A Study on User Behavior Analysis of Integrate Beacon Technology into Library Information Services

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ABSTRACT

With the popularity of mobile devices, location services have been deep into everyone's life, and the positioning of data collection is an important goal of data analysis. However, the current applications mainly focus on outdoor device such as WIFI positioning technology was discussed the most often and also got a lot of well research results. This paper mainly discusses the application of Beacon technology in the information service of the library, and understands the user for the acceptance of new technology. Beacon technology is a combination of user and space environment of intelligent technology, beacon is a low-power Bluetooth sensor technology, the library can use this equipment to understand the use of library physical space and collections. The library can be combined with a smart mobile device via Beacon technology, allows users to receive the latest library information, users can also search on the smart mobile devices on various collections. Users can also direct the user to the bookshelf where the destination book is located, depending on the search needs entered by the user. This study discusses the user's intention to use Beacon in combination with the technology acceptance model and the innovation diffusion theory.

Keywords: Beacon, Bluetooth low energy, location data, indoor positioning, diffusion of innovation theory

FOREWORD

Libraries have always been regarded as a collector, organizer and distributor of information. Now as they face the flourishing development of Internet resources and the rapid increase in users, libraries must now pay attention to the issues of using Internet resources, especially the university library in supporting the teaching and research as its primary mission. The user, regardless of whether they are teachers, students, or researchers are the users of in high-level academic information needs. Therefore, the university library has always been emphasized in information content and quality. In the past, with the widespread establishment of the library website, it can be found in almost every library website that the library has begun to conduct internet resource organization works and provide the internet resources links with value of use on the library web page to allow the library user one more channel of using the resources.

However, due to the popularity and competition of mobile devices in recent years, such as smart phones, tablet PCs, and other products, there has been acceleration in the transformation of mobile technology, coupled with more mature wireless communication environment, reduced telecommunication rates, and the population using mobile device on internet has increased rapidly. Therefore, the library is no longer able to meet the information needs of readers through only utilizing web sites to conduct information services. Readers are carrying mobile devices all the time, resulting in changes of time and location for the readers to receive and send information. Through their mobile devices, readers can receive and send information immediately. The library must also pay attention to the changes in lifestyles for people that the convenience of mobile device design has brought, in particular for the communication delivery and reading of information.

Contribution of this paper to the literature

- Through this study, we can understand that the library uses BEACON technology to provide information services, and can make the information of the library reach the diffusion effect.
- The library uses BEACON technology to provide more accurate indoor positioning, and help readers find the resources they need more quickly.
- Using BEACON technology in combination with social networks, libraries can increase reader-to-library interactions and find new or potential readership from the social network.

THE LIBRARY PROVIDES INFORMATION SERVICES USING INFORMATION TECHNOLOGY

When Readers use the library's collection, they usually search for books from the library web page, copy the call number, and use that to look for books on the shelf. The readers will usually first search from the beginning of classification number bookshelves, then slowly searching back to the needed books. However, readers often need to check two or three rows of bookshelves in order to find the location of the book that is very inefficient. If spending too much time searching for book, readers will often give up their search. However, these search problems indirectly effect the utilization of library collections. One of the main reasons for the failure of library educational function is insufficient use of library collections. The value of a library collection can be demonstrated only until it is fully utilized. In addition, the current emerging self-help library searches for books through automatic machines, which greatly reduces human resources need and allows for 24-hour book borrowing. This reduces the time to search for books and reduces the collection space. Since the construction of a fully automated mechanized library requires a large sum of money to purchase the relevant equipment and the amount of book collection may be limited, it is still difficult to construct a fully automated machine book-searching library.

Therefore, as libraries face the knowledge economy, with people's increasing reading literacy, and in response to the changes of social environment and development of information technology, the form of libraries is no longer limited to the traditional ways of manual borrowing. Instead, they seek new methods in the hopes of providing readers with better books and information services through innovative technology. The following is also the introduction for the library to use technology to provide information services.

RFID

Radio Frequency Identification system (RFID), is a non-contact automatic identification technology. It uses radio waves to identify the target label, perform wireless data identification, and retrieve relevant information. The application of RFID in today's life is quite extensive, for example, Taipei City MRT Easy card, Community Security Proximity Access Control Card, anti-theft system at the entrance of store and bookstore, chip key of car and motorcycle, ID chip implanted in pets, etc all use this form of technology.

Since its introduction, RFID has been a hot topic of the library sector. With more mature of the RFID technology, RFID technology in the library field has a very broad application prospects. In general, RFID applications in the library is mainly for circulation, and for the library and readers, RFID does have its advantages, for example: (1) to simplify the borrowing book operations, (2) easy to find the books that are misplaced on bookshelves, (3) speeds up inventory work, (4) environmental resistance, (5) can be used repeatedly and penetrability, and (6) readers self-help returning books.

Although it seems that RFID has a great advantage currently, none of the applications of the technology and products can be perfect. Before a library considers using RFID, a few questions must be carefully examined:

(1) Cost: Cost is often one of the main factors affecting whether to introduce the new technology applications. Libraries with limited funding must carefully consider whether to introduce RFID. Compared to bar codes and magnetic stripes, the consumables for RFID tags each book are significantly higher, and it is no small amount of money for libraries with easily hundreds of thousands of collections, coupled with the RFID system peripheral relevant application software and readers, automatically borrowing/returning book equipment, etc. create a huge amount of expenses.

(2) Read rate: In addition to metal, moisture, and distance factors, if the direction and distance of each other is incorrect, it is possible that the information cannot be read. For the library that mainly services readers, how to correctly implement the wireless sensor, effectively execute the read function with what should be read and without mistake requires strict testing.

(3) Privacy: When an RFID is widely used, the issue of personal privacy can easily become a problem. The sensors on the shelves for books and journals work with the collections and readers' RFID tags to sense whether the reader removed a certain journal or book. In order to determine the read rate of the journals and books, the user's browsing behavior is as if being monitored.

(4) Security: Due to the characteristics of RFID wireless transmission, the transmitted signal can also be intercepted with wireless signal capture method, therefore, a message encryption function must be added to prevent forgery, tampering information to ensure the confidentiality, integrity and non- repudiation of information.

(5) Existing equipment: Does the library's existing automated equipment, access control systems, magnetic stripe, bar code and degaussing machine, etc. need to be discarded after introduction of RFID? Does it cause the waste the resources of original equipment?

Two-dimensional Barcode

The two-dimensional barcode allows more information and characters to be stored, and the mobile telecommunication operator uses this feature to solve the inconvenience of typing characters in mobile phones. Combined with e-commerce, using a mobile phone with camera function to scan the two-dimensional barcode to conduct online transactions, hence, mobile communication combines two-dimensional bar code to form mobile two-dimensional barcode, abbreviated as QR Code. Among the various types of two-dimensional barcodes, QR Code has the best characteristics, in addition to large storage capacity feature. It also has the features of smaller print size and fast scanning.

The scope of applications for QR Code in mobile commerce can be divided into four general categories, including: (1) Automated text input: uses mobile barcode to store personal information, such as address, phone number, calendar, etc., to perform rapid exchange of business cards and travel information. (2) Digital content download: use mobile bar code to store the basic information of digital content, download of digital content. (3) Website quick link: Attach QR Code on the user's manual, product specifications, newspapers and magazines, advertising publicity materials and other information to provide users with website quick links, telephone speed dial, and other functions. (4) Identity identification and business transactions: display QR Code on the mobile phone as the transaction identification information, or mobile payment certification, can be used such as admission tickets, vending machines, membership identification, mobile payment, and other applications.

For the application area of early two-dimensional barcode in catalog management, in addition to print the two-dimensional barcode on the last page of the book to facilitate marketing and inventory management, the publishing industry also work swith the Chinese MARC Format of National Library or pre-catalog, prints two-dimensional barcode on the copyright page or pre-catalog page. The main purpose is for any library to make a book catalog. By simply scanning the two-dimensional barcode of the machine readable catalog or pre-catalog at ease, the catalog information will be entered into the computer automatically, then the catalog card can be printed right away from printer which shorten the time for the books enter into storage.

In recent years, the library began to use QR Codes to provide services. For example, the library will make the title, author, call number into QR Code of each collection and display in the Webpac, the reader only needs to use mobile phone to scan the QR code on the screen without writes down the call number, book name, author on paper, to be able to find the book on the shelf.

The library also concatenates paper copy journal and electronic journal, affix QR Code on the paper copy journal for the reader to scan the decoded website address via mobile phone and check on line whether there is a collection of the specific electronic journal.

In addition, the library also places some resource location pathfinders in the library. Scan the Location QR Code with a mobile phone, the screen will display the location map and text description of the collection to guide the reader locating the needed collection. The library also affixes the QR Code next to the equipment that requires operating instructions, after scanning the QR Code, use the mobile phone internet to link the video and watch the operating procedure. For example, affix the photocopier operation video QR Code next the photocopier, or even place QR Code on the paper copy instruction that can link to the relevant online resources to access more information.

Micro Positioning BEACON

The representative product using Bluetooth low-power technology is Beacon, the simplest description is a small signal transmitter, and its application has indoor navigation, mobile payment, in-store navigation, indoor positioning, item tracking, and others. With the ever-changing technology, people are increasingly indispensable to mobile devices, but the outdoor navigation technology such as global satellite positioning system (GPS) is

susceptible to the interference from building blind spot indoor, more importantly, accuracy and power consumption cannot meet the needs of indoor positioning applications that resulted in Bluetooth low-power technology Beacon as a indoor positioning solution of the new generation.

Beacon still has to work with an app, the library can develop app, provide readers to download and install in their mobile devices, so that mobile devices are the readers' personal guide at any time and allow the reader to find books in the library without any trouble. As long as they are using their portable mobile devices, readers can be easily guided to the books they want to borrow.

In the aspect of book searching services, it can use indoor positioning, map path navigation and information pushed to the smart phone via the Bluetooth and iBeacon technology that can shorten the user's book searching time in the library, to achieve library personalized services functionality. In addition, in the aspect of reader service, when reader enters into the library, the service can take the initiative to remind the reader of the books borrowed and books to be returned reminders.

From the background interface of library can find out the readers distribution condition of each area, whether there is any abnormal condition. It can also issue messages requesting for help via the reader's mobile device position. Library management personnel then access the reader's position from their own mobile phone management app and go to the reader's location to help.

THE LIBRARY USES BEACON FOR INFORMATION SERVICE APPLICATIONS

Since the Beacon still has to work with an app, the library shall also develop mobile device app, using the iBeacon new technology, combined with location positioning, two-dimensional barcode and other commonly used mobile technology with the library services. This shall bring readers a brand new i-Library Experience. In the aspect of book positioning function in the library, no matter where the reader is, as long as the library app is installed, the reader can view the popular and recommended books directly, or search the books of interest and query the collection status of several nearby libraries directly.

For borrowing from the general collection, the application can quickly position the bookshelf location of the specific book for the reader. When referencing the book collection from the outside, requests can be made directly through app and submit the call book request. There is no longer a need to go to the call book terminal to inquiry and submit again. After the book out of storage, the app will promptly push an "out of storage" reminder to the reader's mobile phone, and the reader can go to the Reader Services/Circulation Desk to borrow the book.

In terms of ease of use, BEACON can not only search for books on smart mobile devices, but also guide the user to the bookshelf where the needed books are located according to the search requirements inputted by the user. It can publish the latest library activity information to the intelligent mobile device in the user's hand when the user enters the library, and send the return dates of borrowed books when the user leaves the library. And, all these services are commercially available Beacon required functions, positioning accuracy improvement, communication method are less a burden to each device, and with electronic certification, encrypted communications and other security functions. It is believed in the near future, readers can experience more convenient services.

RESEARCH DESIGN AND ARCHITECTURE

This research is based on a technology acceptance model and combined with the innovative product characteristics of the Diffusion of Innovation Theory to establish a "Technology Acceptance Model of Library Micro-Positioning Services" as the architecture of this research, and perform an empirical study of users who use the Library Micro-Positioning Services based on this model, to explore whether the degree of "Use Attitude" of Library Micro-Positioning Services will be influenced due to the innovative product characteristics of the diffusion of innovation factors when the user is using the Library Micro-Positioning Services, and the user's "Use Behavioral Intention" is further influenced. This research mainly explores the key factors that influence the users using the Library Micro-Positioning Services, and provides a reasonable explanation and deduction for IT acceptance of general users based on the technology acceptance model, and the technology acceptance model is widely used to predict and explain the user's behavior and the use of the information technology model that has been confirmed by many research to prove its effectiveness.

Through the description of exploring the literature, and based on the Diffusion of Innovation Theory and Technology Acceptance Model, this research paper explores when the library is communicating information through innovative micro-positioning services, understands the influences of innovative characteristics on the attitude of the user using micro-positioning services as well as on the behavioral intention, the architecture of this research is shown as in **Figure 1**.
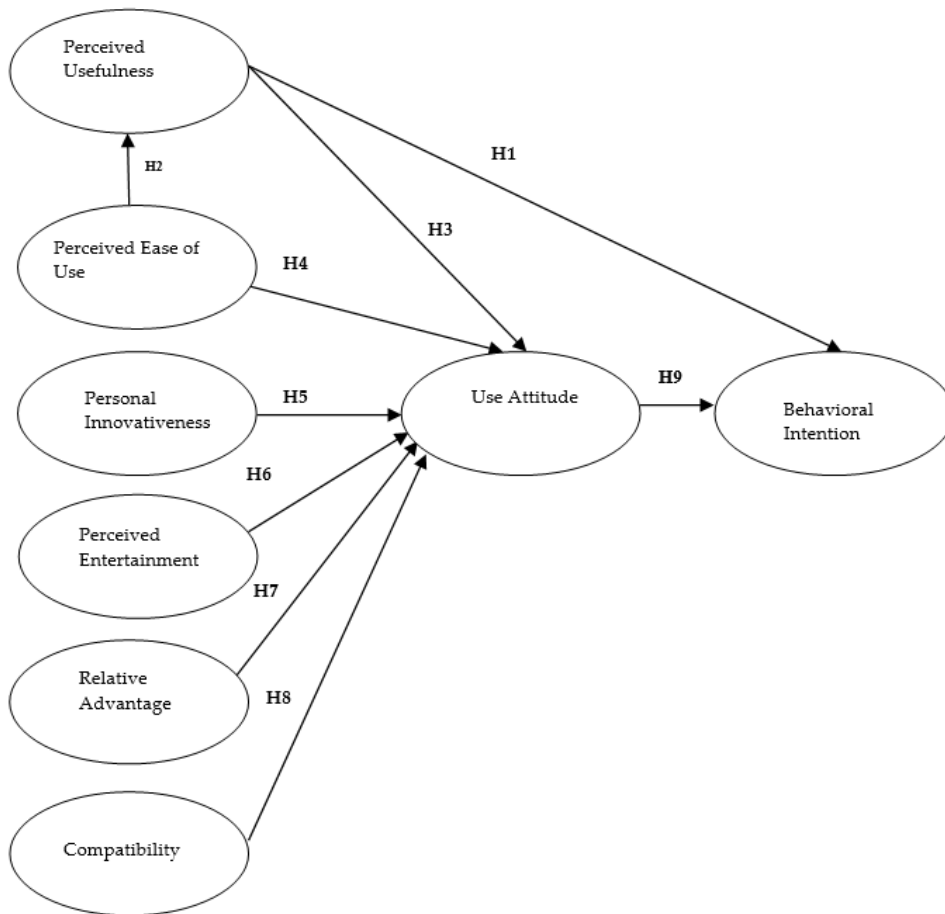
Figure 1. Research Architecture Diagram

Research Hypotheses

The main purpose of this research is to explore the user's behavior on the use of library micro-positioning services to conduct investigation research on the key success factors of the service and is based on the collation of the research literature and establishment of research architecture mainly within the "Technology Acceptance Model" and according to the purpose of this research to submit the following nine hypotheses:

H1: Higher "Perceived Usefulness" of the users' use of the micro-positioning services provided by the library has a positive influence on their "Behavioral Intention"

H2: Higher "Perceived Ease of Use" of the users' use of the micro-positioning services provided by the library has a positive influence on their "Perceived Usefulness".

H3: Higher "Perceived Usefulness" of the users' use of the micro-positioning services provided by the library has a positive influence on their "Use Attitude".

H4: Higher "Ease of Use" of the users' use of the micro-positioning services provided by the library has a positive influence on their "Use Attitude".

H5: Higher "Personal Innovativeness" of the users has a positive influence on their "Use Attitude".

H6: Higher "Perceived Entertainment" of the users' use of the micro-positioning services provided by the library has a positive influence on their "Use Attitude".

H7: Higher "Relative Advantage" of the users' use of the micro-positioning services provided by the library has a positive influence on their "Use Attitude".

H8: Higher "Compatibility" of the users' use of the micro-positioning services provided by the library has a positive influence on their "Use Attitude".

H9: Higher "Use Attitude" of the users' use of the micro-positioning services provided by the library has a positive influence on their use "Intention".

Questionnaire Design

The subject of this research is library users, with the research dimensions including: perception usefulness, perceived ease of use, use attitude, behavioral intention, personal innovativeness, compatibility, perceived entertainment and relative advantage. This research first focuses on research variables to conduct the operational definition, and then based on the scale of excellent reliability and validity in the literature referenced by this research; align with the topic of this research to develop the scale of this research.

Research Scope and Limitation

It has been common for libraries using all types of new technologies to communicate information, especially for university libraries and public libraries. This research will select users from domestic university libraries and public libraries as the main research scope and subjects.

This research is to explore the user's use intention and continuous use intention of the micro-positioning services provided by the library, so the subject of this research is set for community website users, regardless of age and occupation. All the users of university libraries and public libraries are the sample subjects of this research.

SEM (Structural Equation Model) is the tool used in this research, which is a large sample of analytical techniques, the number of samples shall not be too small, in order to obtain stable parameter estimation and standard deviation. As for the number of samples, many scholars put forward their views:

Loehlin (2004) investigated 72 SEM papers and found that the median of the samples was 198, so the recommended number of samples was at least 100, better with 200.

Kline (2005) believes less than 100 samples is not convincing under SEM analysis. Schumacker and Lomax's (2004) investigation literature found that 250 to 500 samples were used in many papers, which is a suitable number of samples. They also agree that less than 100 to 150 samples is not stable. Therefore, if the study variable exceeds 10 and the number of samples is less than 200, the evaluation of the parameters is generally considered to be unstable, and the significance test will lack statistical testability.

If there is no other special reason, the execution of SEM is generally done by the default maximum likelihood method, and when the number of samples is more than 500 for the maximum approximate method, the chi-square value expands seriously, resulting in a poor model fit. Mitchell (1993) even considered that the number of samples shall be at least 10 to 20 times the model variables.

The other rule of thumb is from Bentler and Chou (1987), in the situation of research conforming data, with 5 times the estimate parameters (including error term and path coefficient) as the number of samples, when the data is abnormal (skewness and kurtosis) or has missing values, the number of samples taken by the researcher shall be much larger than the minimum requirement.

To sum up all above, the reasonable number of SEM samples shall be between 200 and 500. Therefore, a number of questionnaires were distributed for this research. The total actual returned copies were 495, in line with the reasonable number of samples discussed above.

After the questionnaire for this research was designed, 45 sample targets were invited to conduct a pre-survey on the questionnaire for this research, and make revisions on those questions with non-fluent semantics, and then the sampling was conducted. Since there are two different ways of sampling in general, Sampling and Census respectively, and since a Census must be surveyed with all people fitting the research setup targets, the cost and difficulty are high, and therefore, this research uses Sample. Sampling is also divided into random sampling and non-random sampling. This research will use purposive sampling and snowball sampling within the non-random sampling, primarily with the questionnaires physically distributed or through email, to mail the questionnaires to the test subject or through email, then request a name list from the test subjects, then continue to distribute the questionnaires, to reduce the cost of this research and speed up the time to receive the returned questionnaires.

RESULTS ANALYSIS

Reliability Analysis

After completing the design of the questionnaire draft, in order to avoid mistakes in answering the survey due to misunderstanding the meaning of the questions by the test subjects, thus affecting the validity of the questionnaire, before distributing the formal questionnaire of this research, 45 library users and experts were invited by purposive sampling to conduct a pre-survey. During the course of filling in the answers, if any unclear semantics issues were found or there were difficulties in filling in the answers, a discussion was conducted right away. Reliability testing on the returned samples of pre-survey was also conducted. According to Nunnally's recommendation, as long as the Cronbach α value of the dimension is larger than 0.7, the reliability of the dimension

Table 1. Validity Analysis Table

Topic	Factor Loading	Composite Reliability	Average Variance Extracted (AVE)
Perceived Usefulness 1_1	0.619		
Perceived Usefulness 1_2	0.737		
Perceived Usefulness 1_3	0.7	0.81	0.72
Perceived Usefulness 1_4	0.81		
Perceived Ease of Use 1_5	0.742		
Perceived Ease of Use 1_6	0.614		
Perceived Ease of Use 1_7	0.542	0.755	0.662
Perceived Ease of Use 1_8	0.73		
Behavioral Intention 1_9	0.738		
Behavioral Intention 1_10	0.769		
Behavioral Intention 1_11	0.79	0.849	0.764
Behavioral Intention 1_12	0.759		
Use Attitude 1_13	0.794		
Use Attitude 1_14	0.798		
Use Attitude 1_15	0.788	0.874	0.797
Use Attitude 1_16	0.808		
Personal Innovativeness 2_1	0.613		
Personal Innovativeness 2_2	0.727		
Personal Innovativeness 2_3	0.776	0.799	0.707
Personal Innovativeness 2_4	0.704		
Compatibility 3_1	0.489		
Compatibility 3_2	0.785		
Compatibility 3_3	0.766	0.738	0.652
Compatibility 3_4	0.506		
Perceived Entertainment 3_5	0.704		
Perceived Entertainment 3_6	0.827		
Perceived Entertainment 3_7	0.74	0.843	0.758
Perceived Entertainment 3_8	0.755		
Relative Advantage 4_1	0.709		
Relative Advantage 4_2	0.751		
Relative Advantage 4_3	0.732	0.783	0.691
Relative Advantage 4_4	0.552		

is acceptable, and the analysis result of the Cronbach α value of this research's pre-survey samples shows that the reliability of each dimension is above 0.7, which indicates that the scale of this questionnaire has a considerable degree of consistency and stability, therefore, no more addition or deletion is needed for the survey questions, only to modify the area of unclear meaning and streamline the wording. Also, re-adjust the layout to improve the comfort of filling in the answers, and use it as the formal copy of the questionnaire.

Therefore, the questionnaire designed for this research, according to Gilford (1954), proposed that when Cronbach's α value is >= 0.7, there is a high degree of reliability. When Cronbach's α value is between 0.35 and 0.7, it is acceptable. When Cronbach's α value is <0.35, it has low reliability (Rong, Tai-Sheng, 2007). The Cronbach α value of each measuring dimension of this questionnaire is between 0.735 and 0.874, and all Cronbach's α values are more than 0.7, which indicates that the reliability of the questionnaire has achieved the high reliability range.

Validity Analysis

Measure the standardized coefficient

When each factor loading is higher than 0.5 represents that it has convergent validity (Anderson & Gerbing, 1988; Bollen, 1989), as shown in **Table 1**, the model has convergent validity.

Composite Reliability (CR)

The CR value of the potential variable is the composition of the reliability of all the measured variables, which indicates the internal consistency of the dimensional indicators. Higher reliability represents higher consistency of these indicators, and the recommended values of Fornell and Larcker (1981) are higher than 0.6 (Huang, Fang Ming,

Table 2. Correlation Matrix Analysis Table

	Perceived Usefulness	Perceived Ease of Use	Behavioral Intention	Use Attitude	Personal Innovativeness	Compatibility	Perceived Entertainment	Relative Advantage
Perceived Usefulness	1.000	.645	.673	.669	.353	.297	.530	.590
Perceived Ease of Use	.645	1.000	.711	.749	.414	.428	.442	.533
Behavioral Intention	.673	.711	1.000	.769	.487	.469	.603	.712
Use Attitude	.669	.749	.769	1.000	.538	.481	.594	.638
Personal Innovativeness	.353	.414	.487	.538	1.000	.392	.492	.482
Compatibility	.297	.428	.469	.481	.392	1.000	.455	.508
Perceived Entertainment	.530	.442	.603	.594	.492	.455	1.000	.656
Relative Advantage	.590	.533	.712	.638	.482	.508	.656	1.000

Table 3. Discriminant Validity Checklist

Dimension	Item Number	Correlation coefficient							
		A	B	C	D	E	F	G	H
A. Perceived Usefulness [1]	4	0.72 [2]							
B. Perceived Ease of Use	4	0.645* [3]	0.662						
C. Behavioral Intention	4	0.673*	0.711*	0.764					
D. Use Attitude	4	0.669*	0.749*	0.769*	0.797				
E. Personal Innovativeness	4	0.353*	0.414*	0.487*	0.538*	0.707			
F. Compatibility	4	0.297*	0.428*	0.469*	0.481*	0.392*	0.652		
G. Perceived Entertainment	4	0.530*	0.442*	0.603*	0.594*	0.492*	0.455*	0.758	
H. Relative Advantage	4	0.590*	0.533*	0.712*	0.638*	0.482*	0.508*	0.656*	0.691

[1] Take the average of the variables as the sum of the average of all the questions of each dimension in the scale.

[2] The diagonal value is the square root of the average variation extracted (AVE) for this potential variable, which shall be greater than the value of the non-diagonal.

[3] *At significant levels of α = 0.05, the correlation coefficient between the variables reached a significant level

2006). As shown in Table, the CR values of all potential variables are between 0.738 and 0.874, and all attained the standard value of 0.6. This represents that the research has an excellent dimensional reliability.

The discriminant validity analysis refers to the degree of correlation between the questions of different dimensions being low, and the evaluation indicators include:

1. **Correlation coefficient:** The correlation coefficient of each research dimension must be lower than 0.85. According to the research result of Kline (Kline, 1998), when the correlation coefficient of the research dimension is lower than 0.85, it represents a certain degree of discriminant validity. The correlation coefficient of each dimension of this research is lower than 0.85 as shown in **Table 2** and **Table 3**.

2. **Average Variance Extracted (AVE):** The Average Variance Extracted (AVE) refers to the average variation interpretation of each measured variable of the latent variable on such latent variable, the criterion is that the value is greater than 0.50 (Fornell and Larcker, 1981; Bagozzi and Yi, 1988), greater the value represents better Reliability and Convergent Validity. If the Average Variance Extracted of each later variable is greater than the squared multiple correlation (SMC) between each pair of latent variables, then it can be considered as a Discriminant Validity (Fornell and Larcker, 1981). As shown in **Table 3**, it can be seen that the square root of the Average Variance Extracted from all dimensions of this research is greater than the correlation coefficient of other dimensions, except for the "Perceived Ease of Use", "Behavioral Intention", "Use Attitude", "Behavioral Intention" and "Use Attitude", therefore, it can be considered as acceptable good Discriminant Validity.

Path Analysis

After analyzing the reliability and validity of the questionnaire of this research, the Structural Equation Model (SEM) of this research model is established by using the advantageous analysis tool - AMOS 20 Version of

Table 4. Standardized Regression Weighted Coefficients
Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
Usefulness	<---	Ease of Use	0.768	0.065	11.838	***	par_12
Attitude	<---	Innovativeness	0.204	0.044	4.671	***	par_13
Attitude	<---	Advantage	0.21	0.048	4.341	***	par_14
Attitude	<---	Compatibility	0.053	0.037	1.43	0.153	par_15
Attitude	<---	Entertainment	0.224	0.043	5.215	***	par_21
Attitude	<---	Ease of Use	0.821	0.114	7.193	***	par_22
Attitude	<---	Usefulness	-0.189	0.121	-1.56	0.119	par_32
Behavior	<---	Attitude	0.761	0.064	11.879	***	par_16
Behavior	<---	Usefulness	0.141	0.068	2.078	0.038	par_17

Table 5. Path value of each dimension and hypothesis testing of this research

Hypothesis	Variable Relationship	Path Coefficient	T Value	P Value	Test Result
H1	Perceived Usefulness → Behavioral Intention	0.168	2.078	0.038	Not Supported
H2	Perceived Ease of Use → Perceived Usefulness	0.853	11.838	***	Supported
H3	Perceived Usefulness → Use Attitude	-0.215	-1.56	0.119	Not Supported
H4	Perceived Ease of Use → Use Attitude	0.922	7.193	***	Supported
H5	Personal Innovativeness → Use Attitude	0.214	4.671	***	Supported
H6	Perceived Entertainment → Use Attitude	0.266	5.215	***	Supported
H7	Relative Advantage → Use Attitude	0.251	4.341	***	Supported
H8	Compatibility → Use Attitude	0.067	1.43	0.153	Not Supported
H9	Use Attitude → Behavioral Intention	0.792	11.879	***	Supported

combining the Factor Analysis (Confirmatory Factor Analysis) and Path Analysis to facilitate the path analysis and hypothesis testing.

After the Confirmatory Factor Analysis, the path analysis can be conducted from the relevant information output content, and from the execution results it can be learned that all the question's standardized regression weighted coefficients are not exceeding or too close to 1, as shown in **Table 4**; The variance of the measurement error is also positive, so it can be determined that the model does not violate the issues of estimation.

And, according to the standardized regression coefficients, the coefficient of the path and the CR value (Critical Ration value is the T value) can be found, which can be understood to show whether the hypotheses of this research can be established, as organized in **Table 4**.

Hypothesis Testing

Based on the results of the path analysis, this research has organized the path value of each dimension and hypothesis testing as shown in **Table 5**.

CONCLUSION

This research takes the existing Technology Acceptance Model, joined with the Diffusion of Innovation Theory, to conduct an empirical survey on exploring the key factors of users when using the micro-positioning services provided by the library, and obtain the following conclusions:

Influence on the "Use Attitude"

The research results show that library users can improve their performance using micro-positioning services, but there is not any positive feeling for the micro-positioning services, therefore, the positive influence on the "Use Attitude" is not established, as it is evident that the library users do not know how to improve the effectiveness of using the library resources through micro-positioning services.

In addition, the positive influence hypotheses of "Compatibility" and "Use Attitude" are not established either, as the literature shows the consistency of the new product value, past experience, and needs, as well as the product itself perceived by the users. In general, for higher compatibility of the new product, the chance of acceptance is higher. However, in the survey of this research, for the library users, the compatibility of using the computer-related information technology does not give them a positive influence on their attitude of using the micro-positioning services provided by the library, which may be due to the fact that the use of computers nowadays is a rather common ability already, even if there is newer information technology, the users have sufficient ability to operate it. Therefore, as shown in the result of this research, there is no positive influence relationship between "Compatibility" and "Use Attitude".

Other relevant hypotheses with "Use Attitude":

In terms of "Perceived Ease of Use", if the library users believe that the use of the library micro-location services is easy, and spend less time and effort in learning the use of this information technology, then the users' own "Use Attitude" will have a positive influence.

In terms of personal innovativeness, higher "Personal Innovativeness" of library users for new technology means more positive attitude for their "Use Attitude" to use information technology. If the library user is more interested in using the micro-location services, there will be a more positive feeling for the micro-location services provided by the library. The "Perceived Entertainment" of the users on information technology will have a positive influence in their "Use Attitude".

In terms of "Relative Advantage", when there is a higher "Relative Advantage" of individual perceived innovativeness, and a higher possibility of using innovativeness, the library users feel that the micro-positioning services provided by the library have a high economic interest, better image, convenience or satisfaction, etc., and the user feels that the "Relative Advantage" is proportional to the acceptance rate of the innovativeness.

Influence on "Behavioral Intention"

The result of this research shows that the "Perceived Usefulness" will not influence the users to improve their own use "Behavioral Intention" when using the micro-positioning services provided by the library, that is, "Perceived Usefulness" does not have a positive influence on "Behavioral Intention". This shows that library users believe the micro-positioning services provided by the library will help improve work efficiency and effectiveness, but will not influence their use "Behavioral Intention" or increase their "Use Intention".

In addition, in terms of the influence of "Use Attitude" on "Behavioral Intention", there is a higher degree of possibility of using the information technology when there is a more positive perception of the information technology when the users accomplished the action through information technology. Therefore, the result of this research also shows that when the users have a positive attitude on the micro-positioning services provided by the library, then their possibility of using the micro-positioning services provided by the library will be higher, that is, the "Use Attitude" of the users on information technology will have a positive influence on their own "Behavioral Intention".

The Influence of Perceived Ease of Use on Perceived Usefulness

The result of this research shows that when the users think that the micro-positioning services provided by the library are easy to use, then they consider the micro-positioning services provided by the library as a useful tool for them. Therefore, the library users will have a positive influence of the "Perceived Ease of Use" of the micro-positioning services on the "Perceived Usefulness" of the micro-positioning services. In other words, the library users do not need to spend too much effort in learning the needed information in order to use the library micro-positioning services, while the users can improve the performance of certain behaviors, the users will consider the micro-positioning services provided by the library is a useful tool.

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