Association for Information Systems
AIS Electronic Library (AISeL)

PACIS 2000 Proceedings

Pacific Asia Conference on Information Systems (PACIS)

12-31-2000

# Intranet Deployment in Hong Kong Companies: Issues, Problems, and Perspectives

Albert Leung
*Lingnam University*

Zenia Chong
*Lingnam University*

Aedy Cheng
*Lingnam University*

Follow this and additional works at: http://aisel.aisnet.org/pacis2000

Recommended Citation
Leung, Albert; Chong, Zenia; and Cheng, Aedy, "Intranet Deployment in Hong Kong Companies: Issues, Problems, and Perspectives" (2000). *PACIS 2000 Proceedings*. Paper 67.
http://aisel.aisnet.org/pacis2000/67

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 2000 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

# Intranet Deployment in Hong Kong Companies: Issues, Problems, and Perspectives

Albert Leung[1], Zenia Chong[2], Aedy Cheng[2]
Department of Information Systems
Lingnan University
Tuen Mun, N.T., Hong Kong.

**Abstract**
*In this paper, an empirical study of intranet deployment in Hong Kong companies is presented. Being one of most common platforms for corporate internal management, intranet is effective in accessing and disseminating intra-organizational data and knowledge, and for supporting operational and strategic corporate decision-making. It is also a very important platform for conducting electronic commerce (EC) on the Internet. A study of the issues, problems and future perspectives of intranet deployment will provide invaluable insights and implications for the current and future EC development in Hong Kong. Drawing on a survey of 44 local companies, this study was conducted in six major aspects: perceived benefit, technical complexity, operational feasibility, external support, maintenance, and staff training. The results are then used to identify a set of issues which have particular relevance for intranet deployment in Hong Kong companies. The paper concludes with a few propositions which constitute a research agenda for further investigation in EC development.*

***Keywords***: Intranet, Electronic Commerce, Intranet Deployment, Extranet

## 1. Introduction

Intranet is one of the most common platform for corporate internal management. It has proven to be effective in accessing and disseminating intra-organizational data and knowledge which is essential for supporting operational and strategic corporate decision-making (Lai, 1998). Furthermore, intranet is also an essential platform for business-to-business (B2B) electronic commerce (EC). Together with Internet and extranet, they form the overall infrastructure for EC. For such reasons, the number of intranets installed around the world has been growing rapidly. Organisations are adopting intranet-based applications at an explosive rate as cost-effective ways to improve corporate communication and automate business processes (Sommers, 1997). In 1995, International Data Corporation (IDC), estimated that there were 100,000 intranet web servers in the U.S. alone, and the number would grow to 4.7 million by the year 2000 (Hills, 1997). Business Research Group also estimated that 70% of all U.S. corporations have intranet in 1997, up from 55% in 1996 (Koprowski, 1997). These companies as diverse as Hallmark Cards Inc., IBM Corp., Wells Fargo & Co. Inc., and Rockwell etc., are deploying intranets for tasks ranging from faster treasury-management services to more efficient manufacturing operations.

According to Koprowski (1997), collaborations within and between marketing, research, engineering and other departments; database access; customer service; order management; and inventory management were the most popular intranet application, since intranets can support rapid, flexible, and wide information flows up, down, and across large enterprises.

[1] Dr. Albert Leung is Assistant Professor at the Department of Information Systems and can be approached via e-mail: leungcka@ln.edu.hk.
[2] Ms Zenia Chong and Ms Aedy Cheng are graduates of the Department of Information Systems.

Kennedy (1997) also pointed out, an intranet could surmount technical as well as organisational obstacles to information flow, whose applications include: corporate communications, sales support and fulfilment, employee information, database linkages, global financial trading, and supporting on-site consulting.

In Hong Kong, intranet presence is comparatively insignificant. Though there is no exact figure about the number of intranet systems or servers installed in Hong Kong, according to a survey conducted in 1997 (Lo and Tam, 1997), few local companies adopted intranet, except a small number of computer companies who themselves offered intranet services to other companies. A recent survey conducted by the Institute of Information and Media Industries of the Hong Kong Productivity Council (HKPC) and IBM China/Hong Kong, found that 65% of local companies have not even boarded the EC bandwagon (Tang, 1999). These results indicate that there are greater concerns about intranet or Internet technology such as lack of understanding, lack of resources, lack of IT culture, and lack of incentives, in the local business communities in which 90% of them are small and medium enterprises (SMEs).

Though intranet technology is relatively mature, and is widely used in countries such as the U.S., little research has been conducted to investigate intranet technology in terms of its initiation, adoption, implementation, and maintenance at both local and international levels. Therefore, there appears to be insufficient insight into these aspects. Specifically, there are needs to know more about why intranet is (or is not) adopted, how intranet has worked for past adopters, what aspects may need further development in order to enhance its value to users, variety of applications run on intranet, to what degree intranet integrates with internal or external systems, and the nature of organisational experiences with intranet in general. Therefore, research in these areas will provide invaluable insights and implications about intranet deployment and more profoundly, EC development.

With these factors in mind, this paper reports an empirical study regarding the deployment of intranet technology in Hong Kong companies, which is based on a questionnaire survey of 44 local companies. As a pilot study for a more in-depth and broad research, this study mainly addresses six issues at the implementation stage of intranet: perceived benefits, technical complexity such as IT resources, external support from consultant, vendor and the Government, operational feasibility, maintenance, and staff training. In order to illustrate the nature and relevance of these six issues, each is reviewed and examined based on the related past research and the results of this study. After descriptions of the research methodology, a summary of findings, conclusions with useful recommendations for intranet deployment and EC development as a whole in Hong Kong as well as other places, are given in this paper. Specifically, drawing on the issues and problems discussed, the paper concludes with a few propositions which constitute a research agenda for further investigation in EC development. It is expected that both research field and business communities would benefit from this study.

## 2. Theoretical Background

As described in (Pierce and Delbecq, 1977; Thompson, 1969), the adoption of technological innovations may be depicted as a three-stage sequence of initiation, adoption, and implementation. The initiation stage concerns the gathering and evaluation of information about the technological innovation. At the following adoption stage, a decision is made about adopting the technological innovation. When the decision is to go ahead with adoption, the

implementation stage involves implementing the technological innovation in the business. Intranet is a technological innovation, thus the three-stage adoption process can apply.

Because of the novelty of intranet, little research has been conducted to understand the technology in the three mentioned adoption stages. While many of the claimed advantages as well as the concerns or risks of intranet are not thoroughly rectified, we therefore decided to initially investigate the issues involved at the implementation stage. We believe that when these characteristics of intranet technology are tested, used, and verified, it would be then appropriate to conduct further research of issues in other stages. In the following sections, we explain how the five factors were identified.

Much research has used the diffusion of innovations theory (Rogers, 1983) to identify attributes of the innovation (such as EDI) that influence its adoption. Among the most commonly investigated characteristics that promote the adoption of the technology are: relative advantage, compatibility (both technical and organizational), and trialability (e.g., pilot tests, prototypes, etc.) (Cragg and King, 1993; Iacovou, Benbasat, and Dexter, 1995). Among the factors identified that inhibit innovation adoptions are cost, complexity of the technology, the need to change internal systems, a lack of technological skills, and a lack of system integration (Pfeiffer, 1992; Saunders and Clark, 1992). As we are studying Hong Kong companies that majority (over 90%) of them belong to the small and medium category, these inibitors should play big role, where resources and computer sophistication are limited (Swatman and Swatman, 1991). Cragg and King (1993) also suggest that economic costs and lack of technical knowledge are two of the most important factors that hinder IT growth in small organizations. Therefore, **perceived benefits** and **technical complexity** are two of the factors in this study.

An intranet can link various servers, clients, databases, and application programs such as Enterprise Resource Planning (ERP). Thus, potentially all company's information such as organisation charts, sales report, production information, can be standardised on Web page basis, which makes a company's operation, control and management much easier, more accurate and efficient. Information that is most frequently included in intranets are corporate policies and procedures, corporate phone directories, human resource forms, training programs, customer databases, product catalogs and manuals, data warehouse and decision support access, image archives, purchase orders, enterprise suits, and travel reservation services (Chabrow, 1998; SurfCONTROL, 1997; Robinson, 1996). Additionally, intranet technology provides a common Web interface across disparate platforms, thus enable the development of cross-platform applications, and the integration of existing legacy applications and databases. Thus, **operational feasibility** is identified as another factor of this study, which considers the degree of internal integration and number of applications running on the intranets.

As SMEs, usually has limited access to capital resources (Ballantine et al, 1998), this subsequently leads to weakness in financing, planning, control and information systems and training (Blili and Raymond, 1993). Due to their lack of financial and technological resources, they tend to seek assistance or support during IT adoption from external sources, i.e. outsourcing. Indeed, the roles played by external consultancy firms, vendors, or even the government, are more critical to them than to large companies. Therefore, **external support** is one of the factors identified.

With the standardisation on Web technology, design of the Web pages presented to users, is critical for effective communication and information flow. Bad design will affect viewing effectiveness. To maintain Web pages, solely relying on technical support staff is not sufficient, as these pages need to be updated frequently which may not be fulfilled by them alone. Thus, end user involvement is crucial for the effective and efficient operation of company resources. Very often, end users will have to be the persons who maintain the contents of these pages. In which case, sufficient training need to be provided to them. Hence, **maintenance** and **staff training** are additional factors considered in this study.

## 3. Research Method

A stratefied random sampling method was used to select companies from the Hong Kong Electronics Handbook Directory prepared by the American Chamber of Commerce in Hong Kong, as it was one of the most comprehensive company database available in Hong Kong. As it was estimated that only a small number of Hong Kong companies were actually deployed intranet, a across-board (all industry sectors) selection was conducted to increase the chance of having more intranet enabled companies. 150 organisations were selected in the end, and was contacted by phone to confirm their willingness to accept an interview or alternatively a mail questionnaire survey.

Based on the above review, the five issues were considered in the questionnaire design. To shorten the questionnaire, maximum five questions were used to cover each issue or factor. For example, questions were asked to find out whether these companies have the existing facilities or expertise to meet the basic requirement of deploying intranet. For those companies which already have intranet in place, the focus was put on the benefits/problems that they have enjoyed/encountered during and after intranet deployment.

Each selected company was sent two questionnaires: one for the top management and the other for the MIS manager if there is one. The “Top Management Questionnaire” was to be completed by company’s top executive. It included those none technical questions relating to the perceive benefit of intranet adoption, operational feasibility, external support, and staff training. The second questionnaire entitled “Technical Questionnaire”, was to be completed by the chief in the MIS department or who is in charge of the company IT development. It involved questions pertaining to the technical complexity and maintenance issues.
Total 300 questionnaires were mailed to the selected 150 organisations. Forty-eight companies returned both questionnaires. Four questionnaires were discarded due to incomplete information. Thus, the actual valid responses were 44 representing a response rate of 29%. The profile of the respondents is shown in Table 1, with majority (84%) from the service industry. Many of them are still at the stage of evaluation of possible intranet deployment. Others who already deployed intranet, only migrated to intranet platform in the last one or two years. In the following sections, we present our investigation in three sections, i.e. technical complexity, operational feasibility, and maintenance and staff training. While Table 2 shows the respondents profile in terms of company size, all of the respondents belong to the small and medium size category.

**Table 1. Respondents by Industry**

| Industry | Number of respondents | Percent |
|---|---|---|
| Finance, insurance, and real estate | 1 | 2% |
| Transportation, communications, and public services such as gas and electric | 12 | 27% |
| Retail Trade | 25 | 57% |
| Manufacturing | 6 | 14% |
| | 44 | 100% |

**Table 2. Respondents by Company Size**

| Company Size (persons) | Number of respondents | Percent |
|---|---|---|
| <30 | 0 | 0% |
| 30-60 | 0 | 0% |
| 61-90 | 24 | 54% |
| 91-120 | 14 | 32% |
| 121-200 | 6 | 14% |
| | 44 | 100% |

## 4. Results

As the main objective of this study is to validate the benefits/uncertainties of intranet deployment, as well as to obtain first hand information in regards of business applications running on intranet, no analytical measures were planned to draw relationships among the identified factors. Complete and rigorous analysis will be conducted during the next stage of the research project.

### *4.1 Perceived Benefits*

As shown in Table 3, 27% of the respondents think that cost saving such as reducing daily operating cost is the main benefit of deploying intranet, whereas improving the efficiency, productivity improvement, and effective management all stand equally at second. This reflects that the main benefits of intranet technology are well recognized by the companies.

**Table 3. The Benefits of Intranet Deployment**

| Benefit | Percent |
|---|---|
| Time Saving | 10% |
| Cost Saving | 27% |
| Work Efficiency | 21% |
| Improved Productivity | 21% |
| Effective Management | 21% |
| | 100% |

### *4.2 Technical Complexity*

All of the companies we surveyed have more or less applied computer technology to conduct company businesses. As shown in Table 4, 57% of them already have local area networks (LAN) in place, and quite a few (11%) have set up wide area networks (WAN). A noticeable 18% of them have taken intranet approach. Among these companies, most of them (75%) have their own expertise to design, install, and maintain their computer systems, while we

also find a few (25%) outsource these tasks to computer companies rather than maintaining their own computer teams. However, all of the intranet users have their own computer expertise. There is no strong indication of a relationship between computer use and nature of company business.

**Table 4. Respondents by network uses**

| Existing Systems | Number of Companies | Percent |
|---|---|---|
| Wide Area Network | 5 | 11% |
| Local Area Network (only) | 25 | 57% |
| Intranet Approach | 8 | 18% |
| None | 6 | 14% |
| | 44 | 100% |

Most of the companies said that they understand the intranet concepts, and believe that they would have the capability to handle the technical issues with certain level of assistance from service providers. Some (6%) indicated that they never heard about intranet before, or think that intranet is too technical (13%), or have no practical use to them (15%). 29% of the respondents concern that intranet may cause too much impact or changes to them, while 20% and the remaining 17% of the respondents regard Web page maintenance and data security respectively as their main concerns, see Table 5.

**Table 5. Why do not use intranet?**

| | Number Of Respondents | Percent |
|---|---|---|
| Never heard of | 5 | 6% |
| Too technical | 12 | 13% |
| Have no practical use | 13 | 15% |
| Not sure of impact | 26 | 29% |
| Security | 18 | 20% |
| Maintenance problem | 15 | 17% |
| | 89 | 100% |

### *4.3 Operational Feasibility*

Intranet approach support business operations on the Internet. To comply with this approach, a company has to make certain changes. Therefore, it imposes potential impact on traditional approach which relies on either manual processes or other networking systems. Whether intranet approach will help them to conduct their business processes more effectively and efficiently, is still relatively unknown. According to our survey, these companies are involved in a wide range of businesses, see Table 1. The service that they use the most is e-mail. Some of the companies (29%) do put company's information on Web servers for employees to look at. A few (9%) of the companies allow limited external access of their internal systems, mainly for marketing purposes. Table 6 shows the overall picture of the main intranet uses.

As indicated in Table 6, the most popular use of intranet is the e-mail. With e-mail, company employees have more options to communicate effectively besides the traditional telephone and fax. However, it is still regarded as an informal way of communication. Paper documentation has to be produced in many critical business processes. Regarding the Web uses, usually only a handful of information is put on the Web. Very often, it was mainly associated with company's background and services offered, which are seldom required to be

updated. This situation reflects that these companies are still hesitating in driving intranet into its full use. As indicated in our survey, the main concern of these companies is that they do not have sufficient expertise to develop dynamic Web pages. Existing staffs are not able to update the contents of the pages themselves. In addition, people are still concerned about internal and external security problems.

**Table 6. Main Intranet Uses**

| | Number of Companies | Percent |
|---|---|---|
| E-mail | 8 | 38% |
| Web page surfing (internal only) | 6 | 29% |
| Web page surfing (with external access) | 2 | 9% |
| Ftp, telnet | 5 | 24% |
| | 21 | 100% |

When asked whether they have met the initial expectation of deploying intranet, all of them showed their confidence in intranet, though exact results have to be verified in a longer term. Though intranets are used, they are limited to certain functions of the company processes, and have not been introduced into a wider spectrum of company operations. In other words, these companies have not fully explored the real EC potential of intranet.

Overall, few companies have reached the stage of conducting businesses on the Internet. Many companies even indicated that intranet is not so relevant to their businesses. In addition, measures of how effective it is as the conduct of EC are undermined and sometimes uncertain. Most of the companies concern that intranet may bring too many changes to the existing systems, and require more resources and user training, and therefore may affect them adversely if applied prematurely. From this standpoint, it may take years before intranet become widely used in the business communities, though many successful examples can be found elsewhere.

### *4.4 External Support*

Quite contrary to our previous review, in terms of external support, only 2 out of 8 companies have sought external support to install and maintain their intranets. This reflects that majority of the companies who installed intranets have their in-house expertise. In terms of the service offered by the external consultants and vendors etc., those companies which responded indicated that the services offered by external parties are not sufficient, lack of variety, or no custom-made packages for their needs.

### *4.5 Maintenance and Staff Training*

Intranets provide an alternative approach for business operations. One major breakthrough is to standardise information such as sales order, on Web basis. Qualified staff is needed to initiate, update, and maintain the Intranet facilities. The problem is whether computer staff or end user should be responsible for maintaining these facilities. Computer staff may have the technical knowledge and skills to meet the requirements, but they may not be able to fulfil each single request from their end users on time due to the traditional backlog problem. There are also risks of leaking classified data to unauthorized personals. However, if end users take up the responsibility of maintaining their corresponding Web resources, they should be

offered appropriate training. Limited information systems skill among company staffs often makes such training difficult.

According to the survey, computer staffs normally carry out the duties of developing and updating the web pages. Some companies outsource certain functions and services to computer firms, which may alleviate the need for technical resources. Internal staffs are rarely involved in the actual development. At this initial stage of intranet deployment in Hong Kong, such arrangement may be acceptable. However, for large scale intranet deployment in EC, proper procedures have to be set up to regulate the maintenance of the information resources as well as staff training. To successfully conduct business on the Internet, end user involvement is crucial.

## 5. Conclusions and Further Research

Based on a questionnaire survey of 44 local companies in Hong Kong, this paper has studied intranet deployment in six major aspects: perceived benefit, technical complexity, operational feasibility, external support, maintenance, and staff training. The study indicated that even though EC has gained great publicity in Hong Kong, there is a lack of understanding of specific EC platforms such as intranet in terms of its functions and applications. Second, many companies have no clearly defined IS/IT investment or business strategy, thus they are not sure how intranet can help them conducting their traditional businesses except the marketing function. In addition, measures of how effective the intranet is for EC are undermined and sometimes uncertain. Consequently, the potential capability of intranet was not fully explored. For example, the lack of integration of intranet with traditional computing resources significantly reduced the potential power that intranet offers. The study also showed that the main uses of intranet are to send e-mail and to distribute company information through WWW. There was no indication of B2B transactions over the Intranet in the survey. Third, lack of IT specialist and user training has made maintenance of intranet resources confusing and difficult. The problem will be even more evident with the increase of Web-based resources. Fourth, though security was not individually discussed in the survey, it is in fact a difficult barrier to overcome.

For recommendations at this stage, external support parties such as consultants, vendors, or the Government, should play a more pro-active role for innovation diffusion or technology transfer to local companies by organizing related exhibitions or seminars. Right now, the Government has several bodies such as HKPC, Hong Kong Industrial Technology Centre, and SME Centre, who are actually going in such a direction by offering services, loans, and other incentives to local companies. With this kind of external support, companies who are lack of necessary resources to understand and carry out the innovative technology adoption such as intranet, can really benefit from its deployment.

Though generally lack of resources and lack of IT culture, local companies should have a business and IS/IT strategy which leads to better understanding and realisation of the benefit of technology deployment. Merely focusing on short term plan or considering IS/IT investments in isolation, implies an inability to reap the synergistic benefits of IS/IT investments such as intranet deployment.

For further research activities, more work need to be done at this implementation stage by incorporating additional factors such as: environmental influences, alignment with business

strategy, strategic IS/IT planning, and success measurement. Ultimately, a reference model or methodology will be generated towards the end of this research. Relationships can also be built up through rigorous analysis of these variables, specifically between company characteristics and intranet deployment. Additionally, this research only concentrated on the implementation stage of technology innovation diffusion, while research is yet to be carried out at the other two stages, i.e. initiation and adoption.

**References**


Ballantine, J., Levy, M., and Powell, P. "Evaluating Information Systems in Small and Medium-sized Enterprises: Issues and Evidence," *European Journal of Information Systems* (7), 1998, pp. 241-251.

Blili, S., and Raymond, L. "Information Technology: Threats and Opportunities for Small and Medium-sized Enterprises," *International Journal of Information Management* (13), 1993, pp. 439-448.

Chabrow, E. "Instruments of Growth," *InformationWeek* (10:5), 1998.

Cragg, P., and King, M. "Small-Firm Computing: Motivators and Inhibitors," *MIS Quarterly* (17:1), March 1993, pp. 47-60.

Freeman, L. "Net Drives B-to-B to New Highs Worldwide," *NetMarketing,* 1998 (www.netb2b.com).

Hills, M. *Intranet Business Strategies.* John Wiley, 1997.

Iacovou, C.L., Benbasat, I., and Dexter, A.S. "Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology," *MIS Quarterly* (19:4), December 1995, pp.465-485.

Ng, H., Pan, Y. J., and Wilson, T.D. "Business Use of the World Wide Web: A Report on Further Investigations," *International Journal of Information Management* (18:5), 1998, pp. 291-314.

Kennedy, M. "Intranet Applications for the Enterprise," *Telecommunication* (31:7), 1997, pp. 29-32.

Koprowski, G. "Intranet Unleased," *Software Magazine* (17:9), 1997, pp. 76-83.

Lo, S. F., and Tam, C. C. *A Study on the Intranet Application in Hong Kong and its Impact on the Hong Kong Companies,* BBA Dissertation, Lingnan College, 1997.

Pierce, J. L., and Delbecq, A. L. "Organizational Structure, Individual Attitudes and Innovation," *Academy of Management Review* (2:1), 1977, pp. 27-37.

Pfeffer, H.K.C. *The Diffusion of Electronics Data Interchange,* Springer-Verlag, New York, NT. 1992.

Retter, T. and Calyniuk, M. *Technology Forcast: 1998,* Price Waterhouse, March 1998.

Robinson, J. "Intranet 100: The Revolution Is Here," *InformationWeek* (11:18), 1996, pp. 106-108.

Rogers, E.M. *The Diffusion of Innovations,* Free Press, New York, NY, 1983.

Saunders, C., and Clark, S. "EDI Adoption and Implementation: A Focus on Interorganizational Linkages," *Information Resources Management Journal* (15:1), Winter 1992, pp. 9-19.

Sommers, B. "Collaborative Development Will Ease Web Maintenance," *Communication Week* (666), 1997, pp. 54.

SurfCONTROL. "The Intranet – A Corporate Revolution," 1997 (www.intranet.com.uk/papers/intranet.intranet.html).

Tang, J. "Hong Kong SMEs are not Ready for E-Commerce," *Asia Computer Weekly* (20:35), 1999, pp. 1.

Thompson, V.A. *Bureaucracy and Innovation.* Huntsville: University of Alabama Press, 1969.