

Information Technology Needs and Benefits in Multi-Unit Restaurants

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ABSTRACT

This study attempted to investigate and compare the level of needs and expected benefits of information technology (IT) applications in restaurant operation from managerial and employee levels. Self-competence levels, education and training needs, and the company IT application levels were evaluated. The respondents for the study were the staff of full-service, mid-scale restaurants owned by a firm. Among the respondents, 17.6% were in managerial level (managers) and 82.4% were in employee level (employees). The results of this study indicated that compared to employees, managers perceived more in-depth that IT is beneficial and is needed in restaurant operation. Both groups rated IT as very much needed and beneficial to restaurant operation. However, managers rated their own technological competence significantly higher than the employees did. Both groups expressed the desire for IT training and education although the managers' needs were stronger than the other group. The company's IT application level was assessed by the managers and employees at a slightly higher than average score on a 5-point scale, showing no difference between the groups. The study findings show that the respondents perceived the IT needs and benefits than the present IT application level of restaurants, which suggests more IT applications be adopted to the restaurant operations. (*J Community Nutrition* 8(3): 127~133, 2006)

KEY WORDS: IT · needs · benefits · restaurant operation.

Introduction

Since information technology (IT) has become essential in the business environment, its widespread use has also become evident in many aspects of the service industry. Large capital investments for installing IT has made it possible to raise revenues, minimize costs, and enhance quality service to customers (Huo 1998). IT has also played an important role in improving the operational efficiency of various industrial operations.

Since the mid-1980s, the IT issue has continued to attract considerable attention from researchers and industry leaders (Cash, Konsynski 1985; Parsons 1984; Porter, Millar 1985). Recent research on IT in the hospitality industry identified and

emphasized its importance in business operations and focused mainly on the overall impact of IT on the competitive advantage of a firm. To access competitive advantage, Kettinger et al. (1994) Applied profitability measures such as return on investment, return on sales, and cash flow to investment, relative market share, changes in profitability, and cash flow. Sethi, King (1994) developed an instrument tool containing seven dimensions like primary activity efficiency, support activity efficiency, resource management functionality, resource acquisition functionality, threat, pre-emptiveness, and synergy. Cho, Olsen (1998) investigated the impact of IT on competitive advantage in the lodging industry adopting Sethi and King's (1994) measurement instrument.

While much of the studies in the hotel and tourism industry were in the area of gaining a competitive advantage in profitability and market share, some researchers dedicated their efforts to determine the effects of using IT on the service quality of operations. Undoubtedly, IT has created such impact on customer service, but it is hard to measure. Reid, Sandler (1992) developed a written questionnaire, which listed 25 di-

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fferent technological innovations. The questionnaire was sent to 400 U.S. hospitality organization vice presidents of operations to evaluate the uses of those innovations. The findings revealed that a number of the more popular technological innovations were being used for the purpose of competition rather than for gaining a competitive edge. Piccoli et al. (2001) focused on the importance of using IT for improving service by thinking of customers' uses of a product or services as a cycle. They proposed the framework called 'Customer Service Life Cycle (CSLC)', which broke down the firm-customer relationship into 12 stages, and each stage showed how IT could be used to support customers' needs and create value.

A number of studies in the hotel industry focusing on the human aspects of technology implementation measured the technology needs and perceptions of hotel managers (Van Hoof et al. 1995). In that study, what was primarily interesting was the determination of the lodging managers' dominant perceptions of the use and implementation of technology in their locations. Camison (2000) assessed the possible benefits to be derived from IT using six identified variables, namely: 'more agile and operative management', 'bigger control', 'enterprise image improvement', 'increment in service quality', 'improvement of information quality for management and decisions adoption, personnel economy (less contracting for temporary workers in some activities)', and 'increase in personnel motivation'.

Although IT is an investment in future profitability, the restaurant business has lagged in adopting the most current trends, compared to their hotel or tourism management counterparts (Ansel, Dyer 1999). Technology is considered an additional expense in a small profit margin restaurant industry, rather than an investment for purposes of future profitability.

In the restaurant industry, Huo (1998) determined factors affecting sustainable competitive advantages measured by profit margin and market share and observed changes in the competitive position of restaurant firms before and after the installation of IT. Except for this study, a number of studies were in the area of technology, specifically POS (Durocher 1995; Kasavana 1995; Romeo 1996). The POS system essential for restaurant operation appeared in the early 1980s (Ansel, Dyer 1999). At that time, restaurants used POS system for cutting costs by automating back office functions like payroll, accounting, and inventory systems. In the 1990s, most of IT development had focused on POS systems integrated

with central databases. Some of the restaurants were lacking in direction on information systems planning from a strategic perspective (Kirk, Pine 1998). They had to experience difficulty relative to updating their IT systems because of little concern given to their company's expansion when the systems were initially installed. Ansel, Dyer (1999) presented a framework for an integrated approach to systems planning and provided a decision model for chain restaurant operators to evaluate investments in IT systems. Huber, Pilmanis (2001) outlined a framework for designing management information systems (MIS) for the quick service restaurant industry.

On the whole, studies on IT in the restaurant industry were mostly confined on the use of technology and POS in its operations. While restaurant management is focused on customers employees, and managers, it is interesting to note that little is known relative to the human aspect of information technology, specifically in the restaurant industry. Since human issues are the key to successful implementation of IT in hospitality management, understanding the perceptions of all levels of the organization is necessary (Peacock 1995). Hence, in this study, the human aspects of IT such as assessing the needs and perceptions of the staff in regard to technology were emphasized rather than the extent of fiscal performance. The purpose of this study is to investigate and compare the levels of needs and expected benefits of IT application in restaurant operation from the perspective of the managers and the employees. Moreover, the study dwells on self-competence levels in IT, education and training needs in IT, and IT application level in the company.

Subjects and Methods

1. Sample and data collection

The respondents for the study were the staff of full-service mid-scale restaurants owned by a firm, which has 65 chains throughout Korea. Since those restaurants are technologically automated to a certain extent for a certain period, they were chosen as target restaurants for the study. The survey was conducted in the winter of 2004, January 12 through January 24. Part-timers, or the full-time employees, who had been working in the restaurant industry for less than six months were not included in this survey. Out of the 465 questionnaires administered, a total of 288 completed questionnaires were returned, yielding a response rate of 62%.

2. Research instrument

Through an extensive literature review and an in-depth interview with expert panelists of technology and restaurant managers, a questionnaire was developed. The expert panelists were comprised of two corporate level managers and four store level managers who have managed IT related works in restaurants and three researchers who have a specialty in IT. To test the accuracy of wording and clarity of meaning, the instrument was pilot-tested to groups of managers and employees being employed by multi-unit restaurants in Korea. Comments and suggestions gathered from the pilot test were used as a basis in restating ambiguous items in the questionnaire.

The self-administered questionnaire had four sections. The first section explores the needs of restaurant IT and consists of 15 items, including restaurant web-site, electronic marketing, customer membership card, real time management of sales by POS, communication network designed to coordinate production from kitchen with menu order in a dining room, advancements in input devices, touch-screen and remote hand-held devices, monitor management for table availability, monitor management for menu order and serving by the tables, table buzzer system for waiters and waitresses, computer system for sales demand forecasting and production planning, computer system for workforce scheduling and attendance of staff, menu analysis, inventory management, management support system such as accounting and purchasing, and inter network with headquarters. Some of the items were derived from previous studies and modified for the present research (Ansel, Dyer 1999; Kasavana 1994). Others were developed through an in-depth interview with panel experts. Respondents were asked to rate each item, using a 5-point, Likert-type scale, ranging from 1 "strongly not needed" to 5 "strongly needed". The second section was on expected benefits when the IT was applied. Eight items including strategic competitive advantages referring to the competitors, simplifying the work process, minimizing costs, revenue management, customer satisfaction, staff productivity improvement, operation efficacy, and synergy effect with business strategies, which were derived mostly from previous studies (Ansel, Dyer 1999; Sethi, King 1994). Respondents were asked to rate how much they agree to given statements, using a 5-point, Likert-type scale. The third section ascertains self-competence in IT tasks, education and training needs, and the application level of the company compared to competitors.

The last section of the questionnaire consisted of demographic items such as gender, age, education, current position, and years of experience. In this study, IT was defined as 'computerized operating technology' to prevent confusion on the part of the respondents.

3. Data analysis

SPSS 10.0 for Windows was used to analyze data and factor analysis was applied to identify individual dimensions of needs. Multivariate analysis of variance (MANOVA) was used to identify significant differences between managers and employees in regard to IT needs and benefits.

Results and Discussion

1. Description of respondents

In regard to demographics, 68.2% were female and 31.8% male. Average age was 25.15. A majority of the respondents (66.1%) were junior college graduates, 18.3% had high school diplomas, and others (15.6%) had college degrees or above the highest level of formal education. Among the respondents, 17.6% were managers and 82.4%, employees. As to work experience in a current work place, 57.5% had more than 1 year experience. When work experience in other restaurants was added, a majority of the respondents (72%) had more than 1 year experience. 30.8% had experience of more than 3 years (Table 1).

2. The IT needs

The 15 items representing restaurant IT applications were factor analyzed, using principal components analysis with varimax rotation, resulting in 4 factors. The factor pattern

Table 1. Descriptive characteristics of the research sample

	Variables	Frequency (%)
Gender	Male	92 (31.8)
	Female	196 (68.2)
Age		25.15 ¹⁾
Education	High school	53 (18.3)
	Junior college	190 (66.1)
	University or above	45 (15.6)
Status	Managerial level	51 (17.6)
	Employee level	237 (82.4)
Work experience (Including other outlets)	< 1 year	81 (28.0)
	≥ 1 year	119 (41.2)
	≥ 3 year	88 (30.8)

¹⁾Average age is 25.15 years
n = 288

accounted for 58.4% of the total variance. Every factor was identified based on the common characteristics. Table 2 provides a list of 4 factor dimensions, along with the items which represent them. The first factor, systematic operation, consisted of five items and made up 35.1% of the total variance. It included items such as sales demand forecasting, menu analysis, and management support system, among others. The second factor, customer relationships, included four items referring to 8.5% of the total variance. It was related to marketing strategies in relation to customers. The third factor, table management, consisted of four items related to table service to customers. This factor explains 8.0% of the total variance. The final factor, smooth operation, consisted of included two items which accounted for the 6.9% of the total variance (Table 2).

Table 3 shows the mean value of IT needs level. To assess the needs level of each of the four dimensions, item ratings for each factor were summarized to variables with a single, aggregate score for each dimension. These aggregate scores representing each factor were used to compare the needs level of dimensions between managers and employees. For the managers, mean value ranged from a high of 4.69 for the most needed dimensions (customer relationship), to a low of 4.24, for least needed dimensions (table management). The employees had a range of 4.42 (customer relationship), to 4.06 (smooth operations). Most of the respondents rated IT needs as "needed" or "strongly needed." This expressed the

need for IT implementation and use in restaurant operations as perceived by the managers and employees.

Multivariate analysis of variance (MANOVA) was used to determine whether there were significant differences in IT needs between the two groups. At the 0.001 level (Pillais test = .000; Hotelling's test = .000), the multivariate test indicated that overall needs level assessments differed in the two samples. Among the 4 dimensions, 3 showed statistically significant differences between the two groups. Ranking of the 4 dimensions based on the mean scores were listed, which indicated little difference in the needs level of the two samples. Customer relationship and systematic operation were ranked first and second in both samples. It is interesting to note that even the first and second ranking of both samples were the same, with the mean value showing significant difference between the samples. The managers showed higher value compared to the employees. Smooth operation was ranked third by the managers and fourth by the employees. Although table management ranked fourth among the managers, and third among the employees, the mean value between the groups did not indicate any significant difference. On the whole, the managers perceived IT application in restaurant operation as more needed, compared to the employees. Ranking of needs level was not much different between the two groups (Table 3).

3. Expected benefits of IT

Respondents expressed agreement with the 8 statements of

Table 2. Dimensions of IT applications in restaurant management

Factors		Factor statements
Factor 1 (Cronbach's $\alpha = 0.8514$)	Systematic operation	Computer system for sales demand forecasting and production planning, menu analysis, inventory management, management support systems such as accounting and purchasing, inter network with headquarters
Factor 2 (Cronbach's $\alpha = 0.8098$)	Customer relationship	Restaurant website, electronic marketing, customer membership card, real time management of sales by POS
Factor 3 (Cronbach's $\alpha = 0.8050$)	Table management	Advancements in input devices, including touch-screen and remote hand-held devices, monitor management for table availability, monitor management for menu order and service by table, table buzzer system for waiters or waitresses
Factor 4 (Cronbach's $\alpha = 0.7995$)	Smooth operation	Communication network designed to coordinate production from kitchen with menu orders in the dining room, computer system for workforce scheduling and attendance of staffs

Table 3. Comparison of needs levels of restaurant IT

	Manager (n = 50)		Employee (n = 234)		F value	p level
	Mean	Rank	Mean	Rank		
Systematic operation	4.67	2	4.34	2	14.673	0.000***
Customer relationship	4.69	1	4.42	1	11.376	0.001**
Table management	4.24	4	4.16	3	0.704	0.402
Smooth operations	4.53	3	4.06	4	5.431	0.20*

*: $p < .05$, **: $p < .01$, ***: $p < .001$

benefits generally expected when IT was applied, from 1, or strongly disagree, to 5, or strongly agree. The mean value of IT benefits is presented in Table 4, showing the managers' strategic competitive advantages compared to competitors with their highest mean value as 4.56. Enhanced customer satisfaction was lowest, 3.90. However, even though enhanced customer satisfaction was lowest, its mean value of 3.90, showed that most of the managers agreed that IT application enhances customer satisfaction. In a comparative study, effectiveness of technology in enhancing customer satisfaction was 3.78, 3.73, and 3.64, respectively in the United States, United Kingdom, and Canada (Van Hoof et al. 1996). In a previous survey by HITA/PKF, 81% of the respondents felt that technology enhanced customer satisfaction. According to the 1990 AH&MA, the survey results of lodging executives showed improved guest experience and satisfaction and rated as the biggest advantage of technology (Coulton 1990). The employees had an average ranging from 4.29 (operation efficacy) to 3.80 (minimizing costs). Most respondents reacted to statements on restaurant IT benefits positively which indicates that managers and employees regard IT implementation in the restaurant as beneficial.

Multivariate analysis of variance (MANOVA) was used to determine significant differences in the expected benefits of IT between managers and employees. At the 0.001 level (Pillai's test = .000; Hotelling's test = .000), the multivariate test

indicated that overall benefit level assessments differed between the two samples. Among 8 statements, strategic competitive advantages compared to the competitors and synergy effect with business strategies showed statistically significant differences between the two groups. When the ranking of the 8 items based on the mean scores were compared, minimizing costs and customer satisfaction ranked lowest in both groups. For the managers, strategic competitive advantage compared to the competitors ranked first, followed by synergy effect with business strategies, operation efficacy, and simplifying the work process as the next three ranking indicators. Among the employees, operation efficacy ranked first and strategic competitive advantages compared to the competitors, simplifying the work process, and revenue management were the following three highest ranked. Ranking of most items was similar between the two groups, except synergy effect with business strategies (2nd for the managers and 5th for the employees). It can thus be implied that the meaning of synergy effect may be more clear and more familiar to the managers than to the employees (Table 4).

4. Self-competence level, education and training needs, and company IT application levels

In the earlier survey, lodging managers rated their own technological competence higher than average, with a 3.36 mean rating (Van Hoof et al. 1996). In this study, managers rated 3.42 in their self-competence level for an IT task, whi-

Table 4. Comparison of perceived benefit levels of IT in restaurant service

	Manager (n = 50)		Employee (n = 233)		F value	p level
	Mean	Rank	Mean	Rank		
Strategic competitive advantages compared to the competitors	4.56	1	4.24	2	9.325	0.002**
Simplifying the work process	4.38	4	4.23	3	1.681	0.196
Minimizing costs	4.04	7	3.80	8	3.646	0.057
Revenue management	4.30	5	4.18	4	1.099	0.295
Enhanced customer satisfaction	3.90	8	4.03	7	1.086	0.298
Staff productivity improvement	4.26	6	4.12	5	1.243	0.266
Operation efficacy	4.42	3	4.29	1	1.298	0.255
Synergy effect of business strategies	4.50	2	4.12	5	10.230	0.002**

** : $p < .01$

Table 5. Other factors relating to IT

	Manager (n = 50)		Employee (n = 238)		T value	p level
	Mean ¹⁾	SD	Mean	SD		
Self-competence level	3.42	0.78	3.09	0.63	2.770	0.007** ²⁾
Education and training needs on IT	4.84	0.55	4.54	0.86	3.159	0.002**
Company's IT Application Level	3.50	0.81	3.42	0.67	0.668	0.506

¹⁾ 1 = Very low, 2 = Low, 3 = Average, 4 = High, 5 = Very high

²⁾ **: $p < .01$

ch is slightly higher than the lodging managers' ratings in a previous study (Table 5). Employees' technological competencies rated 3.09, significantly lower than the managers' ratings. In earlier findings, lodging managers rated 3.08 mean score of their staff technological competence. Even the result of employee technological competencies rated by themselves like this study or by managers like a previous study, showed almost the same mean score.

Training is very necessary in enhancing the understanding and use of IT by employees. Moreover, managers and employees need to be educated to appreciate the value of IT. New technology, by itself, does not generate higher productivity without skilled users (Drucker 1992). The managers' education and training needs of IT rated very high, 4.84, while employees' needs rated a little bit lower compared to that of the managers.

The company's IT application level was assessed by the managers and employees as 3.50 and 3.42, respectively, on a five-point Likert scale, from a low of 1 to a high of 5. However, the assessment did not show any statistical difference between the groups (Table 5).

Summary and Conclusion

In this study, the levels of needs and expected benefits of IT applications in restaurant operation were investigated and compared from managerial and employee levels. On the whole, the mean ratings of the managers were higher than those of the employees. This implies that managers had more depth of understanding of the need for IT applications for greater benefits in restaurant operation. The multivariate test indicated that the levels of needs and expected benefit assessments differed between the two groups. However, the ranking based on the mean ratings for the two groups showed only a little difference in needs level assessments. In the assessment of expected benefits, the ranking of most items were similar except the synergy effect of business strategies. In both groups, the 'customer relationship' factor, which included such items like the restaurant website, electronic marketing, customer membership card, and real time management of sales by POS, rated highest. In response to the increasing demand for restaurant e-business, it would be necessary to establish websites not only to provide online information for users to view, but also to set up a direct link of communications with customers to have a good relationship with them. Customer needs are

the most important factor for websites to succeed. As long as the websites provide valuable services that benefit their visitors, the website visitors would ultimately reward a company. Well-designed websites with useful information and extra benefits available to customers would be helpful to increase sales volume and to improve the reputation of a restaurant.

When the self-confidence level for a task regarding IT was assessed, the employees rated their own technological competencies significantly lower than that of the managers. In regard to IT education and training needs, both groups apparently wanted to be trained and well educated, although managers wanted more. It can be inferred from the results that to improve the self-confidence levels of employees for a task relating to IT, education and training would be effective considering that they have the needs for them. The programs to improve the task skills of employees, and moreover managers, also need to be developed by investigating the specific needs of them on IT. As to the rating of the company's IT application level, there was no significant difference between the two groups.

It is interesting to note that the assessments of self-competence level and company IT application level indicated lower levels compared to IT needs, benefits, and training and education needs. This implies that both the managers and employees admit that IT application in restaurant management is beneficial but the application level of the company is lower than their expectation, even though it is higher than that of competitors'.

On the whole, this study shows that at the managerial and employee levels, perceptions on IT needs and benefits are high but the IT application level in the restaurants is low. Managers at the store level are aware of the needs and benefits of restaurant IT, which will provide feedback to corporate level managers regarding the need for new technology. Corporate managers who are away from functions at the store level tend to overlook the real impact of IT. Results of this study should motivate more intensive applications of IT in the restaurant business, which will give more benefits to restaurant operation and contribute to the national economy.

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