

## **Intentions to Continue Using a Digital Mammography Vehicle Based on the Technology Acceptance Model and Expectation Confirmation Theory**

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### **Abstract**

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This study employs the technology acceptance model and expectation confirmation theory to investigate women's intentions to continue using a digital mammography vehicle (DMV) for breast health check-ups. It analyzes the statistical effects of the respondents' confirmation, perceived usefulness, perceived ease of use, and satisfaction on their intentions to continue use. Purposive sampling was employed to collect questionnaire survey data on women who had used a DMV primarily for a breast health check-up. Of 535 distributed questionnaires, 517 valid cases were analyzed for a response rate of 96.64%. Confirmation, perceived usefulness, perceived ease of use, and satisfaction all positively correlated with intent to continue using the DMV. The results of a multiple regression analysis reveal that the combined effects of confirmation, perceived usefulness, and satisfaction explained about 86% of the variation in the respondents' intent to continue using the DMV. These results serve as a vital reference for improving the quality of breast cancer prevention services and strategies in Taiwan and form a basis for related research, development, and programs.

### **Key words**

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digital mammography vehicle, expectation confirmation theory, continual use intent, satisfaction, technology acceptance model

## **Introduction**

Breast cancer ranks first in cancer incidence among Taiwanese women, and breast cancer deaths rank fourth among all diseases involving malignant tumors, which poses a significant threat to Taiwanese women's health. The standardized breast cancer incidence rate per 100,000 people in Taiwan increased from 40.01 in 1999 to 59.91 (from 4,540 to 8,926 people) in 2009. The standardized mortality rate per 100,000 people increased from 10.02

to 11.45 such that the number of deaths rose from 1,203 to 1,852 people (Health Promotion Administration, Ministry of Health and Welfare, Taiwan, ROC, 2015). Thus, breast cancer has become a major cause of mortality in Taiwan.

Healthy lives can be maintained through regular breast cancer screenings and examinations for early discovery and treatment of breast cancers, and mammography is a sensitive and precise breast cancer screening test. Breast cancers are detected through mammography with 85% to 90% accuracy, which are subsequently treated with a 90% success rate (Ho, Liu, Zhan, Shu, & Pan, 2010). When a cancer is detected early, total mastectomy might be avoided and patients might be able to preserve their appearances. Mammography frees women from the fear of breast cancer, facilitates early diagnosis, and improves effective breast cancer prevention (Donnelly & Hwang, 2015; Institute of Medicine and National Research Council, 2005).

However, although mammography is currently available in Taiwan, women seldom use it. Recently, Taiwan's Ministry of Health and Welfare (National Health Department) has actively invested in breast cancer prevention and healthcare resources to achieve widespread early detection for early treatment. However, breast radiographic equipment is not widespread across Taiwan's medical institutions, and those that have this equipment are concentrated in large metropolitan areas, which leads to low screening rates (Lin, 2014). Consequently, since November of 2009, the Health Promotion Administration of Taiwan's Ministry of Health and Welfare, Executive Yuan, has extended the reach of breast cancer screening services to increase convenient and affordable screening. The screenings employ digital mammography vehicles (DMV) that enable women to obtain examinations in their communities, which makes mammography readily accessible to women in remote areas by eliminating the need to travel to hospital. The DMV initiative is the most important milestone in Taiwan's breast cancer screening provision since the development of digital mobile mammography about two decades ago (Carkaci, Geiser, Adrada, Marques, & Whitman, 2013).

To date, Lin (2014) has conducted the only relevant study in Taiwan, which found that the average number of screenings increased 9.8 times per month after DMV was introduced (before = 104 people/month and after = 1017 people/month). Thus, DMV improved access to mammography for poor women and those in remote areas so that they could benefit from

preventive breast cancer screening. Previously, breast radiographic screening was performed in roving vehicles, with a rate of 7.6% positive results, and the women who tested positive for breast cancer and were admitted to hospital had a referral rate of 88%. After DMV introduction, the rate of positive results almost doubled (14%) and the referral rate decreased to 52.8% (Lin, 2014).

The current study investigated women's feedback about DMV services based on their personal use experiences and in light of the previous research findings. We argued that significant benefits of DMV to women's health are achieved when adoption rates reach a critical mass and experienced users intend to continue their use, which is likely to have strong and positive word-of-mouth effects on the widespread use of DMV.

The technology acceptance model (TAM) proposed by Davis (1989) argues that people's use behaviors are determined by their behavioral intentions, which are, in turn, based on attitudes toward use and the perceived usefulness of such behaviors. Davis (1989) argued that the two fundamental factors that influence intentions to use new technology are perceived usefulness and perceived ease of use (Bhattacharjee, 2001). Perceived usefulness is the extent of improvement in user performance that a user believes a technology is capable of producing. In other words, users would have positive attitudes toward using a technology when they believed that the technology is relatively useful. Perceived ease of use is the extent to which users report that using the technology is easy in that the physical or mental effort involved negatively relates to its acceptance. The TAM has been the theoretical basis for models in many empirical studies on technology acceptance behaviors and has accumulated abundant empirical support. The TAM has many advantages, such as parsimony, clear dimensions, an effective theoretical foundation, and substantial empirical support.

Oliver (1980) developed the expectation confirmation theory (ECT) as an extension of cognitive asymmetric theory, and it has been widely applied in the marketing field regarding customer satisfaction and intention to repeatedly purchase products (Hu, Chau, Sheng, & Tam, 1999; Tsai & Huang, 2007). This theory comprises constructs, such as expectations before use, perceived effectiveness, confirmation, satisfaction, and intentions to continue use.

Oliver (1980) argued that satisfaction is the major direct influence on continued use of a product or object. Satisfaction in this context has two

stages. The first stage is confirmation induced by a comparison of expectations before use to perceived effectiveness after use. The second stage is when expectation before use and uncertainty jointly influence satisfaction. In other words, satisfaction influences users' reuse or continued use of something. Satisfaction is positively correlated with reuse of or intent to continue using something. ECT has been widely used to explain consumer or user satisfaction and continued use (Dabholkar, Shepherd, & Thorpe, 2000; Oliver, 1980; Wan, Li, Huang, & Fang, 2008).

Previous studies on user acceptance behaviors toward new technologies have tended to rely on the TAM (Davis, 1989) to analyze users' behavioral intentions toward accessing information systems. User acceptance of new technologies has been influenced by two key intermediary factors: perceived usefulness and perceived ease of use. However, Bhattacharjee (2001) proposed that the ECT (Oliver, 1980) is primarily employed for user intentions to continue using information systems and suggested that beliefs before use (perceived usefulness) and expectation value jointly influence confirmation by influencing satisfaction and behavior related to the intention to continue use.

It follows that a user's confirmation could be interpreted as the extent of that user's expectation of acceptance of what a technology provides or performs. In sum, confirmation (expectation before use) and intention to continue use are not considered when behavioral intention is investigated under the TAM. On the other hand, the ECT (Oliver, 1980) asserts that confirmation directly influences user satisfaction with a technology, which, in turn, influences behavior related to the intention to continue its use. However, the ECT concerns only the direct effect of confirmation on satisfaction, ignoring the possible effects of intermediary factors. Therefore, this study combined the TAM and ECT to investigate the extent of user acceptance of the DMV and analyze how satisfaction influences user intention to continue using it. The conceptual framework (Figure 1) was developed to reflect the study's goal using a review of the relevant literature to develop the following six hypotheses.

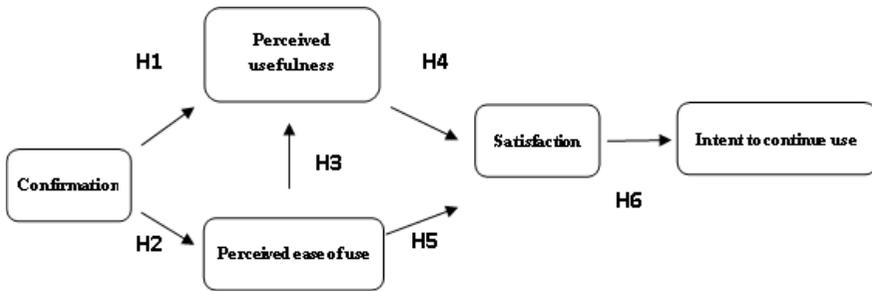


Figure 1. Conceptual framework

### Hypothesis 1 (H1)

Bhattacharjee (2001) used cognitive dissonance theory to hypothesize that user confirmation positively influenced perceived usefulness, which was confirmed. Therefore, we hypothesized that user confirmation positively relates to perceived usefulness.

### Hypothesis 2 (H2)

Bhattacharjee (2001) also used cognitive dissonance theory to explain the relationship between user confirmation and perceived usefulness, arguing that, when consumers have two cognitive dimensions regarding products (i.e., expected and actual performance), and these two dimensions are inconsistent, asymmetry immediately results. Consumers respond by adjusting their original expectations to match actual performance to achieve a consistent cognitive perception. A positive confirmation is generated when actual performance exceeds expected performance, and a consumer responds by increasing his or her expectation of performance to obtain a consistent cognition, which aligns with Oliver (1980). Therefore, we hypothesized that user confirmation positively influences perceived ease of use.

### Hypothesis 3 (H3)

Davis (1989) defined that the perceived ease of use as one thinks that no extent of effort was spent when using a system. In this context, effort is a limited resource allocated to individuals' various activities. When all conditions are similar, users tend to accept a technology that they perceive

as easy to use (i.e., involves the least amount of effort). Then, users allocate their efforts among their activities, which enables them to perform more activities with the same amount of effort. Thus, a low-effort technology might improve individuals' overall performance, meaning that perceived ease of use positively influences perceived usefulness (Bhattacharjee, 2001). We therefore derived the hypothesis that perceived ease of use positively influences perceived usefulness.

#### **Hypothesis 4 (H4)**

Bhattacharjee (2001) employed perceived usefulness in an ECT (Oliver, 1980) study and found that satisfaction increased as perceived usefulness increased. Wan et al. (2008) later found that, when users perceived that using a technology was beneficial, their satisfaction and intentions to continue use increased. Perceived usefulness had the strongest influence on satisfaction. Based on these results, we hypothesized that perceived usefulness positively influences satisfaction.

#### **Hypothesis 5 (H5)**

Doll and Torkzadeh (1988) and Lin (2007) found that perceived ease of use positively influenced user satisfaction, and we therefore hypothesized that perceived ease of use positively relates to user satisfaction.

#### **Hypothesis 6 (H6)**

The ECT (Oliver, 1980) proposes that user satisfaction with a system directly influences user intentions to continue using that system. Bhattacharjee (2001) confirmed that satisfaction was the most accurate predictor of continued use. Based on ECT and the previous study, we hypothesized that user satisfaction positively influences user intentions to continue use.

## **Methods**

### **Sample and Data Collection**

This cross-sectional study used purposive sampling to collect data on

women aged 45 to 69 years old in Hualien County who had used the DMV. A structured in-person survey was conducted by trained interviewers at activity centers in townships and villages throughout Hualien County where the DMV had provided services arranged by the Hualien County Health Bureau. Data were collected between February of 2014 and October of 2015. The trained interviewers described and explained the statements and questions to respondents who had difficulty with the questionnaire. Altogether, 535 questionnaires were collected, 18 were deemed invalid due to insufficient data, and 517 valid questionnaires were used in the quantitative analysis, yielding a response rate of 96.64%.

### Questionnaire

The questionnaire was developed based on a review of the relevant previous literature employed by this study. To confirm the instrument's validity, five experts in public health and healthcare administration reviewed and adapted the statements and questions based on the importance of the content, clarity of the questions and statements, and the items' suitability. The content validity index (CVI) was used to compute the experts' validity scores, which were as follows: 0.90 on importance, 0.89 on clarity, and 0.88 on suitability. The overall CVI score was 0.89, indicating satisfactory validity. Reliability analyses were performed to ensure consistent measurement of the constructs. The overall Cronbach's alpha ( $\alpha$ ) of the questionnaire was 0.910, and those of the individual constructs ranged from 0.776 to 0.832, indicating that each construct evidenced a high level of internal consistency.

The response options on the statements were structured as five-point Likert-type scales, except for those on the personal characteristics. High scores indicated more agreement with the statements, such that 1 = *strongly disagree* through 5 = *strongly agree*.

### Variables

**Intent to continue use.** The intention of a woman in the study to continue using the DMV services was defined as the extent of continued use after receiving a mammogram service in a digital mammography vehicle. The three items in the construct were derived from Lin (2007): 1) I will

use the mammography inspection service in a digital mammography vehicle on a regular basis, 2) I will recommend friends and relatives to receive mammography inspection services in a digital mammography vehicle, and 3) If necessary, I will use a digital mammography vehicle the next time I receive a mammogram. Cronbach's  $\alpha$  was 0.832.

**Confirmation.** Following ECT, this construct was defined as the expected extent of acceptance of performance of the DMV services. Three statements were developed based on Wan et al. (2008) and Lin (2007): 1) The experience of using a digital mammography vehicle service was better than I expected, 2) The services provided by the digital mammography vehicle exceeded my original expectations, and 3) The use of a digital mammography vehicle service helped me a lot. The construct's internal reliability was Cronbach's  $\alpha = 0.776$ .

**Perceived usefulness.** The perceived usefulness construct was defined as users' expectations of using a DMV service that brings satisfaction to their health. Four statements were adapted from Pu (2007) and He (2008): 1) I think it is necessary to have a mammogram examination, 2) The use of mammography in a digital mammography vehicle will increase my willingness to receive breast inspection, 3) Mammography can provide me with information about breast examinations, and 4) Regular mammography can help me understand the condition of my body. Cronbach's  $\alpha$  was 0.829.

**Perceived ease of use.** The perceived ease of use construct was defined as the extent of ease that users expect from using DMV service. The three statements used to measure it were: 1) The mammogram inspection process in the digital mammography vehicle is clear and easy to understand, 2) I think mammography is more accurate than other breast examinations, and 3) The digital mammography vehicle service is more convenient than other breast examinations. Cronbach's  $\alpha$  was 0.821.

**Satisfaction.** Satisfaction was defined as the extent of positive or negative feelings toward a service after one has experienced it. The following 11 items were adapted from He (2008) and Tsai (2008): 1) The mammogram inspection equipment in the digital mammography vehicle seems very clean, 2) The mammogram inspection equipment in the digital mammography vehicle is up-to-date, 3) I understand that mammography does not increase the risk of exposure to radiation, 4) The radiologist had a kind attitude, 5) The radiologist specified the inspection procedures and provided guidance, 6) I felt safe and trusted the radiologist during the inspection process,

7) The radiologist is required to provide detailed information on health education, 8) I think the premises were inspected for cleanliness, 9) I think it is good to wait and have a checkup in a digital mammography vehicle, 10) I am satisfied with the overall service provided by a digital mammography vehicle, and 11) I did not feel uncomfortable after receiving a mammogram. Cronbach's  $\alpha$  was 0.830.

**Personal characteristics.** There were seven demographic questions regarding age, marital status, ethnicity, educational attainment, occupation, number of children, and presence of amenorrhea.

### Statistical Methods

The data were coded, entered into the SPSS (version 22.0) statistical package, and descriptive and inferential statistics were generated to describe the distributions of personal characteristics and the other variables using counts, percentages, means, and standard deviations. Correlations between intent to continue use and confirmation, perceived usefulness, perceived ease of use, and satisfaction were computed using a Pearson product-moment correlation analysis. The effects of confirmation, perceived usefulness, perceived ease of use, and satisfaction on intent to continue use were assessed using multiple regression analysis.

## Results

### Descriptive Statistics

Regarding age, respondents aged 50 to 54 years and 55 to 59 years formed the majority, accounting for 22.4% ( $n = 116$ ) respectively of the sample, followed by those aged 45 to 49 years (21.5%,  $n = 111$ ), 60-64 years (18.4%,  $n = 95$ ) and 65-69 years (15.3%,  $n = 79$ ). Married women accounted for most of the sample (93.2%,  $n = 482$ ), followed by widows (3.7%,  $n = 19$ ), divorced (1.93%,  $n = 10$ ) and unmarried (1.16%,  $n = 6$ ). Regarding ethnicity, the sample mostly was Fujianese (41.8%,  $n = 216$ ) and Hakka (35.8%,  $n = 185$ ), Aboriginal (14.7%,  $n = 76$ ), and other provinces (6.8%,  $n = 35$ ) and others (1%,  $n = 5$ ). About one-half of the sample (50.9%,  $n = 263$ ) had completed elementary school or less and 23.4% ( $n = 121$ ) had completed junior high school, Senior high school (17.6%,  $n =$

91), college or university (7.1%,  $n = 37$ ) and institute (1%,  $n = 5$ ). More than one-half of the sample was unemployed homemakers (54%,  $n = 279$ ), followed by service industry workers (25.7%,  $n = 133$ ), farmers or freelancers (both 6%,  $n = 31$ ), businessmen (4.06%,  $n = 21$ ), Military, public and teaching staff (2.9%,  $n = 15$ ), others (1.35%,  $n = 7$ ). Women with two children accounted for 46.2% ( $n = 239$ ), followed by those with three children (29.2%,  $n = 151$ ), four children (13.5%,  $n = 70$ ), one child (6.8%,  $n = 35$ ), five children (including above) (3.1%,  $n = 16$ ) and no children (1.16%,  $n = 6$ ). Most of the respondents reported amenorrhea (78.9%,  $n = 408$ ), Not yet suspended accounting for 19% ( $n = 98$ ), not sure whether the menopause is 2.1% ( $n = 11$ ).

Overall, the respondents were satisfied with their DMV experiences (mean score was 3.96 on the five-point scale). The mean confirmation score was 3.92, perceived usefulness was 3.97, perceived ease of use was 4.02, and intent to continue use was 3.95.

## Inferential Results

The Pearson correlation analytical results found significant positive correlations of confirmation with perceived usefulness ( $r = 0.657^{***}$ ,  $p < .001$ ) and perceived ease of use ( $r = 0.480^{***}$ ), of perceived ease of use with perceived usefulness ( $r = 0.625^{***}$ ) and satisfaction ( $r = 0.414^{***}$ ), and of perceived usefulness with satisfaction ( $r = 0.424^{***}$ ). Satisfaction and intent to continue use also were significantly and positively correlated ( $r = 0.450^{***}$ ) (Table 1).

**Table 1.**  
*Correlation Results of Relationships between Confirmation, Perceived Usefulness, Perceived Ease of Use, and Satisfaction and Intent to Continue Use*

Variable	Intent to continue use	Satisfaction	Perceived ease of use	Perceived usefulness
Satisfaction	.450 <sup>***</sup>			
Perceived ease of use	.368 <sup>**</sup>	.414 <sup>***</sup>		
Perceived usefulness	.529 <sup>**</sup>	.424 <sup>***</sup>	.625 <sup>***</sup>	
Confirmation	.603 <sup>**</sup>	.462 <sup>**</sup>	.480 <sup>***</sup>	.657 <sup>***</sup>

\*\* =  $p < .01$ , \*\*\* =  $p < .001$

Utilizing multiple linear regression to analyze the interactive effects of confirmation, perceived usefulness, perceived ease of use, and satisfaction on intent to continue use leads to three different path analysis results (Table 2). Model 1 (without perceived ease of use) yielded .86 in  $R^2$  ( $F = 1047.489$ ,  $p < .001$ ), Model 2 included perceived ease of use and omitted perceived usefulness ( $R^2 = .86$ ,  $F = 1003.617$ ,  $p < .001$ ), and Model 3, which included all of the variables, produced .86 in  $R^2$  ( $F = 1033.351$ ,  $p < .001$ ). In Model 3, perceived ease of use lost statistical significance, and, therefore, the net effects of confirmation, perceived usefulness, and satisfaction were significant predictors of the intent to continue using the DMV service. Based on these findings, H1 through H6 were supported.

**Table 2.**

*Multiple Linear Regression Analysis of Confirmation, Perceived Usefulness, Perceived Ease of Use, and Satisfaction vs. Intent of Continual Use*

Variable	Model 1	Model 2	Model 3
	Beta	Beta	Beta
Confirmation	.299***	.411***	.295***
Perceived usefulness	.322***		.281***
Perceived ease of use		.183***	.056
Satisfaction	.344***	.373***	.335***
F	1047.489***	1003.617***	1033.351***
$R^2$	.860	.855	.859
Adj $R^2$	.859	.854	.858

\*\*\* =  $p < .001$

## Discussion

The study revealed the interactive effect among variables of confirmation, perceived usefulness, perceived ease of use, and satisfaction resulting in the increasing intent of use is positive correlated (Doll & Torkzadeh, 1988; Hu et al., 1999; Lee, 2010; Liao 2003; Liao, Chen, & Yen, 2007; Lin, 2007; Oliver, 1980, 1993; Premkumar & Bhattacharjee, 2007; Roca, Chiu, & Martinez 2006; Thong, Hong, & Tam, 2006; Wan et al., 2008; Wang & Fang, 2010). Such result sheds some light on how to define and promote a practical use of DMV service while making the policy and educating the

general publics.

Several scholars have used the TAM to explore behaviors regarding new technologies, but few studies have focused on technology-based healthcare services. Moreover, the TAM has not been employed to explore continued use after a service is first used. Therefore, a focus on user acceptance of and intention to continue to use technological healthcare services is crucial.

The TAM addresses perceived usefulness and ease of use of a service or product. In this study, the TAM was applied to assess use of a technological medical service, and ECT was employed to investigate intentions to continue such use. ECT has been used in studies of medical technology as a reference for the managers of such services. In this study, the TAM and ECT were integrated, and their utility was verified through the analysis of correlations of confirmation, perceived usefulness, perceived ease of use, and satisfaction with women's intentions to continue using mammography provided by DMV services.

The results found that women's expectations of the DMV were based on confirmation and perceived usefulness. Also, women's expectations shown in the results and attitudes towards to the accuracy of the DMV for detecting breast cancer (see Lin, 2014) were consistent with the previous experience and confirmation of using the service provided by DMV. Thus, to increase the effectiveness and satisfaction of DMV service, the healthcare authorities should first offer the results and positive feedbacks from the past users who perceived the usefulness and ease of use via the public media to disseminate the practical use of DMV.

Because confirmation was positively correlated with perceived ease of use, increasing women's confirmation also might increase their perceptions that the DMV service is easy to use. The expectations about the DMV among the women in this study might have created a gap between expectations and experience after they experienced the DMV. However, if confirmation were increased, users' expectations might be more consistent with their experiences and subsequently, it implicated the ease of use of the DMV service. This study found that confirmation positively influenced perceived ease of use. Based on these findings, health authorities should provide more mammography services to women at medical facilities to enable women to develop expectations consistent with their experiences. If this consistency was established, confirmation might increase, which might increase women's perceived ease of use.

Furthermore, this study confirmed the TAM's proposition that perceived ease of use significantly and positively influences perceived usefulness, which implies that perceived usefulness could be enhanced by increasing perceived ease of use. Thus, efforts to improve the perceived ease of use of the DMV might increase women's perceived usefulness and actual use. Thus, it is not surprising that this study found that perceived ease of use and usefulness were significantly and positively related to satisfaction with the DMV. This result suggests that, when women perceive that the DMV is highly practical and convenient, they are highly satisfied. Thus, the functionality and convenience of the DMV are crucial factors to its utility. Health authorities could use the Internet and other media to communicate with women to help them recognize the practicality and convenience of the DMV service, which might increase their use of the service and their satisfaction with it. Indeed, these findings verified a significant positive correlation between satisfaction and intent to continue use. If medical staff were to positively impress women when providing DMV services, their intent to continue using the DMV service might increase.

Although not as powerful as satisfaction, confirmation and perceived usefulness were strong influences on women's intent to continue using the DMV (Table 2). To increase women's intentions to continue using the DMV service, providing useful information about their bodies and health (components of the perceived usefulness construct) were important to the women's future intentions. The multiple regression analysis also found that perceived ease of use was not a significant predictor of intent to continue use in the model (Table 2, Model 3).

## Conclusion

This study contributes to women's studies because of its focus on women's medical issues, including their full knowledge of healthcare and health promotion; reducing the social control of medical authorities; decreasing healthcare discrimination based on age, social status, race, and sex; the right to self-determination regarding healthcare; the right to information and patient-friendly healthcare; a focus on more than technology and equipment; and the promotion of physical and mental health improvements. The government of Taiwan has focused on women's health education, increased participation, and emphasizes the sharing, dissemination, and promotion of

relevant information to women to address these concerns of healthcare policy. Taiwan's Ministry of Health and Welfare has emphasized that the principles of women's health promotion, health protection, and disease prevention should involve strategies and actions that are appropriate to women's specific needs (Chiou, 2014).

The results of this study imply that including women's confirmation feedback and use experiences regarding DMV services would be useful for promoting the services. For example, using with this new state-of-the-art DMV, women will be able to walk onto a medical screening vehicle and have a professional checkup at a convenient location and the use of DMV's services is free, and they offer a high quality from which all women in rural or remote areas could benefit in promotional messages might increase the adoption rate and continued use. Regarding negative perceptions of DMV services, more efforts should focus on specific system improvements to improve and sustain women's good impressions of DMV services.

Some of the scores found in this study suggest that it is necessary to promote women's confirmation of mammography. Breast health check-ups are likely to become more convenient and accessible through DMV services. Thus, to improve perceived effectiveness of DMV services, we suggest a reduction in waiting time. Most of the respondents in this study reported that they waited between 16 and 20 minutes, on average, to be screened. For example, although qualitative data were not included for analysis of this study they told the interviewers, "It takes too much time to merely complete this check-up even [though it is] very convenient to come here," "We cannot stay too long because there are things necessary to take care of at home," and "I feel there is nothing to do but wait as though we have enough free time to be here." If breast health screening were combined with other health tests, women could have other examinations while they wait, which might reduce the annoyance and inconvenience of long wait times.

Another important change would be to ensure that the technology always correctly functions. Some of the respondents reported that they had to reschedule their appointments because the machines had broken during their examinations: "It was so scary when the machine shut down and I was asked to leave and wait outside for awhile," "I think it is unpleasant to be asked to repeat some acts several times, like adjusting my breast on the platform or holding my breath," and "At the end, I was told to come

[back] another time because of equipment breakdown. So time [was] wasted.” Therefore, regular equipment maintenance should be performed to guarantee that the DMVs are in good working order.

This study had some limitations that offer suggestions for follow-up studies. First, because the sample was of women who had used a DMV in Hualien County, and their data were collected using questionnaires, the results might not be generalizable to other areas. Surveys should be conducted in more districts for comparisons and reliable conclusions. Second, the questionnaire was designed to reflect the propositions of certain theories and the results of previous studies, which aimed to enhance the comprehensiveness of the questionnaire and the explanatory power to the analytical results. However, this approach might be difficult for the comprehension of some respondents. To help respondents to understand the questionnaire, the statement and question wording of the items should be modified to fit the respondents’ characteristics.

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