THE BENEFITS OF USING UNIFIED COMMUNICATIONS SYSTEMS FOR SMES

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ABSTRACT

This study investigates the benefits of unified communications (UC) system for a small and medium-sized enterprise in Taiwan.This case study explores the UC system from interviews with staff in the information department of the case company,and using the the Technology-Organization-Environment framework. A questionnaire developed based on balanced scorecard was used to collect data from employees who have used the UC system. Results indicate that the case company has benefited substantially from its adoption of a UC system.The benefits include improved efficiency of communications between the organization and employees; improved communications with upstream/downstream clients and suppliers; reduced expenses for video conferencing facilities.The study recognized the UC system has become an important instrument of communications in the company.

Keywords: Unified Communications System, Technology-Organization-Environment Framework, Balanced Scorecard

1. INTRODUCTION

Many businesses have adopted a unified communications (UC) system in pursuit of better work efficiency of employees and higher competitiveness of the organization. There are three benefits of adopting a UC system, including reduced cost of communications, reduced loss of employee attendances, and more uniformed operation of branches.This study uses an optoelectronic firm in Taiwan's Hsinchu Science Park as an example and the Technology-Organization-Environment (TOE) framework proposed by Tornatzky and Fleischer [22] as the theoretical foundation to investigate the benefits of adopting Lync, a UC system developed by Microsoft. A questionnaire developed based on Balanced Scorecard is also used to measure the benefits of adopting this UC system for employees of this company. Sawalqaetal.[18] also analyses the state of implementation of the balanced scorecard (BSC) among medium and large industrial companies.

2. LITERATURE REVIEW

2.1 Unified Communications System

Unified communications (UC) is the integration of various tools of interpersonal or messaging communications into one platform for more efficient exchange of communications. Based on collaboration, videoconferencing, and virtualization technologies, UC allows businesses to make use of their resources widely distributed around the world to meet specific needs of customers, plans or activities. Hsin-hung Chen, Product Manager at Cisco Systems Inc., mentioned that UC is the integration of various individual communication services, including voice, fax, Email, instant messaging, meeting, graphic exchange, and video conferencing. Li-cheng Lu, General Manager at Polycom Inc. in Taiwan, mentioned that despite the absence of a more complete definition, UC is conceptually intended to allow its users to join an transnational meeting and share data with one another using any readily available device, such as PC or Tablet PC [7]. Liu[11] suggested that businesses adopt UC after upgrading their communication systems into IP-based systems to achieve higher efficiency of communications management and message exchange within the organization. The benefits of UC adoption are not limited to improved efficiency of communications and easier management of communications. The major benefit of UC comes from of its applications on communication terminals. In a UC framework, businesses are allowed to offer data applications on different communication terminals. Data that could be accessed only with a PC or specific devices before are now accessible on terminal devices. Therefore, larger firms with more branches and mobile workers may benefit more

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substantially from UC adoption. Because the benefits of UC adoption are mainly associated with improvement in communication efficiency, it is hard to evaluate them by commonly-used performance indices, such as cost reduction or return on investment. This is also why the benefits of UC adoption are usually more observable among larger businesses. According to Alan Tsao, Research Manager at International Data Center, software communication has gradually taken the place of conventional hardware facilities in the same way that digital cameras tookthe place of film cameras. The emergence of UC software marks the advent of the era of digital communications. The UC market in Taiwan has a growth of 14.8% during 2010~2014. By building a UC platform, businesses can enjoy a continuous reduction in communication cost [13].

In this study, we investigate the benefits of using Microsoft Lync Server for a optoelectronic company in Taiwan's Hsinchu Science Park. Microsoft Lync Server is a new-generation UC system. Its main feature is its support for "link" and "sync". Through seamless integration of software systems, it has combined the functions of telephone communication, instant messaging, and video conferencing into one intuitive user interface. Besides, integrated with features of common software programs, Microsoft Lync Server works beyond the functions of a traditional telephone or any complicated communication or video conferencing device. According to Huan-pei Chen, General Manager of Business Group Lead at Microsoft Corporation, Microsoft Lync Server ushers in a communication revolution as it allows corporate users to achieve efficient communications and collaboration at a lower cost. It also promotes development of the value chain of the communication industry. Hence, businesses have more options and can spend less on procurement of communication hardware devices[12].

The top features of Lync are connect with the outside world, stay in touch anywhere, use the device you want, communicate in the right way, take advantage of standards-based HD video, make virtual meetings more effective, easily join meetings, extend Lync meetings outside your organization with browser-based access, take notes in OneNote, quickly and intuitively find the best way to communicate.The system interface of Lync is shown in Figure 1 and some real cases about Lync are shown in Table 1.

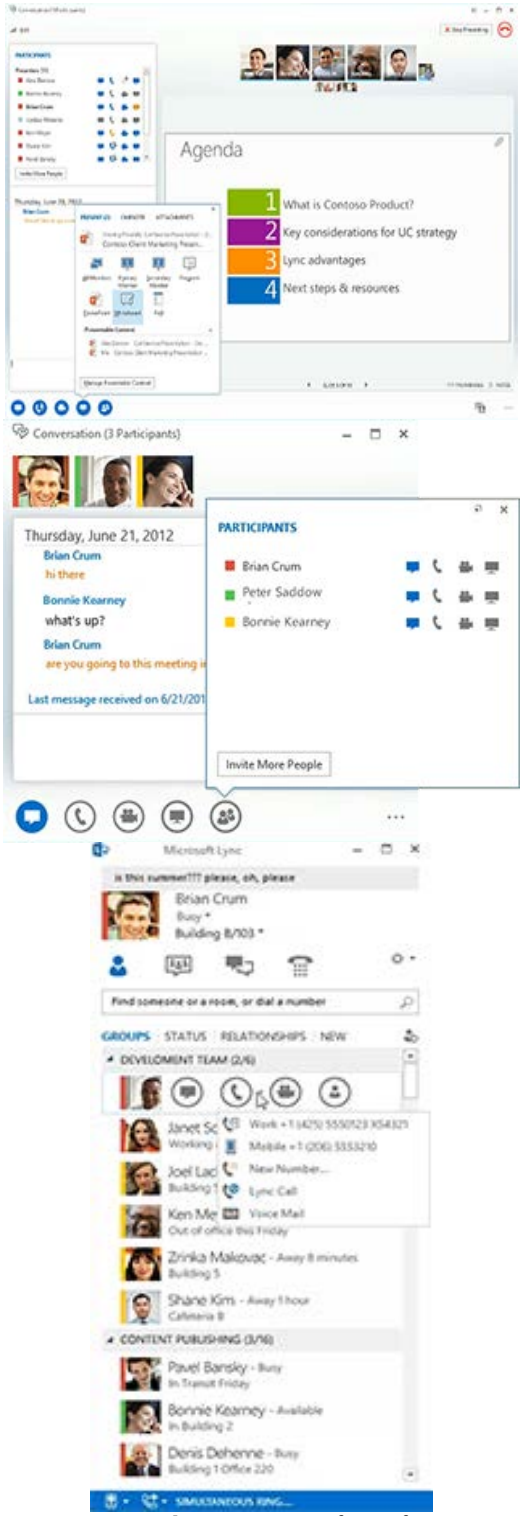

Figure 1: The system interface of Lync

Table 1: Some real world cases about Lync

Real Case	The Benefits of UC System
Adventist Health System	Adventist Health System is a faith-based health care organization headquartered in Altamonte Springs, Florida. It is able to provide employees with a unified, consistent experience across all communications vehicles: email, instant messaging, web conferencing, audio conferencing, videoconferencing, voice, and desktop and mobile devices. It is also looking to use the technology to improve the patient experience.
SunGard	SunGard provides software, processing solutions, and technology services. It has found that using Lync helps unify its company and support greater collaboration across the diverse businesses. The employees love the Lync toolset, by implementing Lync, they can give everyone advanced collaboration tools and have all offices and employees on a level playing field.
UCB	UCB is a bio-pharmaceutical manufacturer based in Belgium with operations in 40 countries worldwide. By upgrading to the latest release of Lync and establishing unified communications throughout the company, UCB can better support its distributed workforce, reduce costs, and enable flexible, effective collaboration.
EmpireCLS Worldwide Chauffeured Services	EmpireCLS Worldwide Chauffeured Services is one of the largest chauffeured transportation companies in the world. It is using Lync Server 2013 to improve its business processes by using Lync meetings for sales calls with customers and by enabling mobile communications with its chauffeurs and staff. With support for VDI, the staff will now access the solution within the virtual desktop just like their other applications, which will help to ensure rapid adoption.
MedcoEnergiInternasional	MedcoEnergiInternasional is an integrated energy company based in Jakarta, Indonesia. With Lync Server 2013, MedcoEnergi can extend the benefits of its communications solution: in particular, enterprise voice to its entire organization, making employees better able to connect to one another. It can also continue its effort to phase out expensive phone systems at its remote sites, helping the company reduce costs.

*Reference: Microsoft Corporation. [14]

Microsoft Lync is an enterprise-ready unified communications platform that offers additional capabilities that are valuable in larger organizations[15]:

1. Lync empowers IT administration flexibility and control via Active Directory and archiving and compliance tools, and it is an extensible platform with documented APIs based on industry-standard technology.
2. Lync offers the resiliency, scalability, and critical features necessary to enhance or replace traditional PBX systems.
3. Lync enables professional online meetings scaling to hundreds of participants.
4. Lync supports everyday productivity with deep integration with Microsoft Office, Exchange, and SharePoint.
5. Lync has the option of running as a hosted service or as an on-premises deployment and has many options for customized support, including Microsoft Services Premier Support.

2.2 TOE Theory

The TOE framework introduced by Tornatzky and Fleischer [22] suggests that technological adoption at firm level is affected by three elements, namely the technological context, the organizational context, and the environmental context. The technological context refers to all technologies that are relevant to the firm, both technologies that are already in use at the firm as well as those that are available on the market but not currently in use. The organizational context encompasses factors including firm size, the centralization, formalization, and complexity of its managerial structure, the quality of its human resource, and the amount of slack resources available internally. Competitive intensity, competitors, suppliers, and government agencies are the factors covered in the environmental context. Teo and King [21] suggested that the technological context is concerned with the key characteristics of the internal technical environment of the organization as well as the external technologies for the organization. An organization's internal technical environment or information capability refers to the professional competence and knowledge possessed by its information department. System planning ability, familiarity with information system (IS) planning, information processing ability, and domain knowledge all belong to the professional competence of the information department. Kuan and Chau[9] argued that status of adoption by supply chain partners and government policies are factors affecting a firm's adoption of technological innovations.

According to Rogers [17], adoption of a technological innovation is affected by relative advantage, compatibility, and complexity of the innovation. Relative advantage refers to the extent to which the innovation is seen as more beneficial than the current technology. Compatibility is how well the innovation aligns with the experiences, values, and beliefs of potential adopters. Complexity refers to the ease of understanding and using the innovation. Simon et al.[19] identified factors affecting adoption of new innovations in three dimensions. Relative, compatibility, and complexity are factors in the

technological dimension. Factors in the organizational dimension are organizational support, team ability, and user participation. Policy, regulations, and competitive pressure are factors in the environmental dimension. Studies have also found that some organizational factors, including organizational size, departmental size, executive support, technical skills, educational training, technical experience, and member backgrounds, are critical to adoption of technological innovations [5, 6, 20].Chen et al.[3] explores the potential applications of IT for Taiwan's manufacturing, and the purpose is to analyze e-Business projects of manufacturing in Taiwan. Nguyen etal. [16] investigates which drivers affect information technology adoption and which factors relate to a successful IT implementation in small businesses, the results suggest that managers/owner–managers must engage with five factors: organization, internal IT resources, external IT consultants, supplier relations, and customer relations. Kuo and Chao[10] focused on the innovative behaviors of SMEs in service industries to clarify the relationships amongst the patterns, outcomes, and impact of information technology (IT) use.

Based on the above literature, we attempt to investigate the benefits of UC adoption for the case company in the following aspects. In the technological dimension, we consider compatibility, relative advantage, complexity, current market condition, and technical competence of the information department. In the organizational dimension, we evaluate firm size, top management support, abundance of resources, competency of the project team, and user participation. In the environmental dimension, we focus on intensity of competition, government policies, and status of adoption by supply chain partners.

2.3 IT Studies based on the TOE Framework

TOE has been extensively applied in research of antecedents to and factors affecting IS adoption. This framework allows both researchers and practitioners to gain an insight into related issues as well as the general ideas about adoption of any innovation at the organizational level. Table 2presents a summary of literature related to TOE.

Table 2: Literature related to TOE

Author (year)	Topic	Abstract
Kuan and Chau (2001)[9]	A perception-based model for EDI adoption in small businesses using aTechnology-Organization-Environment framework.	This study investigates factors affecting EDI adoption intentions among small businesses. Results confirm that the TOE framework is a useful approach for examining factors affecting the EDI adoption decision.
Wang and Wang (2010)[23]	Understanding the determinants of RFID adoption in the manufacturing industry.	This paper proposes nine variables that affect RFID adoption in the manufacturing industry. The nine variables are relative advantage, compatibility, complexity, top management support, firm size, technology competence, information intensity, competitive pressure, and trading partner pressure.
Chan et al.(2012) [2]	An empirical investigation of factors affecting e-collaboration diffusion in SMEs.	This study proposes a model to examine a stage-based e-collaboration diffusion process in SMEs. An integrated technology adoption model based on the TOE framework, inter-organizational relationship, and Unified Theory of Acceptance and Use of Technology is proposed for empirical validation.
Chong and Chan(2012)[4]	Structural Equation Modeling for multi-stage analysis on Radio Frequency Identification (RFID) diffusion in the health care industry.	This paper presents a multi-stage analysis on the antecedents to diffusion of RFID in the health care industry. Results show that variables within the TOE framework and the Diffusion of Innovation theory have different effects on the evaluation, adoption, and routinization stages of RFID diffusion.
Bernroiderand Schmöllerl (2013)[1]	A Technological, Organizational, and Environmental analysis of decision making methodologies and satisfaction in the context of IT induced business transformations.	Based on the TOE framework, this study performs a factor analysis to explore factors affecting decision making satisfaction in the context of IT induced business transformations.
Lyu et al.(2014) [12]	A study of RFID readiness framework and its application.	This paper proposes a framework which covering organization, environment, and technology three facets. Analysis shows that all three facets are associated with each other and expected value, managers' commitment, as well as network infrastructure are the key factors that influence the intent of adopting RFID in the case industry.

3. CASE STUDY

We adopt the case study approach to evaluate the benefits of adopting Microsoft Lync Server for the case company. The interview was designed according to the TOE theory introduced by Tornatzky and Fleischer [22]. Figure2 shows the subdimensions of each dimension of this framework.

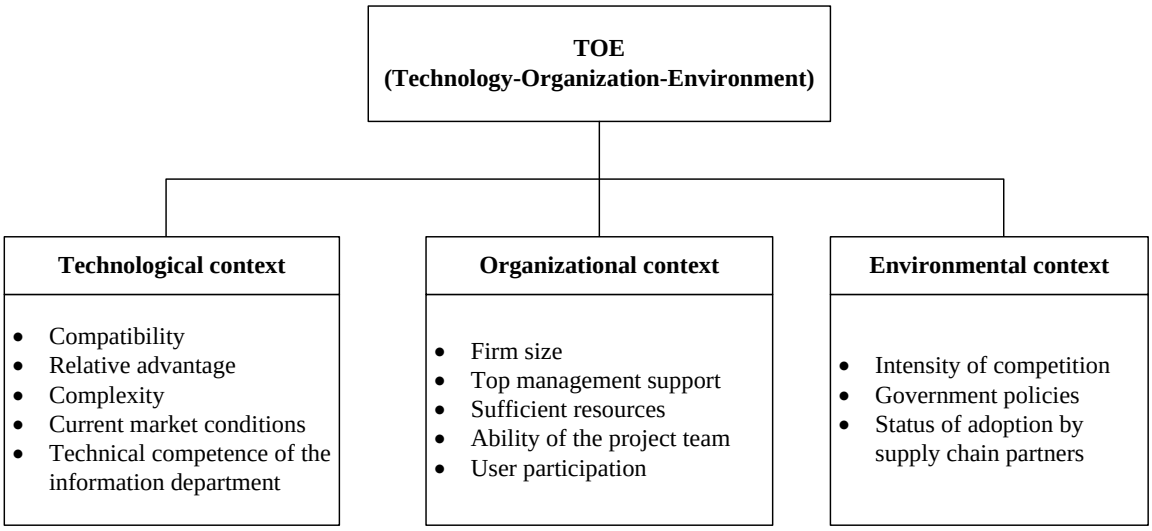

Figure 2: Research framework

The case company was established in 1983, the company has its core business in LED production. It manufactures a wide range of products, including light-emitting components, illumination sensors, and lighting systems. Currently, this company has about 1,400 employees and a total of five plants, two plants in Hsinchu, Taiwan, and three in China. Due to persistent investment and dedication over the years, this company has become a leader in the LED industry. Thanks to the professional competence and creativity of its research and development team, this company has obtained international patents for many of its LED innovations. So far, it has accumulated rich experiences and outcomes, particularly in the production of LED die and design of LED applications.

As suggested by Yin [24], we obtained data through analysis of related document and files, interview, and direct observation in the case company. The interview was targeted at employees of the information department who were involved in the implementation of Lync. A total of five employees, including the manager and the vice manager of the department, and three project members, joined our interview. The basic data of these participants are provided in Table 3.

Table 3: Basic data of the participants in the interview

Department	Position	Length of service
Information department	Manager	21 years
	Vice Manager	16 years
	Director	9 years
	Deputy Director	13 years
	Engineer	8 years

According to the TOE framework, we first determined subdimensions in each of the three dimensions, namely technological context, organizational context, and environmental context. For each subdimension, we further designed questions to be used in the interview.

After the interview, we analyzed the results in terms of the current status and benefits of Lync for the case company. Below is our analysis and discussion of the results in the technological, organizational, and environmental dimensions.

3.1 Analysis in the Technological Dimension

After adoption of Lync, employees of all departments have been enabled to contact each other for message exchange, document revision or meeting in an easier manner. Through Lync, they know the status of each person to contact with and can therefore avoid bothering busy ones. Employees outside the office are also enabled to communicate with employees currently in the office. This function of Lync is helpful for improving the work efficiency of employees. As most of the software programs used

by the case company are products of Microsoft, system compatibility is not a problem for this company. After adoption of Lync, communications between employees have become more instant, and multiple members are allowed to join any meeting. Through the function of instant meeting built in Lync, employees can organize or join a meeting immediately without leaving their offices. Besides, Lync has been very useful for organizing video conferencing for members at different branches. It allows the meeting organizer to invite multiple members to the meeting and record its video and audio for later viewing or record keeping. If necessary, external members can also be invited to join the meeting. This function helps the company develop closer relationships with supply chain partners and indirectly improve their work efficiency. The adoption of Lync has also resulted in a reduction in the telephone cost, transportation cost, and business travel accidents of employees. Lync does not require a complicated installation and configuration procedure, and its user interface looks like those used by general communications software. So, most employees have no problem using it. Despite a variety of UC software systems available on the market,the case company chose Lync for the following reasons: better integration with internal IS, possession of Microsoft accounts, high market penetration, and lower investment cost.

3.2 Analysis in the Organizational Dimension

The case company has two plants located in Taiwan's Hsinchu Science Park. It has about 1,400 employees, and 400 of them are using Lync. In terms of firm size, most interview participants agreed that their company is in a size suited for adoption of Lync. This is because the company has multiple plants, and some of the plants are located overseas. Lync can help increase the efficiency of communications between plants. Before adoption of Lync, the company relied primarily on email and telephone for communication. Now with Lync, they can solve urgent issues more in a timely manner. The top management in the company also shows a supportive attitude toward adoption of Lync and has sufficient knowledge of the benefits of Lync. The cost of adopting Lync was about NT$600,000~300,000 for the hardware, 100,000 for the software, and 200,000 for the consultants' services. The installation and configuration of the system took about 2~3 weeks, and five project members accomplished the task under the assistance of software developers. The project members had sufficient technical competence, so the installation was carried out smoothly. After adoption of Lync, the company also offers online video instruction and training to employees. Therefore, most employees have high acceptance of Lync and are satisfied with the services it provides.

3.3 Analysis in the Environmental Dimension

After adoption of Lync, communications between employees have become more instant and cost-efficient. Efficiency is a kind of competitive advantage of firms. As to the status of adoption of Lync by supply chain partners, most participants mentioned that almost all of their supply chain partners are using communications software such as Skype or MSN. Lync supports connectivity with Skype and MSN, so they can have instant communications with their supply chain partners easily. In terms of government policies, most respondents found no direct association between adoption of Lync and government policies. However, one of them mentioned that adoption of Lync is aligned with the goals of traffic reduction and energy saving.

4. QUESTIONNAIRE SURVEY

To explore the benefits of Lync from the perspective of users, we developed a questionnaire based on Kaplan and Norton's [8] Balanced Scorecard. The questionnaire consists of four perspectives, including learning and growth, internal processes, customer, and financial. A total of 160 questionnaires were administered to employees who have used Lync in the case company. 147 responses were obtained, and 138 responses were valid, resulting in a valid response rate of 86%.

The descriptive statistics of the sample are provided in Table 4. Most of the respondents are male, taking 60.1%. Among the age groups, the 31~40 group is the largest. About 68.8% of the respondents have a university education background.About 68% have worked for the firms for more than 5 years.Table 5 shows the mean and standard deviation for each question about the benefits of Lync.

Table 4:Basic data of employees with experiences of using Lync

Variable	Group	Sample size	Percentage
Gender	Male	83	60.1%
	Female	55	39.9%
Age	20 or under	0	0%
	20 ~ 25	3	2.2%
	26 ~ 30	21	15.2%
	31 ~ 35	41	29.7%
	36 ~ 40	42	30.4%
	41 ~ 45	21	15.2%
	46 ~ 50	7	5.1%
	51 ~ 55	2	1.4%
	56 or above	1	0.7%
Education degree	Senior high / vocational school	2	1.4%
	College	19	13.8%
	University	95	68.8%
	Graduate degree or higher	22	15.9%
Position	Assistant general manager	2	1.4%
	Manager / vice manager	15	10.9%
	Director of the section / Deputy director of the section	24	17.4%
	Management professional	37	26.8%
	Chief engineer	15	10.9%
	Engineer	43	31.2%
	Others	2	1.4%
Length of service	Less than 1 year	13	9.4%
	1 ~ 3 years	30	21.7%
	4 ~ 6 years	19	13.8%
	7 ~ 9 years	18	13.0%
	10 years or longer	58	42.0%

Table 5: Mean and standard deviation for each question in the questionnaire

Perspective	Question	Mean	*SD*
Learning and growth	1. Lync has helped improve the efficiency of information exchange between employees.	4.08	.651
	2. Lync has helped improve employees' efficiency in handling problems.	3.92	.705
	3. Lync has helped improve the work efficiency of employees.	3.75	.743
	4. Lync has helped improve the productivity of all the departments.	3.54	.775
	5. Lync has helped improve the competitive advantage of the company.	3.57	.763
Internal processes	1. Lync has helped improve the efficiency of work processes.	3.70	.770
	2. Lync has helped reduce the work complexity.	3.51	.747
	3. Lync has helped improve the interactions between departments.	4.08	.640
	4. Lync has helped improve the interactions between plants.	3.99	.764
	5. Lync has helped improve the efficiency of business management.	3.62	.717
Customer	1. Lync has helped improve employees' efficiency in solving problems that must be handled immediately.	3.87	.743
	2. Lync has helped improve the efficiency of communications with customers.	3.55	.838
	3. Lync has helped improve customer satisfaction with the company.	3.43	.837
	4. Lync has helped improve customer trust in the company.	3.38	.794
	5. Lync has helped improve the service quality of the company.	3.54	.812

Table 5: Mean and standard deviation for each question in the questionnaire (Continued)

Perspective	Question	Mean	*SD*
Financial	1. Lync has helped reduce the work hours of employees.	3.72	.783
	2. Lync has helped reduce cost of communications for the company.	3.96	.768
	3. Lync has helped reduce cost of business travel.	3.52	.766
	4. Lync has helped reduce the cost of buying new hardware.	3.48	.785
	5. Lync has helped reduce the cost of information processing.	3.59	.752

According to Table 5, respondentsshowed a high level of agreement on nearly all the questions. Below is our analysis of the results in each perspective.

1. Learning and growth: The case company's adoption of Lync has resulted in higher efficiency of information exchange between employees and higher efficiency solving problems. The respondents also agreed that their work efficiency, productivity of all the departments, and competitive advantage of the company all improved after adoption of Lync.
2. Internal processes: Results show that the adoption of Lync has led to greater interactions between departments and between plants. The respondents also recognized improvement in efficiency of work processes, management efficiency, and work complexity after adoption of Lync.
3. Customer: The employees' efficiency in solving urgent problems was enhanced after adoption of Lync. Although the means in this perspective are relatively lower compared to other perspectives, we believe if the case company makes a greater use of Lync in customer management, it can enhance its service quality and customers' satisfaction and trust in them.
4. Financial: The results confirm that the adoption of Lync has helped reduce the company's communication expenses as well as employees' work hours. Besides, respondents also recognized its contribution to reductions in business travel cost, hardware cost, and information processing cost.

5. CONCLUSION

In this study, we applied case research and questionnaire survey methods to investigate the benefits of adopting Lync. These benefits for the case company and its employees are respectively concluded as follows:

5.1 The Benefits for the Case Company

In our case study, we investigated the benefits in the technological, organizational, and environmental contexts respectively. Below are our conclusions drawn from the case study.

In the technological context, Lync has helped improved message exchange between employees and problem solving efficiency of employees. The instant meeting function in Lync is very helpful for the company to have videoconferencing with its subsidiaries. The meeting organizer can invite multiple members to the meeting and also record the meeting for later reviewing. Lync also allows the meeting organizer to join members outside the company into the meeting. Therefore, the company can develop closer relations with upstream/downstream partners and indirectly gain an improvement in work efficiency. Besides, Lync is easy to install and use. Because the case company uses mainly products of Microsoft, it did not experience large compatibility problems during implementation of Lync. In addition to communication cost and transportation cost, Lync has reduced the business travel accidents of employees. The reduction in occurrence of such accidents is an aspect that businesses should pay attention to.

In the organizational context, the case company is in a size suited for adoption of Lync. The efficiency of communications is particularly important for a company that has numerous overseas plants and a large number of employees. Higher work efficiency can indirectly lead to higher firm competitiveness. After adoption of Lync, the company has been able to solve urgent problems in a timely manner, and the communication model of their employees has also changed. According to the staff of the information department, they offer online video instruction and training on use of Lync. Therefore, most employees are satisfied with such service.

In the environmental context, communications between employees have become more instant and efficient after adoption of Lync. With the rise of green awareness in recent years, adopting UC has become a way to reduce use of paper and cost of communications. The reduction in these aspects can translate into a competitive advantage. As to the status of adoption of Lync among partners, most respondents mentioned that almost all of their supply chain partners are using Skype or MSN. Since Lync

supports connectivity with Skype and MSN, they can have instant communications with their partners.

To sum up, the benefits of adopting Lync for the case company are good in terms of quantity and quality. Below is a summary of the advantages of adopting Lync: it is easy to use and highly integratable with existing IS; it integrates the internal process of electronic forms; it allows employees to solve problems across geographical and time boundaries; message exchange becomes easier and more convenient; it increases the efficiency of communications between departments and plants; it helps develop closer relationships with clients and partners; it supports recording of meetings; it saves the cost of buying expensive videoconferencing systems; telephone service cost and travel cost can be reduced; occurrence of business travel accidents can be reduced.

5.2 The Benefits for the Employees

According to the analysis of the questionnaire responses, most employees of the case company recognized the benefits of using Lync. The benefits in each perspective are concluded as follows.

In the perspective of learning and growth, Lync has helped improve employees' efficiency in message exchange and problem solving. According to the manager of the information department, improvement in these two aspects creates a competitive advantage for the company. In the internal processes perspective, respondents saw greater interactions between departments and plants after adoption of Lync. This finding is consistent with the response of one staff in the information department, who mentioned that Lync has enabled them to communicate by messaging, telephone, and meeting without geographical and time constraints. This finding also implies that Lync has become an indispensable communication tool for the employees of the case company. In the customer perspective, Lync has helped improve the employees' efficiency in handling time-sensitive problems. This finding is consistent with the manager's response in the interview. He said that in addition to internal applications, Lync also supports communication with external members. This function facilitates development of closer relationships with clients and partners and improvement of work efficiency. In the financial perspective, the communication expense of the company and work hours of employees have reduced after adoption of Lync. This finding echoes the response of one staff in the interview, who mentioned that Lync can help reduce the costs of telephone communication and business travel. As to the reduction in work hours, one staff of the information department stated that communications between members have become more instant after adoption of Lync. As the distance between team members is close, members can accomplish their team tasks in a shorter time. In other words, whenever the company has a new product, it can enter the mass production and sales stages earlier to improve its competitiveness in the industry.

In this study, we explored the benefits of UC using a case study and a questionnaire survey. We found that the benefits of UC for the case company were considerable in terms of both quality and quantity, and such benefits were also recognized by most of its employees. Results of this research can be a reference for potential adopters of UC.

5.3 Limitation and Future Research

Although this study makes some contributions to practice, it bears some limitations that provide an avenue for future research direction. This study has focused on SMEs in Taiwan.However, this sample does not represent all types of organizations in Taiwan. The results could differ if research would be carried out on larger firms. Therefore, further research should cover of larger firms, so as to provide a clearer result of the extent of implementation and benefits country-wide.

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中小型企業導入整合性通訊系統的效益之研究

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摘要

本研究以台灣的中小型企業之光電產業公司為例，探討企業導入整合性通訊系統後對於公司整體效益之影響。本研究以個案研究及問卷調查為主，以TOE理論為基礎，針對資訊部門人員為訪談對象，以探討企業導入整合性通訊系統之效益；本研究亦針對使用過整合性通訊系統的部門員工進行問卷調查，以平衡計分卡來衡量個案公司導入整合通訊系統後員工的使用效益。經由個案研究結果顯示，個案公司導入整合性通訊系統後所帶來的實質效益十分顯著，如：提昇企業和員工間訊息溝通的效率；促進上下游客戶及供應商之聯繫；節省視訊設備、電話費和差旅費用等，而經由問卷調查結果亦獲得員工使用之效益，即個案公司的員工對於整合通訊系統效益是給予肯定的，顯示出此通訊系統已成為員工在工作時的重要溝通工具。

關鍵詞：整合性通訊系統、TOE理論、平衡計分卡
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