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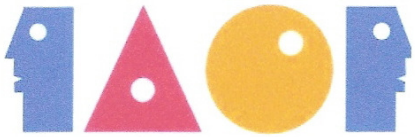

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UTILIZATION OF CLOUD COMPUTING APP FOR HOMESTAY OPERATION – DESIGN AND ANALYSIS

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Abstract

A cloud computing APP for homestay operators of Taiwan has been designed by the study. The prevalent DeLone & McLean information system (IS) success model was used as foundations to the five measures of IS success model based by the study. Seven hypotheses were proposed relating to each of the five measures, "system quality", "information quality", "intention to use", "user satisfaction", and "net benefits". A questionnaire consisted of 26 items was used to grade each of the five measures of the constructed cloud computing APP. Respondents of the internet survey indicated that they were more satisfied with "system quality" and "information quality" of the constructed APP. Although still satisfied with the APP, "user satisfaction" received the lowest mean score, at 3.81 out of the five-point Likert scale. Of the proposed hypotheses, three statistically validated hypotheses are: "information quality positively affects intention to use"; "system quality positively affects user satisfaction"; and "information quality positively affects user satisfaction".

Keywords: cloud computing, homestay, IS success model, service APP

Introduction

Ever since the implementation of full off-days on Saturdays, the policy of two off-days per week has contributed to the growth of tourism/hospitality related businesses. With more people seeking leisure and/or recreational opportunities away from home during weekends, the demand of lodging varieties has increased as well. Diverse populations from Hakka and aborigines make organizational network of culture tourism realizable in rural areas

(Saeng-Ngam et al., 2009). A unique industry in Taiwan, called "min-shu" in Mandarin, offers guest stays in rural areas where tourists have more opportunities to experience the natural and local gusto. The term "min-shu" came from the Japanese-style bed and breakfast (B&B), "minshuku", which is the equivalent of "home stay" or "hostel" in America or "B&B" in Britain. Generally, homestay enhances tourism facilities in a country for ecotourism, rural tourism, and cultural tourism that may not be solved through traditional means of accommodation such as hotel, motel, lodging, and camping (Bhuiyan et al., 2013). Unlike typical hotels, homestay is frequently family oriented with limited manpower. With advanced wireless technology, the study seeks to shorten the lacked manpower by designing a cloud computing platform of information technology (IT) for homestay operation.

Cloud computing is internet protocol (IP) based high development and integration of computer technology. In general, cloud computing is broadly divided into three categories: Infrastructure-as-a- Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS). Cloud computing may also be divided into five layers including "client", "application", "platform", "infrastructure", and "server" to look more reasonable and clearer than the three categories. Human – computer interaction is an important criterion of a successful "application", as well as ease use user experience characteristic (Gong et al., 2010).

The popular APP is the short of "application" which is a type of software in smart phones used by many in their everyday life. Unfortunately, the current operation system (OS) is not uniform across all smart phones. It is similar to the non-compatibility between Microsoft Windows and Apples where the App in Yahoo can not be installed and used in Apple's *i*OS unless compatible *i*OS is developed in Mac. Mobil phones work the same way as in computers where compatible APP developed may be used across all smart phones.

The study seeks to design a cloud computing APP in smart phones for homestay operation. The cloud computing APP is a concept of distributed computing model where dynamic services may be provided to users of the APP from sent data via virtual computing support. The APP would bring convenience to both consumers and homestay businesses. Survey would be used as basis of evaluation, conclusion, and recommendation. The objectives of this study are summarized as follows. (1) To construct a cloud computing APP for homestay businesses. (2) Designed graphics are user-friendly for easier operation. (3) Established APP shortens the communicating distance via faster data transfer. (4) Faster transfer of information reduces consumers' waiting time. (5) Competitiveness of homestay businesses is enhanced by the constructed cloud computing APP.

Literature Review

Although Vaquero et al. (2009) had listed 22 definitions and provided comprehensive analysis of cloud computing characteristics, the term "cloud computing" may have been inspired by the cloud image often used to represent internet flowcharts or diagrams. It is a large pool of virtualized resources that are ease to use while enabling on-demand network access to a shared pool

of computing resources that is fully managed by the provider. As an example, Chieu et al. (2010) had previously designed and implemented a cloud-based demand driven business analytic solution of platform for cross enterprise improvements. Also, studies had identified 10 characteristics of cloud computing: "user friendliness", "virtualization", "internet centric", "variety of resources", "automatic adaptation", "scalability", "resource optimization", "pay per use", "service SLAs (service-level agreements)", and "infrastructure SLAs" (Buyya et al., 2009; Geelan, 2008).

Based on the information "influence" theory of Mason (1978), DeLone and McLean (1992) proposed Information Systems (IS) Success Model for measuring the complex-dependent variable in IS research. As shown in Figure 1, there are six aspects in the DeLone & McLean IS Success Model in which "system quality" and "information quality" influence "use" and "user satisfaction" of the information system. Not only do "use" and "user satisfaction" mutually influence each other, they also influences "individual impact" and sequentially the "organizational impact". Later, Pit et al. (1995) and Myers et al. (1997) proposed an additional aspect, the "service quality", in addition to "system quality" and "information quality" of the DeLone & McLean IS Success Model. Then, Seddon (1997) proposed an additional measure, the "society" in addition to "individuals" and "organizations" in IS use, which may have served as a precursor to the Updated IS Success Model by DeLone and McLean (2003). There were three major modifications to the DeLone and McLean Updated IS Success Model. First, "service quality" was added to "system quality" and "information quality". Second, the aspect of "Use" was defined more specifically to "intention to use" and "use". Finally, "net benefits" replaced "individual impact" and "organizational impact" for the inclusion of "society impact", as shown in Figure 2.

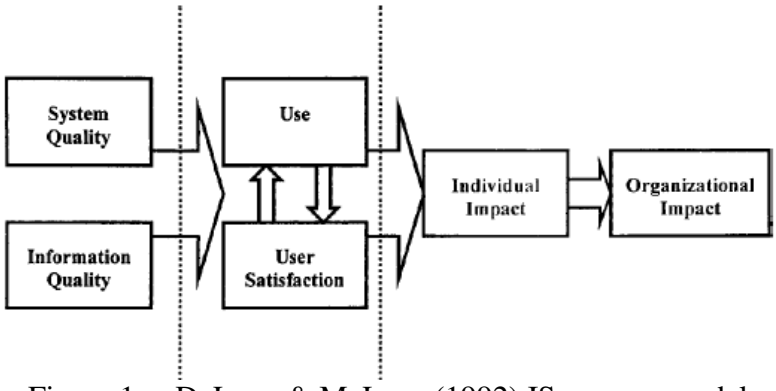

Figure 1. DeLone & McLean (1992) IS success model

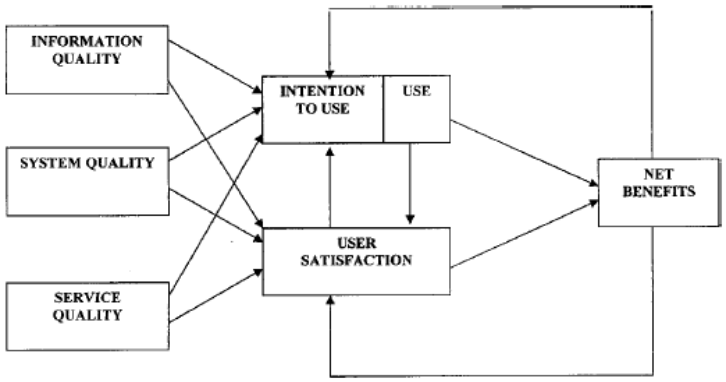

Figure 2. Updated DeLone & McLean (2003) IS success model

Methodology

From literature review, the study constructed the following hypotheses regarding cloud computing APP system for homestay operators of Taiwan.

H1: System quality positively affects intention to use.
H2: Information quality positively affects intention to use.
H3: System quality positively affects user satisfaction.
H4: Information quality positively affects user satisfaction.
H5: User satisfaction positively affects intention to use.
H6: Intention to use positively affects net benefits.
H7: User satisfaction positively affects net benefits.

The construct was derived from the DeLone & McLean (2003) updated IS success model, as shown in Figure 3. Since survey would be taken on respondents who had just experienced cloud computing APP system for homestay operators, exclusion of "service quality" takes place because it is not applicable for the study. "Service quality" applies more toward long haul maintenance of the cloud computing APP system. From the hypotheses, a questionnaire was developed which consists 26 items concerning operation of cloud computing APP for homestay businesses of Taiwan. Then, subsequent survey and data analysis would follow.

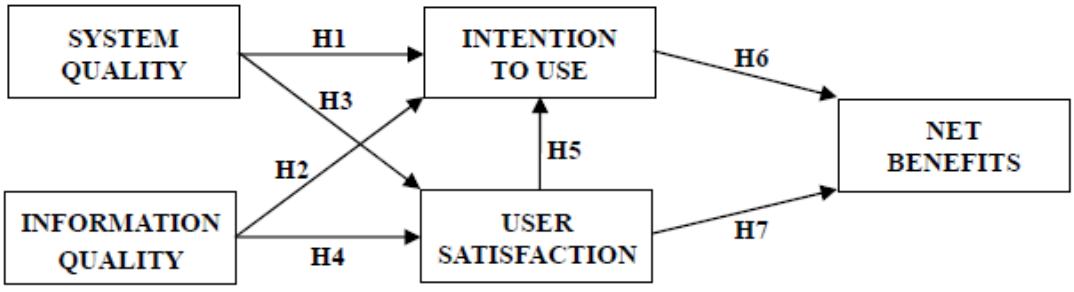

Figure 3. Research construct of cloud computing APP for homestay operation

The research team developed a cloud computing APP for homestay ("min-shu") operators of Taiwan. Primarily, the developed APP provides services to consumers and bridges communication between travel agencies and homestay businesses. As shown in Figure 4, potential consumers may use their smart phones or tablet computer (e.g. *i*Pad, Android devices) to choose a prospective homestay that fits their needs. Then, the established 3G web connects to the prospective homestay cloud computing APP environment, followed by security mechanism (i.e. certification). Data from consumers' inputs are sent to cloud computing (IaaS, PaaS, and SaaS) which redirects to the service platform of the prospective homestay. In turn, consumers see information of the prospective homestay on their smart phone or tablet computer which saves time and effective integration of travel agencies and homestay businesses. Finally, functions of the APP developed by the study for remote booking of homestay are shown in Figure 5.

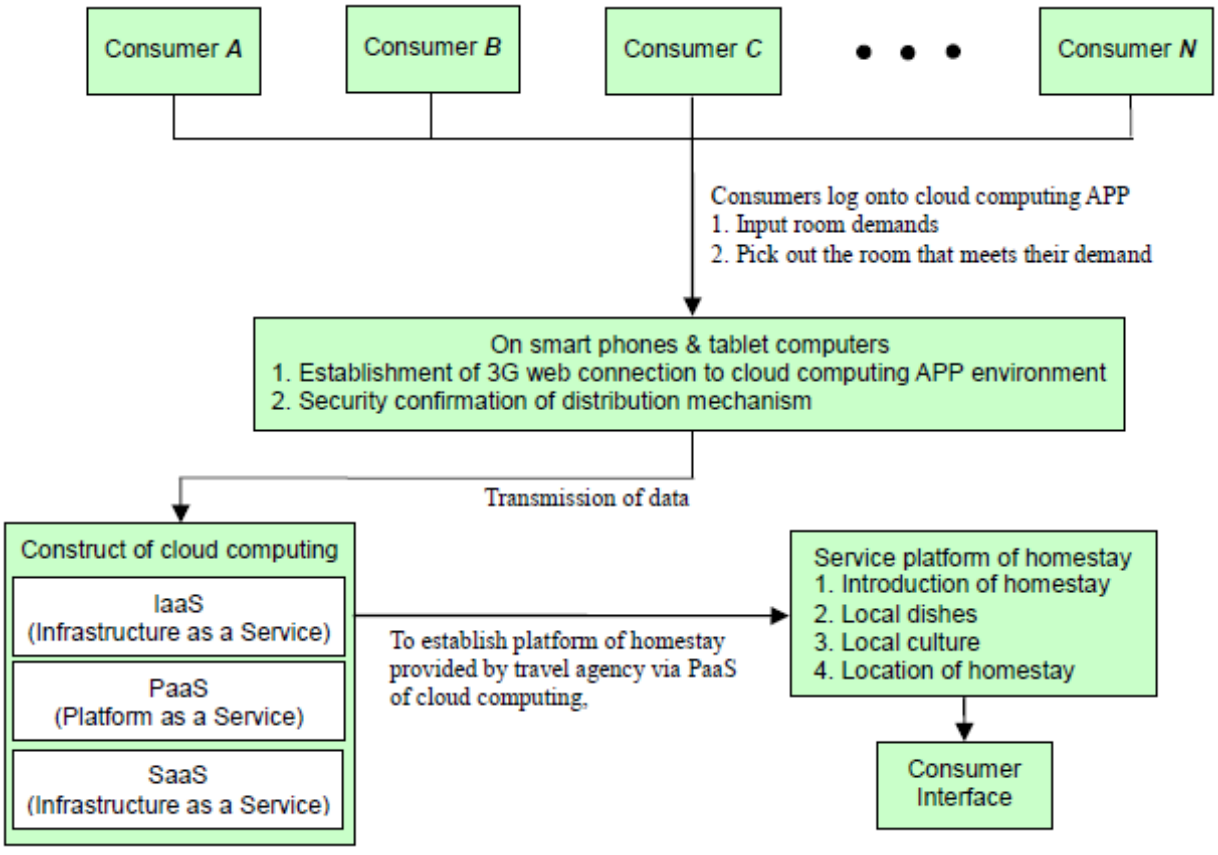

Figure 4. Construct of the APP on homestay operation

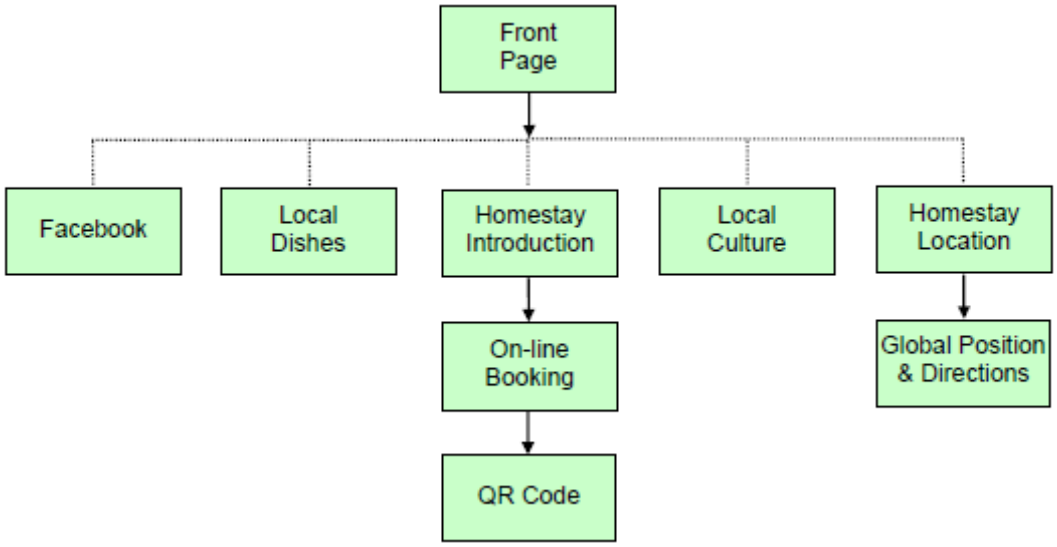

Figure 5. APP functions of homestay remote booking

The Internet survey was taken on 127 consumers who had used the APP platform services of http://www. cmore-map.com.tw/. There were five constructs in the questionnaire which included a total of 26 items under "system quality", "information quality", "intend to use", "user satisfaction", and "net benefits". Each item was rated on a five-point Likert-type scale, 1 = strongly disagree, 2 = tend to disagree, 3 = neutral, 4 = tend to agree, and 5 = strongly agree. Items relating to gender, age, occupation, education level, and income level were included for analysis of respondents' demographic characteristics. Items relating to behavior characteristics of respondents were also included.

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Results and Discussions

As shown in Table 1, 52.0% of the respondents were female while male represented 48.0% of the population. By age, majority of the respondents were in the age group of "under 25" and "26 – 30 years old", represented by 33.9% and 31.5% respectively. By occupation, majority of the respondents were students (37.8%), followed by service workers (24.4%). By education, a heavy majority of the population had earned a college degree, at 66.9%. By monthly income, majority of respondents were earning less than NT$20,000 (42.5%), followed by "NT$30,000–40,000" (36.2%) and "NT$20,000–30,000" (13.4%).

Table 1. Demographic characteristics of the respondents

Demographic characteristic	Number of respondents	Percentage
Gender		
Male	61	48.0
Female	66	52.0
Age		
25 or under	48	33.9
26 – 30	48	31.5
31 – 35	19	12.6
36 – 40	17	11.8
41 – 50	9	5.5
Over 50	9	4.7
Occupation		
Professional / Technical	25	19.7
Blue collar	19	15.0
Service worker	31	24.4
Student	48	37.8
Others	4	3.1
Education		
Junior high school or less	8	6.3
High school	23	18.1
College	85	66.9
Post graduate	11	8.7
Monthly income		
Less than NT$20K	54	42.5
NT$20K – 30K	17	13.4
NT$30K – 40K	46	36.2
NT$40K – 50K	8	6.3
More than NT$50K	2	1.6

As shown in Table 2, majority of the respondents were experienced visitors to a homestay in which 63.8% had more than three times of stay. Also in the majority was how respondents received information about the homestay where 71.7% of the sample indicated that they received the information from friends and/or relatives. Most traveling parties to a homestay had three to five people (70.1% of the sample). Hiking was found to be the most frequent leisure activity while staying at a homestay, by 55.1% of the respondents. Majority of the respondents indicated that they were willing to revisit the homestay they had stayed (59.8% of the sample). The top reason that respondents refuse to revisit a particular homestay is the lack of views and uniqueness offered by the homestay (62.2% of respondents).

Table 2. Behavior characteristics of the respondents

Behavior Characteristic	Sample	Percentage
How many times have you stayed in a homestay?		
Once	5	3.9
Twice	16	12.6
3 times	25	19.7
More than 3 times	81	63.8
How did you receive information about the homestay?		
Large events	5	3.9
Travel agency	8	6.3
Travel handbook	4	3.1
Internet	19	15.0
Friends / relatives	91	71.7
What is the number of party in your travel group?		
2 or less	8	6.3
3 – 5	89	70.1
5 – 10	25	19.7
More than 10	5	3.9
What type of leisure activities do you participate in a homestay?		
Hiking	70	55.1
Cycling	25	19.7
Fishing	11	8.7
Others	21	16.5
Will you pay a repeat visit to the homestay?		
Yes	76	59.8
Maybe	48	37.8
No	3	2.4
The reason you refuse revisiting a homestay is:		
Too crowded	3	2.4
Bad service	4	3.1
Lack of attractiveness	25	19.7
Old facility	16	12.6
Lack of views and uniqueness	79	62.2

As shown in Table 3, results of the satisfaction analysis were proven reliable by the Cronbach's alpha (> .70). In the six measures of "System Quality", highest mean was found in "easy to operate" (4.46), followed by "capability to handle multiple tasks" (4.44) and "operation stability" (4.32). There were also six items in "Information Quality" in which the highest mean was found in "easy to understand" (4.47), followed by "tits my personal needs" (4.45), "accurate" (4.43), and "up-to-date" (4.40).

There were five items in "Intention to Use" in which the highest mean was found in "intend to use repeatedly" (4.38), followed by "intend to recommend to others" (4.27)" and "intend to spend more time" (4.26). Of the four items under "User Satisfaction", "satisfied with the web interface" and "satisfied with the menu truthfulness" received the highest means, at 3.85 and 3.84 respectively. Finally, there were five items in "Net Benefits" in which the highest mean was found in "saves planning time" (4.56), followed by "saves communicating time' (4.38) and "knowledge of actual amount exchanged" (4.37).

Table 3. Satisfaction analysis

Attributes	Mean	S.D.
System Quality (α = .702)		
1. Fast response	4.16	0.562
2. Reliable operating system	4.25	0.458
3. Easy to operate	4.46	0.531
4. Capability to handle multiple tasks	4.44	0.530
5. Operation stability	4.32	0.473
6. Personal security	4.28	0.548
Information Quality (α = .719)		
7. Completeness	4.18	0.448
8. Fits my personal needs	4.45	0.511
9. Accurate	4.43	0.497
10. Up-to-date	4.40	0.521
11. Easy to understand	4.47	0.533
12. Provides good layout	4.26	0.544
Intention to Use (α = .796)		
13. Intend to spend more time	4.26	0.662
14. Intend to use repeatedly	4.38	0.708
15. Intend to purchase more	4.18	0.765
16. Intend to recommend to others	4.27	0.639
17. Increases my trust on the website	4.12	0.789
User Satisfaction (α = .791)		
18. Satisfied with the web interface	3.85	0.826
19. Satisfied with the information content	3.79	0.778
20. Satisfied with the menu truthfulness	3.84	0.815
21. Satisfied with the overall function	3.76	0.978
Net Benefits (α = .735)		
22. Saves planning time	4.56	0.543
23. Saves communicating time	4.38	0.659
24. More understanding of what is provided	4.26	0.637
25. Increased affection	4.05	0.670
26. Knowledge of actual amount exchanged	4.37	0.682

Regression analysis was performed on each of the seven established hypotheses. The results of regression analysis for "System Quality" and "Information Quality" as independent variables with "Intention to Use" as the dependent variable are shown in Table 4. The positive regression coefficient (Beta = .458) in "Information Quality" indicated that the regression model was statistically significant and that "Information Quality" positively affects respondents' "Intention to Use". However, the negative regression coefficient (Beta = -.022) in "System Quality" indicated statistical insignificance, meaning invalid hypothesis that "system quality affects intention to use".

The results of regression analysis for "System Quality" and "Information Quality" as independent variables with "User Satisfaction" as the dependent variable are shown in Table 5. The positive regression coefficient (Beta = .273) in "System Quality" indicated that the regression model was statistically significant and that "System Quality" positively affects "User Satisfaction". Similarly, the positive regression coefficient (Beta = .762) in "Information Quality" also indicated statistical significance in that "Information Quality" positively affects "User Satisfaction". Specifically, significance was shown highly of the validated hypothesis from $p = .001$.

The result of regression analysis of "User Satisfaction" as the independent variable with "Intention to Use" as the dependent variable is shown in Table 6. The negative regression coefficient (Beta = -.034) indicated that the regression model was statistically insignificant, meaning the invalid hypothesis that "user satisfaction positively affects intention to use".

The results of regression analysis for "Intention to Use" and "User Satisfaction" as independent variables with "Net Benefits" as the dependent variable are shown in Table 7. The negative regression coefficient (Beta = -.054) in "Intention to Use" indicated that the regression model was statistically insignificant that the hypothesis of "intention to use positively affects net benefits' was proven invalid. Similarly, the negative regression coefficient (Beta = -.048) in "User Satisfaction" also indicated statistical insignificance, meaning invalid hypothesis that "user satisfaction affects net benefits".

Table 4. Results of regression analysis on H1 and H2

Variables	Beta	S.D.	*t*-value	Significance
Constant	.195	0.046	4.647	.000***
System Quality	-.022	0.116	-0.183	.855
Information Quality	.458	0.172	2.706	.008**

$F = 3.692$; $R^2 = .047$; Adjusted $R^2 = .034$; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 5. Results of regression analysis on H3 and H4

Variables	Beta	S.D.	*t*-value	Significance
Constant	.447	0.056	7.704	.000***
System Quality	.273	0.165	1.635	.095
Information Quality	.762	0.236	3.243	.001**

$F = 6.067$; $R^2 = .075$; Adjusted $R^2 = .063$; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 6. Results of regression analysis on H5

Variables	Beta	S.D.	*t*-value	Significance
Constant	.285	0.024	10.887	.000***
User Satisfaction	-.034	0.058	-0.601	.547

$F = 0.362$; $R^2 = .002$; Adjusted $R^2 = .004$; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 7. Results of regression analysis on H6 and H7

Variables	Beta	S.D.	*t*-value	Significance
Constant	.281	0.025	10.702	.000***
Intention Use	-.054	0.061	-0.885	.378
User Satisfaction	-.048	0.042	-1.137	.256

$F = 7.791$; $R^2 = .095$; Adjusted $R^2 = .083$; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Conclusion

In general, respondents were very satisfied with "System Quality ($M = 4.32$)" and "Information Quality ($M = 4.37$)" of the developed cloud computing APP system. The also indicated highly of "Intention to Use ($M = 4.24$)" and "Net Benefits ($M = 4.32$)". Interestingly, "User Satisfaction" received the lowest mean score, at 3.81. Four items relating to "User Satisfaction" were web interface, information content, menu truthfulness, and overall function. It may be interpreted that respondents were not as satisfied with the design APP as they were satisfied with the cloud computing information system (IS). This particular finding is understandable that the developed web page interface, information, menu, and functions are in the early phase which requires constant modification according to user feedback. Nevertheless, the overall cloud computing APP system for homestay has proven to be successful.

The regression analysis validated three of the seven proposed hypotheses; H2: Information quality positively affects intention to use; H3: System quality positively affects user satisfaction; H4: Information quality positively affects user satisfaction. Statistical significance was not found in H1

(System quality positively affects intention to use), H5 (User satisfaction positively affects intention to use), H6 (Intention to use positively affects net benefits), and H7 (User satisfaction positively affects net benefits). It must be noted that statistical insignificance doesn't necessary mean that these four hypotheses are invalid. Under different circumstances (e.g. larger sample, different sample population, etc.), these four hypotheses may yet be proven valid. The authors take note that the imbalance of the sample population (e.g. most respondents were young, students, and low income) may have limited representation of the sample population. A caveat to be made here is that respondents who made the time to participate in the on-line survey tend to be young and students. Middle aged professional adults with mid to high incomes may not find the time for participation of the survey, or maybe simply unwilling to participate. It is a phenomenon that studies of internet survey must overcome.

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