Applying Rogers' Diffusion of Innovation theory to the acceptance of online databases at University Zone of Iran*

F. Nazari[1], F. Khosravi[2] and **F. Babalhavaeji[1]**
[1] Department of Library and Information Science, Science and Research Branch,
Islamic Azad University, Tehran, IRAN
[2] National Library, Tehran, IRAN
e-mail: nazari_lib@yahoo.com, fa.Khosravi@gmail.com, F.babalhavaeji@gmail.com

ABSTRACT
The introduction of online access to electronic reference materials has changed the forms of information services provided by libraries for their users However, although electronic information sources are collected on a large scale by academic libraries, they are not used in the same scale. The main objective of this study is to find out the factors that affect the adoption and use of online databases. Rogers' diffusion theory was used to evaluate the effect of perceived innovation attributes of the online databases on the rate of adoption. The survey instrument was distributed to 351 faculty members from the *8th Zone of Islamic Azad University (IAU) in Tehra.* This study confirms that the respondents perceived the relative advantage (Correlation Value 0.64), compatibility (Correlation Value 0.65), complexity (Correlation Value -0.57), trialability (Correlation Value 0.31), and observability (Correlation Value 0.53), all are related to adoption and use of online databases. The findings of the present study indicated that 49.28 percent of faculty members were early majority and over 60 percent of the faculty members accepted and used online databases, indicating the acceptance rate is average (3.67).

Keywords: Rogers' Diffusion of Innovation theory; Online Databases; Academic libraries; Technology adoption ; Iran

INTRODUCTION

The introduction of compact discs and local databases in the 1980s and then the World Wide Web in the 1990s have tremendously changed the system of scholarly communication. These innovations have provided new and fast access to information sources in the form of online databases. Universities, as important providers of information technology to students and faculty members, are making an effort to offer the new technologies for scholarly communication. The adoption or rejection of the innovations depends on the awareness of people who use them (Yu and Tao 2009). There are many internal and external factors, such

as innovation attributes, demographic variables, environmental and institutional factors, which affect the use of new technologies by university faculty.

Although online databases are common among faculty members of universities, the level of their willingness to accept and use other forms of information is not known. Rogers (1986), who introduced the diffusion of innovations theory in 1964, recognized the attributes of innovation, which are important in its adoption. Factors such as poor infrastructures, high costs, language barriers, social and political factors, may form barriers to adoption (Al-Gahtani 2003). Rogers (2003) observed that members of all social systems do not readily accept an innovation in the same order and at the same rate. Rogers' theory functions as a scientific framework to understand the behavior of why some technologies are quickly adopted and used while others not.

The introduction of online access to electronic reference materials has changed the forms of information services provided by libraries for their users (Martin 2001). Many information sources, including books, periodicals, articles and patents become easily accessible and are available in electronic form via the online databases. Universities are prepared to invest on electronic resources in order that Faculty members have access to databases of publishers such as Elsevier, Wiley, and Springer and of vendors such as EBSCO and ProQuest. It should be realized that although electronic information sources are collected on a large scale by academic libraries, they are not used in the same scale (Weiner 2003). The main objective of this study is to find out the factors that affect the adoption of information technology innovations, which in this context is use of online databases. Diffusion theory is used to evaluate the effect of perceived innovation attributes on the rate of adoption of the online databases. By studying and recognizing the attributes, which help or hinder adoption, university governance can formulate appropriate strategies to increase the rate of use of electronic materials and reduce the effects of negative factors.

Given the reasons stated, this study investigates the relationship between perception of attributes of innovation diffusion theory such as relative advantage, compatibility, complexity, trialability and observability with the adoption and use of online databases among university faculty members**.**

LITERATURE REVIEW

An overview of the literature shows that many researchers have studied the impact of the attributes of innovations on different social settings on the basis of Rogers' theory (Rogers, 1995). Most researchers focused their studies on the relationship, the incentive and preventive roles of the attributes in adoption of an innovation. In explaining his theory, Rogers reports the studies carried out by Kivlin (1960), Fliegle and Kivlin (1966) who studied fifty innovations introduced to a group of Indian farmers. They concluded that the relative advantage and observability of results had a positive correlation with their rate of adoption (Rogers and Shoemaker 1990). Singh (1966) also observed 130 Canadian farmers' reactions to twenty-two innovations introduced to them. He concluded that relative advantage, complexity, trialability and observability of results affected the rate of adoption of innovations and had positive correlations with it (Rogers and Shoemaker, 1990). Wyner (1974) and Holloway (1977) found relative advantage and compatibility to be significantly related to perceptions among potential adopters of instructional technology in high schools (Rogers and Shoemaker 1990).

Surry (1993) studied the perceptions of weather forecasters with regard to innovative computer based training and found that relative advantage, complexity and compatibility were important adoption considerations. Drucker (1994) emphasized simplicity and observed that to be successfully adopted the innovation should be simple and deal with only one subject; which otherwise, will confuse their targeted community. Surry (1997) have found that the perception of the innovation attributes, such as compatibility, complexity and relative advantage play a significant role in the adoption of new information technology in instruction (Surry,1997). Al-Gahtani (2003) carried out a survey to investigate how perceived attributes of computer technology influenced its rate of adoption in the workplace in Saudi Arabia. In his study, he examined knowledge workers from all sectors of the economy. The results showed that attributes such as relative advantage (0.27 at p < 0.01), compatibility (0.340 at p <0.01), trialability (0.256 at p <0.01) and observability (0.256 at p<0.01) played positive roles in computer adoption, while complexity (−0.305 at p < 0.01) was a negative factor.

Williamson et al. (2003) in a study evaluated the content, potentiality and the use of some online databases introduced to Australian public libraries in the state of Victoria. Using the factors of innovations in Rogers' theory, they studied the factors, which accelerated or slowed down the adoption of databases. The relative advantages such as access to large amounts of reliable information, access to many full-text articles, the compatibility of the databases with technical conditions of the public libraries and the experience of using the Internet encouraged library patrons to use databases. On the other hand, some weaknesses such as articles on special subjects, non-satisfactory subject coverage of databases, the limited number of articles about Australia, unfamiliarity of many users with searching databases and differences of search strategies required from one database to another were barriers to the diffusion of databases.

Li (2004) carried out a study on faculty perceptions about attributes and barriers affecting the diffusion of web-based distance education (WBDE) at the China Agricultural University (CAU). He concluded that CAU faculty's perception and tended to agree with the existence of the five attributes of WBDE (relative advantage, compatibility, complexity, trialability, and observability). Professional area, gender, age, the level of education and academic rank had no significant influence on the five perceived attributes.

Hayati and Jowkar (2008) studied the process of adoption of electronic reference materials in academic libraries of Iran. The results show that the most effective factors in adopting electronic reference materials are the ability of electronic reference materials to facilitate information retrieval, shortening the time of searching and fair cost of resources. The most problematic factors, which slow down the adoption of electronic reference materials, stem from unfamiliarity of academic librarians and users with computers and searching the databases.

Usluel, Askar and Bas (2008) focused on information and communication technology (ICT) usage, which is an indicator of diffusion. The study revealed that understanding the relative advantage (mean=9.12), compatibility (mean=8.56), complexity (mean=8.22), triability (mean=8.39) and observability (mean=7.8) were positively correlated with the use of technology by the faculty members. The findings of the study showed, that the use of ICT is getting more widespread in higher education. The faculty members make use of ICT mostly as a means of communication, for doing research about the courses they teach through the Internet, for publishing their lecture notes and for making announcements

concerning their courses (assignments, projects) on the Internet. This situation seems like a one-way communication though this could be attributed to the faculty members' skills in using publishing tools on WWW as well as the lack of an institutional regulation concerning the web publishing of course contents.

Al Ghaith, Sanzogni and Sandhu (2010) investigated factors that influence the adoption and the usage of e-services in Saudi Arabia. The factors were empirically tested against data collected from 651 participants using survey questionnaires. Perceived complexity was found to be the most significantly related factor affecting e-service adoption in Saudi Arabia, followed by privacy and compatibility. Quality of the Internet and its relative advantage also had a notable effect on e-service usage and adoption in Saudi Arabia.

A recent study carried out by Janardhanam, Sinha and Babu (2011) showed that the adoption of a new technology as a strategic management tool is a welcome sign for all business schools or B-schools. The results show that Diffusion of Innovation Technology (DOI) theory was successful in predicting the future adoption of new technologies for the purpose of teaching preparation and lecturing. Hence, based on the above analysis, it can be judged that most of the respondents believe that the introduction of new technologies in B school has many relative advantages with mean (3.7955), compatibility (3.2516), demonstrability (3.5741), and positive image (3.1430). Low mean scores on complexity (2.6899) of e-learning suggest that they are not too worried about the complexities. Hence, it can be inferred that except in case of complexity and avoidance, B-school has shown positive attitudes and perceptions towards the adoption of e-learning amongst the B-school of Bangalore. Important strategic consideration is the identification and acquisition of existing e-Learning resources suitable to the teaching and learning context of the institute.

THEORETICAL FRAMEWORK

In his theory, Rogers (2003) defines diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system." In other words, the study of the diffusion of innovation is about how, why, and at what rate a new idea or technology spreads among the members of a social system. According to Rogers (2003), a technology has two components: a hardware aspect that consists of the tool that embodies the technology as material or physical objects, and a software aspect that consists of the information base for the tool. Since the software component of a technology is not so apparent, innovations in which the software is dominant are less observable and have a slower rate of adoption. The perceived attributes of innovations can help in understanding the rate of diffusion. Rogers describes these factors in five categories of innovations attributes as follows: relative advantage, compatibility, complexity, trialability, and observability (Borgatta and Montgomery 2000; Holland 1997; Rogers 1995; Walker 1999).

Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes (Rogers, 1995). Relative advantage indicates the benefits and costs resulting from adoption of an innovation and is one of the best predictors of an innovation's rate of adoption.

Compatibility is the compatibility of an innovation with existing values, beliefs, and the needs of potential adopter. Compatibility is the key factor for all innovations, even those with a high relative advantage. If the idea seems morally irreconcilable, then the

innovation will not be adopted. To be implemented, an innovation must be considered socially acceptable.

Complexity refers to the adopters' perception on the degree of difficulty to understand and use an innovation. The perceived complexity of an innovation is generally related to its rate of adoption in a negative direction. Some innovations are easily understood by most members of a social system and will be adopted quickly, whereas others may be more complicated and will be adopted more slowly.

Trialability is the degree to which an innovation may be experimented with on a limited basis. Thus, the perceived trialability of an innovation is usually positively related to its rate of adoption. The trialability is more important for earlier adopters than later ones, because earlier adopters have no precedent to follow when they adopt, while later adopters are surrounded by peers who have already adopted the innovation and, these peers act as a kind of vicarious trial for later adopters.

Observability is an innovation that offers observable results. The easier individuals can see the results of an innovation, the more likely they are to adopt it. The perceived observability is related to the rate of adoption in a positive direction.

Therefore, argued that innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly. However, in this context, because of the differences in personal experiences, environments, and technology needs, faculty members will certainly perceive the attributes of online databases technology differently.

Research Hypotheses

This study examined the perceived attributes of innovation based on Rogers' diffusion theory in the context of the use of online databases amongst faculty members in Iran and test the following five hypotheses:

H1: There is a significant relationship between the relative advantage attribute and adoption of online databases.
H2: There is a significant relationship between the compatibility attribute and adoption of online databases.
H3: There is a significant relationship between the complexity attribute and adoption of online databases.
H4: There is a significant relationship between the trialability attribute and adoption of online databases.
H5: There is a significant relationship between the observability attributes and adoption of online databases.

RESEARCH METHODOLOGY

This study used the analytical survey method. The participants of this research were faculty members of eighth zone of Islamic Azad University. The number of faculty members was 3902. Based on Krejcie and Morgan (1970), if the population size is 3,500 to 4,000, 351 people are considered adequate as the sample of the study. The questionnaire used was divided into two parts. The first part consisted of the faculty's demographic attributes (gender, education, age, academic rank, education field, teaching experience) and the

second section included items related to the research variables and multiple-choice questions to measure perceived attributes of online databases and the faculty members' acceptance and use of them. A Likert scale was used with 5 options (1= completely disagree to 5 =completely agree). Most of the question items have been used by Rogers and other researchers using Rogers' theory in previous studies. Forty questionnaires were distributed to conduct the pilot study, and the Cronbach's alpha was used to measure the reliability of items in the questionnaire. Alpha values greater than 0.70 are acceptable for basic research (Sekaran 2000). The result of Cronbach's coefficient alpha which shows the acceptable level of alpha is given in Table 1.

Table 1: Reliability Analysis

Variables	Number of items	alpha
Perception of the effective feature of online databases	24	90%

RESULTS

The results concerning the rate of adoption and use of online databases as the dependent variable in relation to perceived of innovation attributes vary among the respondents (Table 2). Generally, 65.1 percent of the faculty members use these databases either often and always, 34.9 percent of the respondents rarely use them or not very frequently.

Table 2: Respondents' Rate of Adoption and Use of Online Databases (N=351)

Aspect	Frequency & percentage					Mean
	Always	Often	Usually	Sometimes	Rarely	
Rate of adoption and use	75 (21.4%)	154 (43.9%)	80 (22.8%)	17 (4.8%)	25 (7.1%)	3.67%

Figure 1 listed the respondents' rate of adoption and use of online databases over the time. The use of online databases was 3.42% by innovators, 8.55% by early adopters, 49.28% by the early majority, 27.35% by the late majority, and 11.40% by laggards. The results will be discussed according to different attributes of online databases; comprising "relative advantage" (5 attributes), "compatibility" (6 attributes), "complexity" (2 attributes), "trialability"(2 attributes) and "observability" (8 attributes) (Table 3).
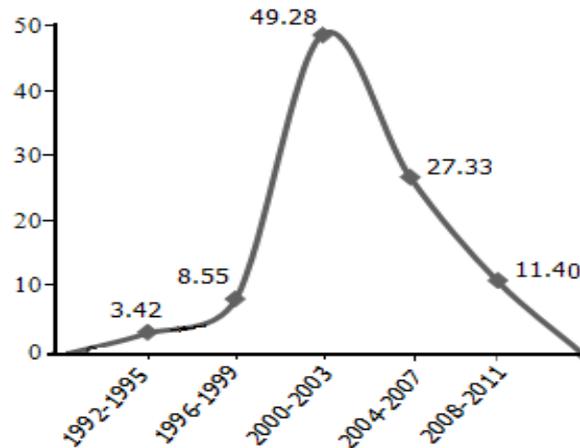
Figure 1: Respondents' Rate of Adoption and Use of Online Database (N=351)

The results show that in general most faculty members have a positive perception towards attributes of online databases. Table 3 shows the attributes of relative advantage. About 56.1% of faculty members selected the item 'strongly agrees' for the statement 'Online databases include a vast amount of information.' For the attributes of compatibility 71.5% of the faculty 'strongly agrees' with 'Using online databases isn't against social, cultural and religious criteria.' For the item 'Learning online databases is very hard', which is the attribute of complexity, 77.8% of faculty members selected 'disagree', and for the attribute of trialability 67% of faculty members agreed with the item 'The possibility of using online databases in a trial period'. In the attribute of observability, 65.2% of faculty members agreed with the items 'Browsing, choosing and printing retrieved information is possible via online databases.' and 69.5% agreed with 'Access to full-text information is possible via online databases.' In general, the faculty members reached an acceptable understanding of the adoption of online databases, with perceived relative advantage (mean=4.41), compatibility (mean=4.33), complexity (mean=1.88), trialability (mean=4.02) and observability (mean=4.19).

Testing the Research Hypotheses
We used the Friedman test to show faculty members' perception on the attributes of online databases. Each attribute was assigned a mean rank. Tables 4 to 8 show the priorities of other attributes obtained from the Friedman test. Table 4 listed the statements concerning respondents' perceived "Relative advantage" about the online databases. Respondents' perceived that "Online databases include a vast amount of information" positively, with the highest mean score of 4.54, followed by "Boolean operations in online databases lead to easy retrieval of information" (mean= 4.53) and the lowest mean score was attributed to "Online databases provide retrospective searching". A Chi-Square test carried out showed that there was a significant difference between the attributes at the probability level of 0.01 (Chi-square: 279.580 ; df : 4; Asymp: Sig: 0.000).

Table 3: Analysis of Faculty Members' Perceived Attributes of Online Databases (N=351)

Aspects	Item Statements	Frequency & Percentage					Mean
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	
Relative advantage	Boolean operations in online databases lead to easy retrieval of information.	194 (55.3%)	148 (42.2%)	9 (2.6%)	-	-	4.41
	Online databases provide of searching in special fields.	155 (44.2%)	180 (51.3%)	16 (4.6%)	-	-	
	Online databases provide searching to hypertext and related documents.	186 (55%)	158 (45%)	7 (2%)	-	-	
	Online databases provide retrospective searching.	79 (22.5%)	230 (65.5%)	42 (12%)	-	-	
	Online databases include a vast amount of information.	197 (56.1%)	148 (42.2%)	6 (1.7%)	-	-	
Compatibility	Being familiar with online databases and knowing how to use it is the same as to be familiar with computer and the internet	80 (22.8%)	242 (68.9%)	29 (8.3%)	-	-	4.33
	Before starting professional activity in university, I knew how to use online databases	237 (67.5%)	112 (31.9%)	1 (0.3%)	1 (0.3%)	-	
	Subject coverage of online database is related with my professional and scientific activity	97 (27.6%)	239 (68.1%)	14 (4%)	1 (0.3%)	-	
	Information in online databases has authenticity like print materials.	92 (26.2%)	237 (64.7%)	30 (8.5%)	2 (0.6%)	-	
	Online databases are accessible without time and place limitation.	79 (22.5%)	231 (65. 8%)	40 (21.4%)	1 (0.3%)	-	
	Using online databases isn't against social, cultural and religious criteria	251 (71.5%)	92 (26.2%)	6 (1.7%)	1 (0.3%)	1 (0. 3%)	
Complexity	Learning online databases is very hard.	-	4 (1.1%)	220 (61.3%)	273 (77.8%)	52 (14.8%)	1.88
	Using online databases is very difficult.	-	7 (2%)	22 (6.3%)	225 (64.1%)	97 (27.6%)	
Trial ability	Comparing online databases with print materials is necessary in deciding to use online databases.	26 (7.2%)	232 (66.1%)	90 (25.6%)	3 (0/9%)	-	4.02
	The possibility of using online databases in a trial period.	103 (29.3%)	235 (67%)	12 (3.4%)	1 (0.3%)	-	
Observability	Online databases make the most updated worldwide information available.	47 (13.4%)	223 (63.5%)	80 (22.8%)	1 (0.3%)	-	4.19
	Retrieval of a large number of results	111 (31.6%)	222 (63.2%)	28 (5.1%)	-	-	
	Alerting services can be done via online databases.	40 (11.4%)	208 (59.3%)	102 (29.1%)	1 (0.3%)	-	
	Access to full-text information is possible via online databases.	72 (20.5%)	244 (69.5%)	33 (9.4%)	2 (0.6%)	-	
	Access to information and storage information at the same time is possible via online databases.	123 (35%)	206 (58.7%)	21 (6%)	1 (0.3%)	-	
	Information retrieval is possible in a short time via online databases.	147 (41.9%)	195 (55.6%)	9 (2.6%)	-	-	
	Online databases can be used simultaneously by many people.	214 (61%)	133 (37.9%)	4 (1.1%)	-	-	
	Browsing, choosing and printing retrieved information are possible via online databases.	97 (27.6%)	229 (65.2%)	24 (6.8%)	1 (0.3%)	-	

Table 4: Descriptive Statistics and Friedman Test on Relative Advantage Attribute

Aspect	Item statements	Descriptive Statistics & Friedman Test			Chi-Square	df	Asymp. sig.
		Mean	Std. Deviation	Mean Rank			
Relative advantage	Boolean operations in online databases lead to easy retrieval of information.	4.53	.549	3.26	279.580	4	.000
	Online databases provide of searching in special fields.	4.40	.576	2.29			
	Online databases provide searching to hypertext and related documents.	4.51	.539	3.22			
	Online databases provide retrospective searching.	4.11	.583	2.26			
	Online databases include a vast amount of information.	4.54	.532	3.31			

Table 5 listed the statements concerning respondents' perceived "Compatibility" about online databases. Respondents' perception that "Using online databases isn't against social, cultural and religious criteria" received the highest mean score of 4.68, followed by "Before starting professional activity in university, I knew how to use online databases" (mean: 4.67) and the lowest mean score was (4.10) attributed to provision for "Online databases are accessible without time and place limitation". To find out if these attributes are significantly different, a Chi-Square test was carried out and the result showed that there was a significant difference at the probability level of 0.01 (Chi-square: 539.601; df : 5; Asymp: Sig: 0.000.)

Table 5: Descriptive Statistics and Friedman Test on Compatibility Attribute

Aspect	Item statements	Descriptive Statistics & Friedman Test			Chi-Square	df	Asymp. sig.
		Mean	Std. Deviation	Mean Rank			
Compatibility	Being familiar with online databases and knowing how to use it is the same as to be familiar with computer and the internet	4.15	.539	2.97	539.601	5	.000
	Before starting professional activity in university, I knew how to use online databases	4.67	.496	4.38			
	Subject coverage of online database is related with my professional and scientific activity	4.23	.525	3.21			
	Information in online databases has authenticity like print materials.	4.17	.575	3.04			
	Online databases are accessible without time and place limitation.	4.10	.596	2.88			
	Using online databases isn't against social, cultural and religious criteria	4.68	.550	4.52			

Table 6 shows the statements concerning respondents' perceived "Complexity" about online databases. They emphasized that learning online databases is very hard which

received the highest mean score of 1.94, while the mean for the difficulty in using was 1.84. The difference between the means shows that these two factors led to a lesser receptiveness. Instead, simpler innovations, which are learned easily lead to more receptiveness and a wider diffusion. A Chi-square test carried out on these attributes shows significant difference at the probability level 0.01 (Chi-square 36.750; df: 1; Asymp: Sig: 0.000).

Table 6: Descriptive Statistics and Friedman Test on Complexity Attribute

Aspect	Item statement	Descriptive Statistics & Friedman Test			Chi-Square	df	Asymp.sig.
		Mean	Std. Deviation	Mean Rank			
Complexity	Learning online databases is very hard.	1.94	.503	1.56	36.750	1	.000
	Using online databases is very difficult.	1.83	.624	1.44			

Table 7 lists the statements concerning respondents' perceived "Trialability" about online databases. Respondents' perception of "The possibility of using online databases in a trial Period" received the highest mean score of 4.25, followed by "Comparing online databases with print materials is necessary in deciding to use online databases" (mean: 3.80). It seems that familiarity with new services and the new instruments prior to use is critically important in perceiving and disseminating them. To find out if these attributes are significantly different, a Chi-square test was carried out which showed significant difference at the probability level 0.01 (Chi-square: 140.625; df: 1; Asymp: Sig: 0.000).

Table 7: Descriptive Statistics and Friedman Test on Trialability Attribute

Aspect	Item statement	Descriptive Statistics & Friedman Test			Chi-Square	df	Asymp.sig.
		Mean	Std. Deviation	Mean Rank			
	Comparing online databases with print materials is necessary in deciding to use online databases.	3.80	.571	1.30	140.625	1	.000
Trialability	The possibility of using online databases in a trial period.	4.25	.525	1.70			

In terms of respondents perceived "observability" about online databases, Table 8 shows that the seventh attribute, "Online databases can be used simultaneously by many people", and the sixth attribute, "Information retrieval is possible in a short time via online databases" with means score 4.60 and 4.39 respectively have the highest ranks. The third attribute, "Alerting services can be done via online databases", had the lowest rank with mean score 3.82. The results of a significance test carried out on the eight attributes of observability showed that there were significant differences (Chi-square: 752.081; df: 7; Asymp: Sig: 0.000).

Table 8: Descriptive Statistics and Friedman Test on Observability Attribute

Aspect	Item statement	Descriptive Statistics & Friedman Test			Chi-Square	df	Asymp.sig.
		Mean	Std. Deviation	Mean Rank			
	Online databases make the most updated worldwide information available.	3.90	.604	3.40			
	Retrieval of a large number of results	4.26	.546	4.75			
	Alerting services can be done via online databases.	3.82	.620	3.12			
	Access to full-text information is possible via online databases.	4.10	.559	4.16			
Observability	Access to information and storage information at the same time is possible via online databases.	4.28	.584	4.84	752. 081	7	.000
	Information retrieval is possible in a short time via online databases.	4.39	.539	5.24			
	Online databases can be used simultaneously by many people	4.60	.514	5.97			
	Browsing, choosing and printing retrieved information are possible via online databases.	4.20	.562	4.52			

Correlation Analysis

To test the research hypotheses in terms of the relationship between innovation attributes and the adoption of online databases, the Pearson correlation coefficient was used. Table 9 shows that the five hypotheses were strongly supported. The hypotheses have been accepted with 95 confidence rates (for all hypotheses the *p*-value obtained is 0.0001>0.05).

Table 9: Results of Correlation Analysis (N=351)

Hypotheses	Significance	Correlation Value	Results of hypotheses test
H1: There is a significant relationship between the relative advantage attribute and adoption of online databases.	0.0001	0.64	Supported
H2: There is a significant relationship between the compatibility attribute and adoption of online databases.	0.0001	0.65	Supported
H3: There is a significant relationship between the complexity attribute and adoption of online databases.	0.0001	-0.57	Supported
H4: There is a significant relationship between the trialability attribute and adoption of online databases.	0.0001	0.31	Supported
H5: There is a significant relationship between the observability attributes and adoption of online databases.	0.0001	0.53	Supported

p-value < 0.05

DISCUSSION AND CONCLUSION

This study found evidence to support Rogers' theory of DOI. The DOI theory illustrates the significant impacts that specific attributes of online databases have on their adoption. The results shows, there is a significant relationship between the perceived attributes of innovation and their adoption. The five hypotheses in this study were confirmed by the results obtained. The results of the present study conform to those studies carried out by Kivlin (1960), Fliegle and Singh (1966), Wyner (1974), Holloway (1977), Surry (1993, 1997), Drucker(1994), Al-Gahtani (2003), Li (2004), and Janardhanam, Sinha and Babu (2011), which found the five attributes were correlated to the adoption of innovations. The attributes, such as relative advantage, compatibility and observability were positive factors correlating with innovation adoption, while complexity was a negative factor (Al-Gahtani 2003; Al Ghaith, Sanzogni and Sandhu 2010; Janardhanam, Sinha and Babu 2011). Regarding the validity of the hypotheses related to the five main factors of the attributes, "relative advantage", "compatibility", "complexity", "trialability", and "observability", we can conclude that these factors did influence faculty members' attitudes towards using online databases. This study increased our understanding of the attributes of faculty members that indicated high level of acceptance and use of online databases and use of these tools in their scientific activities. Although this study indicated a significant difference regarding the innovation features and the respondents' ability to perceive, the determining factor in the perception is still the acceptance of the online databases.

This study confirms that the respondents perceived the relative advantage (Correlation Value 0.64), compatibility (Correlation Value 0.65), complexity (Correlation Value -0.57), trialability (Correlation Value 0.31), and observability (Correlation Value 0.53), all are related to adoption and use of online databases. This finding is consistent with Al-Gahtani (2003) who found that how perceived attributes of computer technology played positive roles in computer adoption, while complexity (-0.305 at $p < 0.01$) was a negative factor.

Diffusion researchers believe that a population can be broken down into five different segments, based on their propensity to adopt a specific innovation: innovators, early adopters, early majorities, late majorities and laggards. The findings of the present study indicated that 49.28 percent of faculty members were early majority and over 60 percent of the faculty members accepted and used online databases, indicating an acceptance rate is average (3.67).

This study is limited to the perception of innovation attributes and other studies could be carried out to include other factors such as organizational and demographic variables (age, gender, education, academic rank, education field and years of teaching experience) and their relation to the acceptance of new technologies by the university faculty members. However, the findings of the research may be useful to university administrators to further initiate better facilities to enable higher diffusion of online databases and new technologies, to support their research.

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