Perceived Uncertainty and Perceived Usefulness of Intranet in the Restaurant Franchise Industry*

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Absract

The restaurant franchise industry is one that could benefit significantly from the use of intranet technology, from its potential for improving communications between franchisors and franchisees, to providing easier inventory and ordering processes. However, there is a level of trepidation among potential users about whether the technology would improve their work performance. This study sought to examine the relationships between perceived uncertainty and perceived usefulness of intranet technology in the restaurant franchise industry. Through a review of available literature, 10 sub-dimensions of perceived uncertainty (Duncan, 1972) and six sub-dimensions of perceived usefulness (Davis, 1989) were derived. Canonical correlation analysis was used to examine the relationships between these concepts using data collected from 163 franchising restaurant managers in South Korea. Findings from the data analysis demonstrates two negative factors and one positive factor in perceived uncertainty that influence perceived usefulness, thus offering some implications of what to consider when implementing an intranet system in a restaurant franchise.

Keywords : Perceived Uncertainty, Perceived Usefulness, Intranet, Restaurant, Franchise

I. Introduction

The restaurant franchise industry has been growing rapidly and its impact on the global economy is greatly increasing (Bradach, 1998). In the 1990s, franchise businesses accounted for one-third of all retail sales in the United States (Parsa, 1996). In 2004, more than 40 percent of all retail sales were generated by franchise companies, and among those sales, 46percent were generated by restaurant franchises (Combs, Michael, & Castrogiovanni, 2004).

Over the past decade, industry and academic authors have extolled the virtues of the use of technology in the restaurant franchise industry. Kasavana & Philips (1994) discussed the needs and benefits of technology in the industry. Their research was further expanded by Hoof, Collins, Combrink, & Verbeeten (1995), who demonstrated that hospitality firms can maximize competitive power by taking advantage of technology.

Earlier researchers have also suggested some benefits of technology, in particular the ability of technology to enhance employees' performance (Curley, 1984; Edelman, 1981; Sharda, Barr, & McDowell, 1988). Earlier researchers postulated that technology acceptance significantly improves the employee performance.

For example, employees and managers can communicate more easily with trading partners through information technology such as intranets and extranets. Those technologies have also been shown to enhance the communication between franchisees and franchisors (Dickey & Ives, 2000).

Despite the many ways technology can be useful in the franchise industry, the performance gains such technology offers are often hindered by some managers' unwillingness to accept and use available systems (Bowen, 1986; Young, 1984). Managers' perceptions of the technology available to them has been an important issue for many years, thus generating a number of studies examining factors influencing the perceived usefulness of information technology as it relates to its acceptance (Davis, 1989; Ginzberg, 1981; Lucas, 1975; Robey, 1979; Schultz & Slevin, 1975; Swanson, 1974; Swanson, 1987).

Davis (1989) defined perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance” (p.320). People's use of an application (or lack thereof) depends on the extent they believe it will help them perform their job better. Therefore, examining the factors influencing perceived usefulness is an important research topic in the franchising restaurant industry.

As Chenhall and Morris (1986) stated, perceived usefulness is influenced significantly by perceived uncertainty. Duncan (1972) defined uncertainty as not knowing the outcome of a specific decision in terms of how much the organization would lose if the decision were incorrect. Perceived uncertainty towards technology has long been thought to be a negative factor towards perceived usefulness. However, our understanding of the relationship between the two is relatively weak.

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Because the use of intranet technology in a restaurant franchise can generate significant benefits, it is important to determine how to generate acceptance and use of such technologies. Thus, the purpose of this study is to identify the relationship between perceived uncertainty and perceived usefulness of an intranet system in the restaurant franchise industry.

II. Literature review

1. Theoretical Background

Technology Acceptance Model (TAM) and Contingency Model of Perceived Usefulness

The technology acceptance model (Davis, 1989) explains the causal links between perceived usefulness and users' attitudes, intentions, and actual usage of the system. According to TAM, users' perceived usefulness is highly influenced by their attitude, experience, expected outcome, and the uncertainty of the technology.

Similarly, Chenhall and Morris (1986) proposed a contingency model of perceived usefulness that explains the relationship between perceived uncertainty and perceived usefulness. Using data collected from 36 managers in manufacturing organizations in Sydney, Australia, they concluded that managers' perceived uncertainty has a direct impact on perceived usefulness. The two models (TAM and the contingency model of perceived usefulness) are widely cited in the information technology and accounting fields, however no previous study has applied the models to the restaurant franchise industry. Our hypothesis is that the perceived uncertainty of intranet technology influences a manager's perceived usefulness in franchising restaurant industry.

2. Perceived Usefulness and Perceived Uncertainty

2.1. Perceived Usefulness

As stated previously, perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989). Perceived usefulness has been considered a critical factor in the success of technology use in business because it influences an individual's acceptance and, thus, use of information technology (Keil, Beranek, & Konsynski, 1995). Various research projects have been conducted providing theoretical and practical background for perceived usefulness in a number of industry settings (e.g. Goodhue & Thompson, 1995; Tan & Benbasat, 1993; Vessey, 1991; Vessey & Galletta, 1991).

Devaraj, Fan, & Kohli (2002) examined the impact of perceived usefulness on consumer attitude formation. They found that perceived usefulness influences how consumers perceived the technology, consequently influencing attitudes towards the technology in e-business. Expanding their research, Lee and Kim (2009) examined how perceived usefulness influences, perceived interaction and satisfaction using the empirical data collected from 842 undergraduate students. Oh, Ahn, & Kim (2003) expanded on that research and found that perceived usefulness affects user attitudes of the adoption of the Internet. Similarly, Schultz & Slevin (1975) and Robey (1979) postulated that the performance of a technology is highly related to its acceptance, and both studies verified that perceived usefulness of technology is correlated to employee performance level.

While earlier studies suggest that perceived usefulness influences users' attitude and behavior, Davis's later study (1989) developed variables and succeeded in developing new measurement scales for perceived usefulness. Because of his new insights, Davis' variables and measurement items have been widely accepted and continue to be used in current research. The variables used in Davis(1989)' study are:

1. Time, or does the technology allow a user to accomplish a task quickly
2. Performance, or does the technology improve performance
3. Productivity, or does the technology increase productivity
4. Effectiveness, or does the technology enhance effectiveness
5. Easiness, or does the technology make it easier to do work
6. Usefulness, or is the technology useful in the workplace

2.2. Perceived Uncertainty

Knight (1921) and Luce & Raiffa (1957) defined uncertainty as those situations where the probability of the outcome of an event is unknown as opposed to risk situations where each outcome has a known probability. Lawrence & Lorsch (1967) state that there are three situations concerning uncertainty: (1) the lack of clear information, (2) the length of time it takes to receive feedback, and (3) the general uncertainty of causal relationships. Integrating previous research, Duncan (1972) stated that, in surveying these different concepts, the definitions were too broad in scope and did not facilitate the overall objective of technology acceptance. His definition focused on the specific decision that required the use of the technology rather than the overall situation. Thus, he defined uncertainty as not knowing the outcome of a specific decision, in terms of how much the organization would lose if the decision were incorrect

Using a combination of Knight (1921) and Luce & Raiffa's (1957)'s definition as well as Duncan's (1972) definition, we define the perceived uncertainty of information technology as “Not knowing the results of using an information technology in terms of how much the organization would lose if using that technology delivered inappropriate results.” Thus, this study seeks to identify relationships between the impact of “perceived uncertainty of information technology” on its perceived usefulness in franchising restaurant industry.

3. Proposed Technology - Intranet

The use of intranet is rapidly leading to new ways of using, sharing, and managing information in many organizations. An intranet is a network within an organization that utilizes standard Internet protocols and services, which may include Web sites that are accessible only for use within an organization(Post & Anderson, 2006). From the perspective of restaurant franchise, an intranet is used to (1) share

managerial/marketing information between employees in franshisor and franchisee and (2) share network operating system (e.g. order, inventory management) within the franchising company.

Sridhar (1998) stated that an intranet can be useful for rapid and flexible access to information required for decision-making for managers. Previously, managers in a firm stored spreadsheets, analyses, and reports on their personal computers. However, this decentralized data was difficult to share, even if the computers were networked. Using Internet technologies to develop an intranet, corporate data is easier to access, with search engines and browsers that make it easier to find and view data in many forms. Sridhar (1998) discussed ways that an intranet can be useful for rapid and flexible access to information required for decision-making for managers in franchising field.

III. Research methodology

1. Data Collection

The target population of this study was the managers in franchised restaurants who currently use intranet technology. Three franchising restaurants in South Korea agreed to participate. Survey questionnaires were distributed to 348 managers . Among them, 163 usable questionnaires were collected (response rate = 46.84%).

2. Measurement

Perceived uncertainty was measured with the 10 variables developed by Duncan (1972). Perceived usefulness was measured with Davis' six variables developed by Davis (1989). See Table 1 for a list of the variables used.

All items were assessed on five-point Likert-type scales ranging from one (“strongly disagree”) to five (“strongly agree”). Regarding reliability of measurement, this study adapted Duncan (1972) and Davis (1989)'s scales, which is widely used in information technology area. Also, considering canonical correlation analysis's characteristic, this study regarded one questions as each variable.

<Table 1> Measurement Items (Perceived Uncertainty and Perceived Usefulness)

Perceived Uncertainty of Intranet (Prediction Variates)	
1	How often do you feel that you get the necessary information from the intranet in making decisions?
2	How often do you feel that you are unable to predict how the intranet is going to help in decision making?
3	How often is it hard to tell how the intranet will help in making a decision?
4	How often do you believe that the information you get from the intranet is adequate for decision making?
5	How difficult is it for you to get the necessary information from the intranet for use in decision making?
6	How difficult is it to obtain information from the intranet when you need it for decision making?
7	How often do you feel that you can consider an alternative course of action before making a decision using the intranet to follow a specific course of action?
8	How often do you feel that you can effectively consider the consequences of making decisions using the intranet before they are made?
9	How often do you feel that you are unable to tell if the decisions made in using the intranet will have a positive or negative effect on the organizations overall performance?
10	It is usually hard to determine what the outcome of a decision using the intranet will be before it is made.
Perceived Usefulness of Intranet (Criterion Variates)	
1	Using the intranet in my job enables me to accomplish tasks more quickly.
2	Using the intranet improves my job performance
3	Using the intranet in my job increases my productivity.
4	Using the intranet enhances my effectiveness on the job.
5	Using the intranet makes it easier to do my job.
6	I find the intranet to be useful in my job.

2. Analysis Method: Canonical Correlation Analysis (CCA)

Canonical correlation analysis simultaneously measures relationships between two sets of variables. (Hair et al., 1998). Because this study sought to find correlations between one set of variables (multiple dependent variables) and a second set of variables (multiple independent variables), CCA was an appropriate technique for this study. Additionally, CCA is a good technique for this study as it is generous with regard to sample size. Canonical correlation analysis requires at least 10 observations per variable. This study includes 16 variables with a sample size of 163, thus fitting the criteria for CCA.

Furthermore, two assumptions should be satisfied for CCA. First, the assumption that there is linearity assumption between each variable and all other variables must be met. A visual inspection of the results indicated that all 16 variables are appropriate for the analysis. Second assumption is that there is no multicollinearity, which could make the interpretation of our data less reliable (Hair et al., 1998). Multicollinearity was checked using a correlation matrix and was not detected.

IV. Results

Of the survey respondents, 102 (62.6%) were male, and 61 (37.4%) were female. Sixty-eight percent of respondents had either a four-year college degree or a master's degree, indicating a high level of education overall. The mean age of the sample was 36.0 years old. Among those surveyed, 153 (93.9%) worked for franchised unit only 10 (6.1%) worked for company-owned units. Of the respondents, 109 (66.9%) were general managers, and 43 (26.4%) were managers.

Most respondents (98.8%) used Microsoft Internet Explorer. Regarding Internet connection, 74 (45.4%) used modems, and 47 (28.8%) used ISDN connections. The vast majority of respondents (86.5%) used Intranet at least several times a week (see Table 2).

<Table 2> Demographic Details

Sociodemographic Variables		n	Percentage
Gender	Male	102	62.6
	Female	61	37.4
Education	Some college	9	5.5
	2-year college	43	26.4
	4-year college	86	52.8
	Masters	25	15.3
Mean age	36.0 years old		
Unit	Company owned	127	45.4
	Franchised	110	39.3
Position	General Manager	109	66.9
	Manager	43	26.4
	Other	11	6.7
Browser	Netscape Navigator	2	1.8
	Microsoft Internet Explorer	161	98.8
Connection	Modem	74	45.4
	ISDN connection	47	28.8
	T1 connection	16	9.8
	Don't know	16	9.8
	Other	10	6.1
How many times during a week	About once a week	8	4.9
	2 or 3 times a week	14	8.6
	Several times a week	30	18.4
	About once a day	57	35.0
	Several times each day	54	33.1

Note: The various totals indicate the total numbers of respondents with valid responses.

As shown in table 3, CCA derives six functions; however, as only functions reaching a significant level of 0.05 using chi-square are relevant, only two functions from this study are statistically significant and will be discussed (Hair et al., 1998).

As shown by canonical correlations (0.702 and 0.432), the first two pairs of canonical variates exhibit a strong relationship (Table 3). The variance shared by the pairs of canonical variates (also referred to as a canonical root and eigenvalue) are 0.493 and 0.186 (Table 3).

<Table 3> Canonical Variates Standardized Coefficients

Perceived Uncertainty of Intranet (Prediction Variates)			
1.How often do you feel that you get the necessary information from the intranet in making decisions?			
Function 1	-0.169	Function 2	0.335
2.How often do you feel that you are unable to predict how the intranet is going to help in decision making?			
Function 1	0.311	Function 2	0.053
3. How often is it hard to tell how the intranet will help in making a decision?			
Function 1	-0.246	Function 2	-0.768
4. How often do you believe that the information you get from the intranet is adequate for decision making?			
Function 1	-0.371	Function 2	0.035
5. How difficult is it for you to get the necessary information from the intranet for use in decision making?			
Function 1	0.421	Function 2	-0.463
6. How difficult is it to obtain information from the intranet when you need it for decision making?			
Function 1	0.414	Function 2	0.185
7. How often do you feel that you can consider an alternative course of action before making a decision using the intranet to follow a specific course of action?			
Function 1	0.173	Function 2	-0.007
8. How often do you feel that you can effectively consider the consequences of making decisions using the intranet before they are made?			
Function 1	-0.467	Function 2	-0.479
9. How often do you feel that you are unable to tell if the decisions made in using the intranet will have a positive or negative effect on the organizations overall performance?			
Function 1	-0.322	Function 2	0.380
10. It is usually hard to determine what the outcome of a decision using the intranet will be before it is made.			
Function 1	0.275	Function 2	0.287
Perceived Usefulness of Intranet (Criterion Variates)			
1. Using the intranet in my job enables me to accomplish tasks more quickly.			
Function 1	-0.337	Function 2	0.184
2. Using the intranet improves my job performance.			
Function 1	-0.358	Function 2	0.139
3. Using the intranet in my job increases my productivity.			
Function 1	-0.178	Function 2	0.246
4. Using the intranet enhances my effectiveness on the job.			
Function 1	0.063	Function 2	0.854
5. Using the intranet makes it easier to do my job.			
Function 1	-0.067	Function 2	0.215
6. I find the intranet to be useful in my job.			
Function 1	-0.444	Function 2	-1.059
		Function1	Function2
Canonical correlation		0.702	0.431
Squared canonical correlation		0.493	0.186
Chi-Square		170.011	69.679
DF		60	45
Probability of chi-square		0.000	0.011

Table 4 indicates the redundancy index. A redundancy index is the amount of variance in a canonical variate explained by the other canonical variate in the canonical function and can be computed for both the dependent and independent variate (Hair et al. 1998). The re-

dundancy indices for the criterion variate of functions 1 and 2 are 0.260 and 0.020, respectively; the predictor variate has a redundancy index of 0.062 for function 1 and 0.017 for function 2.

<Table 4> Redundancy Analysis of Criterion and Predictor Variates for Canonical Functions

	Criterion Variates (Usefulness)		Predictor Variates (Uncertain)	
	Function 1	Function 2	Function 1	Function 2
Canonical roots	0.493	0.186	0.493	0.186
Redundancy index	0.260	0.020	0.062	0.017
Cumulative percentage	0.260	0.280	0.062	0.079

There are three powerful variables that contribute significantly to the criterion variate in function 1: (1) “Using the intranet in my job enables me to accomplish tasks more quickly,” (2) “Using the intranet improves my job performance,” and (3) “I find the intranet to be useful in my job.”

The three predictor variables that relate most closely to the variations in the criterion variate are: (1) “How often do you believe that the information you get from the intranet is adequate for decision making?,” (2) “How difficult is it for you to get the necessary information from the intranet for use in decision making?”, and (3) “How often do you feel that you can effectively consider the consequences of making decisions?”

In order to interpret how prediction variables are related to the criterion variables, the correlation matrix should be considered (Table 5). Negative correlation between c5 and u1, u2, and u6 means that “difficulty of getting information from intranet in decision making” is negatively related to perceived usefulness of intranet technology. It is especially negatively correlated to three factors: (1) “Using the intranet in my job enables me to accomplish tasks more quickly,” (2) “Using the intranet improves my job performance,” and (3) “I find the intranet to be useful in my job.”

<Table 5> Correlation Matrix

	u1	u2	u3	u4	u5	u6
c1	0.1606	0.3036	0.2455	0.2650	0.1878	0.2234
c2	-0.0846	-0.1327	-0.0207	-0.1012	-0.2506	-0.0994
c3	0.0053	-0.1117	-0.1332	-0.0856	0.0129	-0.1015
c4	0.1537	0.2978	0.3155	0.1941	0.1564	0.1529
c5	-0.3743	-0.2426	-0.2591	-0.3980	-0.2858	-0.2544
c6	-0.1635	-0.2487	-0.2859	-0.1340	-0.0757	-0.1581
c7	-0.1052	-0.1712	-0.1752	-0.1538	-0.0629	-0.2416
c8	0.0519	0.1815	0.0586	0.1190	0.1247	0.3179
c9	0.1223	-0.0409	-0.0065	0.0245	-0.1025	-0.0449
c10	-0.1685	-0.3017	-0.2193	-0.2582	-0.2580	-0.3349

Note: c=perceived uncertainty; u=perceived usefulness

Another negative correlation between c6 and u1, u2, and u6 indicates that “difficulty to obtain information from the intranet when you need it for decision making?”is negatively related to perceived usefulness of intranet technology. In particular, it has a very strong negative correlation to three factors: (1) “Using the intranet in my job enables me to accomplish tasks more quickly,” (2) “Using the intranet improves my job performance,” (3) “I find the intranet to be useful in my job.”

A positive correlation between c8 and u1, u2, and u6 indicates that “How often do you feel that you can effectively consider the consequences of making decisions using the intranet before they are made” is positively related to perceived usefulness of intranet technology. Especially, it is very positive to three factors: (1) “Using the intranet in my job enables me to accomplish tasks more quickly,” (2) “Using the intranet improves my job performance,” and (3) “I find the intranet to be useful in my job.”

In summary, three factors in perceived uncertainty strongly influence three factors in perceived usefulness.

V. Discussion and Implications

The information system success model provides a theoretical framework for two dimensions: information quality and system quality. According to the information system success model, the success of an information technology relies strongly on the technology's system quality (i.e. speed or ease of use) and the technology's information quality (i.e trustworthiness or reliability of information). The information system success model explains that system quality and information quality singularly and jointly affect users' acceptance of an available technology (DeLone & McLean, 1992). The analysis performed in this study confirmed important factors using canonical correlation analysis methodology, and also confirmed the importance of those factors in the restaurant franchise industry.

The data presented above demonstrates that there are two negative factors in perceived uncertainty that influence perceived usefulness: (1) Difficulty of getting information from Intranet in decision-making, (2) Time to search information from Intranet. When managers are unable to find the information they need on an intranet, or when they can not find the information quickly enough, their performance may decline. Those two factors can delay decision-making, therefore restaurant managers feel the intranet is not useful.

It is clear that for people to adopt intranet technology is it should be easy to search information, and it should provide the information quickly. If the Intranet takes too long time, they will not consider the intranet a useful tool.

Analysis further reveals one positive factor that influences perceived usefulness: Trustworthiness towards the effectiveness of intranet in decision-making. This study replicated previous studies and extended the findings in information technology research field to the restaurant franchise industry.

An intranet can be an extremely useful tool in the restaurant franchise industry, in which there are many disparate locations and managers on different sites who need the same or similar information to make important business decisions. However, as we found in this study, it is very important for such companies to insure that they in-

stall intranet technology that is fast and easy to use, thus decreasing the potential users' uncertainty and increasing the likelihood that they will adopt the technology.

Given that there has been little study of information technology use in restaurant franchises, the exploratory results derived in this study may serve as a guide in future research seeking to understand how to effectively use information technology in the industry and to encourage adoption of the new technologies available.

More practically, from the perspective of system quality, a franchising restaurant firm's Intranet should be aesthetic and well organized, provide good access, and should be easy to navigate. These system quality factors relieve perceived uncertainty of employees, thus form favorable attitudes towards the Intranet when they actually use it. No matter how thorough the information content of a Intranet is, if the website is not attractive in design, speed, and ease of use, employees will not take use of it due to uncertainty. Furthermore, from the perspective of information quality, it is important to provide credible and clear information to employees. As data analysis indicates, employees expect credible and clear information on a Intranet. No matter how certain the Intranet is, if it does not provide credible and clear information in the organization, employees will not use the Intranet.

VI. Study Limitation and Future Studies

Despite its theoretical/practical implications, three limitations of this study should be addressed. First, this study did not consider the fact that most franchisees have negative attitude towards the headquarters' control and management. Regarding control and management, franchisors have very different perspective from franchisees. Therefore, future study should incorporate franchisees' attitude towards the control (e.g. franchisor' policy), thus can provide more reliable implications for practitioners. Second, this study adapted measurement scale from Duncan (1972) and Davis (1989). Even though these scales are widely used, it is not guaranteed that these scales fit within franchise industry. Therefore, future restaurant franchising studies need to further verify the reliability of the scales in the restaurant setting. Lastly, this study used CCA for data analysis. however, CCA is useful for clarifying correlation between prediction variables and criterion variables. However, CCA has limitation for explaining causal relationships between them. Therefore, for fturue studies, it is necessary to uese more advanced statistical methodology (e.g. SEM), thus further verify our data analysis results.

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