetable of running vehicle, fuel consumption charts, norm charts, repair and upgrade lists, transportation.

4.3. Marketing, product distribution and customer services subsystems

(1) Sales management subsystem
Assist the statistics and reports of the business situation of enterprises including information on products at enterprise's warehouses and information on sales situation at agents. From that we can know the consumption situation of each type of product to have a production plan.

(2) Website for enterprise introduction and product advertisement
This website is a place to provide and advertise information of enterprises (products and transactions). Webstie

is the initial step of enterprises in the program of participation, e-commerce integration

Apart from the general website for the whole enterprises, it is necessary to build each thematic website including: information and introduction about enterprise pages, products introduction page, promotion and discount pages, support customer page, receiving and replying customer's feedback page. Information on these pages is retrieved from the respective databases.

(3) Customer forum and listening customer's comments

Customer forum is a form of organizing the communication environment between customers and enterprises, creating conditions for enterprises to approach the market, capturing customer's demands, attracting customers to access enterprise's Website, track ing the enterprise's products. The forum is connected to an ISP for installation on enterprise's website. Information from databases of customer comments, chat, customer response, etc. are posted to the Web of enterprises.

4.4. Specialized databases

(1) Develop specialized databases for business operations in departments, divisions, rooms.

(2) Develop general databases for management purposes, decision support, business management and serve public services.

The classification of such information subsystem is only formal; in fact, the information subsystems have interrelated information exchanges that meet the requirements of the problems of operational management and production automation support, which occur daily in enterprises. The information subsystems in the information system of enterprises are a unified body, they operate in mutually reciprocal relationships. Information subsystems should not be separated, but information systems should be considered as an integrated system of information systems.

5. CONCLUSIONS

Having a complete information system is essential need for enterprises if they want to have a highly effective business. In order to be able to build and deploy well the information system for an enterprise, especially e-commerce business enterprises and serve well the needs of production and business management, it is necessary to apply synchronous measures. Apart from the above mentioned factors, it is necessary to pay attention to some other issues such as the highest levels of leaders should pay proper attention to the information system project, organize the management and implementation of the project effectively, well implement technical procedures when deploying the system, especially in terms of standardization, creation and promotion of human resources in information technology and production automation. In addition, appropriate policies and measures are needed to ensure financial resources, human resources, legality as well as regular attention to improve the quality and effectiveness of the system.

REFERENCES

Development strategy of information technology and communications to 2010, orientation to 2020. Ministry of Posts and Telecommunications.

Documents and reports on information and communication technology in Vietnam of National Steering Committee *on information technology,* VNCI, Ministry of Commerce, Ministry of Education and Training.

White book on Vietnamese Information Technology and Communications in 2014- Information and Communications Publishing House – 2014

Report on the socio-economic situation in 2014 and the tasks of 2015 presented by Nguyen Tan Dung Prime Minister at the 8th session of the XIII National Assembly, October 20, 2014

John J. Rakos. *Software Project Management for Small to Medium size Projects*. Prentice Hall, 1990.

Field, Mike and Laurie Keller, *Project Management*, London, International Thomson Business Press, 1998.

Report on the readiness for information and communications technology development and application (Viet Nam ICT Index) 2014 of Vietnam Association for Information

Processing; Office of National Steering Committee on information technology and Ministry of Posts and Telecommunications in Ha Long on August/2014

P. Cowhey, M. Kleeman, Unlocking the Benefits of Cloud Computing for Emerging Economies: A Policy Overview, University of California, San Diego, 2012.

P.D. Hamerman, L. Herbert, C. Andrews, A. Ephraim, Application Adoption Trends 2015: The SaaS Boom Continues As Businesses Demand Agility, Forrester Research Inc., 2015.

I.S. Mangula, I. van de Weerd, S. Brinkkemper, The adoption of software-as-a-service: an indonesian case study, in: Proceeding of PACIS 2014. Paper 385, 2014.

T. Oliveira, M. Thomas, M. Espadanal, Assessing the determinants of cloud computing adoption: an analysis of the manufacturing and services sectors, Inf. Manage., 51 (2014) 497-510.

Y. Alshamaila, S. Papagiannidis, F. Li, Cloud Computing adoption by SMEs in the North East of England, J. Enterp. Inf. Manage., 26 (2012) 250-275.

Asia Cloud Computing Association, SMEs in Asia Pacific: The Market for Cloud Computing, Asia Cloud Computing Association, 2015.

BCSG, The Small Business Revolution: Trends in SMB Cloud Adoption, BCSG, 2015.