Exploring the Roles of Lifestyles and Innovation Attributes on the Adoption of Electronic Service Delivery (ESD) in e-Government

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Abstract

Like many other governments around the world, the Hong Kong Government is moving ahead along the e-Government direction. Electronic Services Delivery (ESD) Scheme was therefore launched in 2000. However, there is a lack of comprehensive research on reviewing the whole Scheme. The one commissioned by Taylor Nelson Sofres (TNS) Consultants merely concerned about the online security as an obstacle to adoption. Other motivating factors such as values and lifestyles also play significant roles. Against this background, this study is aimed at filling the niche by investigating the impact of lifestyles and innovation attributes on the adoption/non-adoption decision of ESD.

Data for this exploratory study were collected from a snowball sampling of 367 Internet users in early 2003. Among them, only 32.7% were ESD users. Although most of the respondents were very concerned with network security, results show that adoption decision depends on whether the service will bring them relative advantage for the ESD users and non-complexity of the service for the non-users. Furthermore, innovator lifestyle type was a significant predictor for ESD users; while experiencers and innovators were found significantly linked to likelihood to adopt decision. However, no relationship was found between individuals' Internet use habits, demographics, and the adoption decision. Implications for improvement of the e-services based on the findings of the study are discussed.

Word count: 216

Introduction

Since 1997 the Chief Executive of the Hong Kong Special Administrative Region (HKSAR), Mr. Tung Chee Hwa, has set a vision for Hong Kong to be a leader and not follower in the information world tomorrow; and to use information technology to retain Hong Kong's competitive edge and to drive overall expansion.[1] To that end, the Information Technology and Broadcasting Bureau (ITBB) was set up in 1998[2] and commissioned the Digital 21 Strategy to build capabilities and infrastructure in support of the information economy and to create a strong foundation for growth in the use of information technology. It is against this background, the Electronic Service Delivery (ESD) Scheme was launched in 2000.

After two years of ESD Scheme establishment, the level of adoption, according to the 2002 Benchmark Research commissioned by the Taylor Nelson Sofres (TNS) Consultants, was only 37% of those living in Hong Kong who had used the Internet to access Government Online over the last twelve months. Internationally speaking, Hong Kong belonged to the group of high e-government user countries, such as Norway, United States, and Australia, with the country average in Government Online use reported in the TNS survey at 30%.[3] Although it is an encouraging sign to see that Hong Kong ranked in a high position in terms of rate of adoption of e-government service, the study in 2002 examined the reasons why a majority of Internet users were not adopters and found that security was a key barrier, with 52% considered it unsafe, to using e-services. However, the study did not go into details in

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[1] HKSAR Policy Address 1997.

[2] The Bureau integrated with the Commerce and Industry Bureau in 2002 with the introduction of Accountability System and renamed as Commerce, Industry and Technology Bureau.

[3] TNS is one of the largest market information companies in the world. The Government Online Study is a syndicated marketing information report designed to measure the impact of the Internet on government globally and nationally. The study is a result of interviews with nearly 30,000 individuals across 31 countries/cities, namely, USA, Canada, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, Germany, Great Britain, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Russian Federation Slovakia, Spain, Sweden, Turkey, Australia, Hong Kong, India, Japan, Malaysia, New Zealand, Singapore, South Korea and Taiwan. Available: http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan007044.pdf

exploring what other factors hinder people from adopting the e-services. The issue of security alone cannot fully explain the adoption of the ESD Scheme. Such an explanation ignores the complexity of adoption or non-adoption decision process. The characteristics of an innovation, as perceived by members of a social system, determine its rate of adoption. Attributes of innovations such as relative advantage, compatibility, complexity, trialability, and observability are all important factors in predicting the diffusion of any innovations (Rogers, 1995). Besides, values and lifestyles psychographic segmentation of a social system, usually used in analyzing consumer behaviors, suggested that ones' personality traits would also play a significant role in influencing their adoption decision.

In 2001, the Hong Kong Census and Statistics Department in the area of PC and Internet usage conducted a more large-scale, comprehensive official study on information technology (Census and Statistics Department, 2002). However, it did not touch on the ESD Scheme or on the diffusion of e-government services. Although there are many overseas studies on evaluating the effectiveness of e-government services, like *A Best Practices Review: Local E-government Services* [4] (Thieme, 2001) and *Better Public Services through e-government: Academic Article in support of better public services through e-government 2002* [5] (Comptroller & Auditor General, 2002), they are, by large, contextual studies. They may be significant to the study of e-government development in the United States and in U.K. respectively, but they contribute very little in understanding the case in Hong Kong.

This study is, therefore, aimed at filling this niche and tried to examine the effects of innovation attributes and people's lifestyles on the ESD Scheme adoption in Hong Kong. The results will enable us to improve the Scheme to cater to the needs of the users and enhances the e-government policies.

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[4] It is conducted by the U.S. Joint Legislative Audit Committee Members in 2001/02. Available: www.legis.state.wi.us/lab/windex.htm

[5] United Kingdom National Audit Office conducted this study in March 2002. Available: www.nao.gov.uk

E-government

E-government is the use of information and communication technology (ICT) to promote more efficient and cost-effective government, facilitate more convenient government services, allow greater public access to information, and make government more accountable to citizens. There are six stages in its establishment, namely, (1) setting up an e-mail system and internal network; (2) enabling inter-organizational and public access to information; (3) allowing 2-way communication; (4) allowing exchange of values; (5) digital democracy; and (6) joined-up government (Roger, 1999; Wescott, 2001).

Putting it into the context of Hong Kong in the area of ESD Scheme, Hong Kong is at the fourth stage of e-government development. ESD is a web portal that provides convenient ways for citizens to conduct business with the government. As Hong Kong is still too premature to enter the fifth and sixth stages, digital democracy and joined-up government will be excluded in this study.

ESD life Scheme

The ESD life Scheme is a key initiative of the Digital 21 Strategy with the aims of delivering high quality public services to the community in an innovative manner, improving the efficiency and reducing cost of delivery of public services, and fostering the development of electronic commerce in the territory. People can gain access to the Scheme via the Internet or the kiosk located in some shopping malls, and some of the Mass Transit Rail (MTR) stations. This research will concentrate on the Scheme provided via the Net.

Over hundreds of services are available under the ESD Scheme for the public twenty-four hours a day and seven days a week, ranging from essential daily issues to relaxing and cultural issues. These services are categorized into eleven items, namely, leisure, wedding, household, health, finance, citizenship, education, tourism, transportation, business and employment. Users may visit the site for information, opinion sharing (e-mailing their

requests), and transaction.

According to TNS (2002), the major web site use is information seeking (33%). Only seven percent of the users transacted through the site. Usage of the site remains strongest amongst the group under the age of 25, accounting for 63%; while the group between the ages 25-34, accounting for 49%. Only 30% of the group between 35-44 is the site users. The percentage decreases gradually to 21% and 10% respectively for the groups 45-54 and 55-65. Males are slightly more likely to use Government Online (38%) as compared to females at 35%.

Theoretical frameworks

Lifestyles

Past research have focused on the concept of lifestyles and values and examined their impacts on information technologies adoption and consumer behavior (Becker and Connor, 1981; Donohew, Palmgreen, & Rayburn, 1987; Kamakura and Mazzon, 1991; Lai, 2001; Leung, 1998; Tigert, 1974; Wallings, 1985; Yew, 1997). Amongst these studies, the VALS system -- short for values and lifestyles -- is found to be most appropriate in explaining people's behavior in adopting the ESD Scheme.

VALS is a way of viewing people on the basis of their attitudes, needs, wants, beliefs and demographics. The VALS program was created by the SRI International in 1978 in an attempt to understand people's personality through their behaviors amid the changing U.S. values and lifestyles in the 1970s. VALS uses psychology to segment people according to their distinct personality traits. In 1989, VALS was redefined to maximize its ability to predict consumer behavior. By using psychology to analyze and predict consumer preferences and choices, the current VALS system creates an explicit link between personality traits and

purchase behavior.[6]

VALS places adult consumers into one of eight segments based on their responses to the VALS questionnaire. The main dimensions of segmentation framework are primary motivation (horizontal dimension) and resources (the vertical dimension). Consumers buy products and services and seek experiences that fulfill their characteristic preferences and give shape, substance, and satisfaction to their lives. An individual's primary motivation determines what in particular about the self or the world is the meaningful core that governs his or her activities. Consumers are inspired by one of the three primary motivations: ideals, achievement, and self-expression. People's personality traits, such as self-confidence, innovativeness, leadership, in conjunction with key demographics, like age, income and education, determine an individual's resources. Different levels of resources enhance or constrain a person's expression of his or her primary motivation.

The eight segments of VALS system range from the top with most resources and high motivation, the innovators, to the bottom part with least resources and low motivation, the survivors. In-between are thinkers (more resources) and believers (less resources) motivated by ideals; achievers (more resources) and strivers (less resources) motivated by achievement; and experiencers (more resources) and makers (less resources) motivated by self-expression.

Furthermore, SRI International sought to compare the attitudes and behaviors of the Internet users to map out people's affinities (Fassett, 1995). The results showed that 50% of the Internet users were among the segment of actualizers (now known as innovators). They are successful, sophisticated, take-charge people with high-esteem. Since they have abundant resources, they exhibit all three primary motivations in varying degrees. They are change-leaders and are the most receptive to new ideas and technologies. They are active consumers and continue to seek challenges. Image is important to them and their lives are characterized

[6] VALS system is available at www.sric-bi.com/VALS/

by variety.

The survey further revealed that 18% of the Internet users were experiencers. They are motivated by self-expression, young, enthusiastic, impulsive, avid consumers; spend a comparatively high proportion of their income on fashion, entertainment, and socializing. Accounting for 13% of the Internet users were strivers. They are trendy, fun looking, and very enthusiastic about the web. As they are motivated by achievement, they concern very much about the opinions and approval of others. However, they do not have enough financial ability to meet their desires. It is then followed by the fulfilleds (now known as thinkers), who made up of 11% of the web users, feeling frustrated over the Web's structure. They are well-educated, well-informed people and motivated by ideals. They have a moderate respect for the status quo and open to consider new ideas.

Achievers made up of 6% of the Internet users in the survey. They were found to be too busy and impatient to use the Internet. They are successful and status-oriented. They value consensus, predictability and stability. The remaining 2% of the Internet users in Fassett's survey made up of believers, makers, and strugglers (now known as survivors). They have limited resources and received little education. They are practical, cautious, conservative, and traditional.

Inspired by Fassett's (1995) survey, this study is aimed at finding out if a VALS system structure can be identified in Hong Kong. If yes, what types of people will use ESD Scheme, and what other factors can be uncovered for both the adoption and likelihood to adopt ESD?

Despite the fact that VALS system is a well-established research and consulting tool widely accepted globally, cultural and social differences do exist across the world. Taking into account of their own culture and national characteristics, Japan has developed another set of VALS to better cater to their own needs. However, this study will adopt a modified version

of the U.S. VALS, as lifestyles in Hong Kong in many ways mirror that of the United States. Furthermore, Hong Kong is a cosmopolitan city and is under strong influence of the West. Based on this theoretical framework, we ask:

RQ_1: What lifestyle indices similar to VALS inventories can be identified in Hong Kong?

Lifestyles alone cannot fully explain why people adopt an innovation. In view of this shortcoming, innovation attributes from the diffusion theory (Rogers, 1995) will also be used to examine why some people use the ESD Scheme while others do not.

Diffusion of Innovations

Diffusion theory describes how new ideas or practices are introduced and adopted in a social system with a special focus on the communication relations and information flows that promote adoption (Rogers, 1995; Lievrouw & Livingstone, 2002). To be more precise, there are four main elements: (1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system. Rogers' (1983, 1995) suggestion that the characteristics of an innovation, as perceived by the members of a social system, determine its rate of adoption are of special relevance to this study. These five attributes are relative advantage, compatibility, complexity, observability, and trialability.

Relative advantages refers to the degree to which an innovation is perceived as better than the idea it supersedes. These advantages can be measured in economic terms, convenience and satisfaction obtained. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is going to be. In the case of ESD Scheme, people may try to adopt it if they find that they save time and money in using the service. Based on this attribute, we hypothesize that:

H1: The more advantages the ESD users perceive in using ESD services, the more often they will use it.

Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An idea that is not compatible with the prevalent values and norms of a social system will not be adopted as rapidly as an innovation that is compatible. As a result, we expect:

H2: The more the ESD users perceive ESD services compatible with their existing values and past experiences, the more often they will use it.

Complexity refers to the degree to which an innovation is perceived as difficult to understand and use. In most of the cases, new ideas that are simpler to understand will be adopted more rapidly. Put it into ESD context, people may use it if it does not require very specific skill and software. Those have access to Internet can gain access to ESD web site. No special skill is required. However, some of the services (e.g., the vehicle license renewal) require digital certificates, which have to be purchased from the Hong Kong Post. Thus, we formulate the third hypothesis:

H3: The less complex the ESD users perceive ESD services, the more often they will use it.

Observability means the degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt. Such visibility stimulates peer discussion of a new idea, as friends and neighbors of an adopter ask him or her for innovation-evaluation information about it. Therefore, it is hypothesized that:

H4: The more benefits ESD users can observe from using ESD services, the more often they will use it.

Trialability is the degree to which an innovation may be experimented with on a limited basis. New ideas that can be tried on installment plan will generally be adopted more quickly than innovations that are not divisible. However, as this is a cross-sectional study,

trialability was excluded in our analysis.

Past research has shown that values, lifestyles, media use, and their socioeconomic backgrounds varied between adopters and non-adopters of new information technologies (Dickerson & Gentry, 1983; Dupagne, 1997; Dupagne & Agostino, 1991; Hunter & Allen, 1992; Jeffres & Atkin, 1996; Leung, 1998; Leung & Wei, 1998; Reagan, 1987). This study also examined how predictive lifestyles, innovation attributes, Internet behaviors, and demographics are of ESD adoption. Thus, the following research questions are raised:

RQ2: How do ESD users differ from non-ESD users in terms of lifestyles, Internet usage pattern, and demographics?

RQ3: To what extent can lifestyles, ESD attributes, Internet usage pattern, and demographics predict (a) levels of ESD use and (b) likelihood to adopt ESD?

Method

Sampling and questionnaire

Data for this exploratory study were collected through snowball sampling method in Hong Kong. Questionnaires were sent to e-mail accounts of researchers' relatives, friends and colleagues, who were Internet users, for responding and forwarding to their peers in early 2003. A total of 377 questionnaires were received. Among them, 10 were found invalid as they were returned with blank form. Therefore, only 367 were included for analysis.

The questionnaire was designed in English but translated to Chinese for fielding. The questionnaire was comprised of four parts: Part A enquired about the ESD users' usage pattern and their views on the e-services. Part B targeted non-ESD users and was aimed at examining the reasons for non-adoption and whether people would consider adopting the service if improvements were made. Part C included 35 questions adopted from U.S.-VALS with slight amendments to fit the Hong Kong situation. And finally, Part D was questions on

individuals' demographics.

Sample Profiles

Among the 367 respondents, 120 (32.7%) were ESD users and 247 (63.7%) were non-ESD users. These results were very similar to that commissioned by TNS in which 37% Internet users had accessed e-government services online. In terms of gender, the sample consisted of 50.1% male. Over 54% of the respondents were in the age group of 26-35, followed by 19.1% from the 19-25 age group, 18.8% from 36-45, 5.2% from 46-55, 3% from 18 or below, and less than 1% was 56 or above. The mean age group was 3.05 (sd=.85). With regard to the education level, 52.6% received tertiary education; 10.4% gained post-graduation or higher level of education. About 33% received secondary level of education, and only 0.3% had finished primary school. The mean education group was 5.6 (sd=1.89). Of the 367 in the sample, over 60% earned less than US$3,213 per month, 14.4% had a monthly salary of US$3,214-$4,499, 10.6% earned US$4,500-$6,427, and about 3% earned more than US$6,427 a month. The mean income group was 3.99 (sd=1.39). Over 59% were executives, managers, or professionals, about 22% were clerical staffs, more than 8% in services or sales, and about 6% were students.

Measurements

Lifestyles. To assess lifestyle types in Hong Kong, the 35-item VALS instrument from SRI was used. Respondents were asked to rate their agreement with each statement regarding their values and attitudes toward life according to their self-orientation and resources using a 5-point Likert scale, with 1 meaning "strongly disagree" and 5 meaning "strongly agree." However, after pretest, it was found that some items were not applicable or not truly reflective of the local culture, value, or belief although Hong Kong shares a somewhat

common culture with the West. As a result, 10 items were eliminated. In addition, item 13, "The Federal government should encourage prayers in public schools," was amended to "The Hong Kong Government should encourage schools to have more ethics classes" for better fit to the local context.

Innovation Attributes. Two sets of innovation attributes were assessed. One was for the ESD adopters called "ESD attributes" and the other was for the non-adopters labeled "reasons for non-adoption" because of the characteristics of ESD. Following Rogers' (1995) terms, ESD attributes were characterized as relative advantages, complexity, compatibility, and observability. Six items were used to measure relative advantages with a standardized alpha equals .86. Items were (1) ESD provides convenience; (2) ESD simplifies application procedure; (3) ESD saves time; (4) ESD improves ways of getting government information; (5) ESD is safe and reliable; and (6) ESD saves Government expenditure. Complexity was assessed with one item: "using ESD is easy." Compatibility was evaluated by asking if they agreed "ESD fits Hong Kong life style." And finally "Using ESD means able to keep the pace with IT development" was used to measure "observability." Similarly, "reasons for non-adoption" was assessed using the same categories of attributes. Opposite to the concept of relative advantages in the adoption theory (Rogers, 1995), "relative advantages" was renamed "relative disadvantages." This attribute, as one of the reason for non-adoption, was measured with two items, namely (1) Don't want to disclose personal data and (2) Computer network is insecure. Reliability of these two items was high at .84. "Complexity" (α= .71) was measured also with two items: (1) ESD requires e-certificate and (2) Using ESD is very complicated. One item was used to measure "compatibility," i.e., "Government services on the Web is not comfortable, want more human touch." Observability (α= .43) was also assessed with two items, namely (1) No idea about services available at ESD and (2) No suitable services. Again, respondents were asked to rate their agreement to each of the

statements above using a 5-point Likert scale with 1 meaning “strongly disagree” and 5 meaning “strongly agree.”

ESD Usage. ESD usage was measured by asking respondents if they have used six e-services: (1) services such as sports facilities reservation and library loans; (2) government fees handling; (3) browsing of and downloading from government websites; (4) vehicle registration; (5) ID and passport applications; and (6) request for marriage certificate. A “1” was coded for every service they have used and a “0” if they have never used one. Data ranged from “0” to “6.”

Likelihood to Adopt ESD After Improvement. Likelihood to adopt ESD services was assessed if respondents would consider e-services after a group of six improvements were made: (1) improve network security; (2) no need to fill in too much personal information; (3) transaction without e-certificate; (4) simplify all application procedures; (5) enhance services; and (6) more publicity on ESD service. A 5-point Likert scale was used with 1 meaning “definitely will not consider” and 5 meaning “definitely will consider.” A composite likelihood to adopt index was constructed by combining the six items with data ranged from 6 to 30. Reliability alpha was high at .88.

Internet Use. Two questions were asked to assess respondents’ Internet use: (a) how long have they been online in years? And (b) how often do they use the Internet, excluding work, in a typical week? Responses were (1) less than 3 hours a week, (2) 4 to 7 hours, (3) 8 to 10 hours, (4) 11 to 14 hours, (5) 15 to 21 hours, and (6) more than 21 hours a week.

Demographics. Age, gender, education, personal monthly income, and occupation were demographic variables assessed in this study.

Findings

VALS in Hong Kong

To uncover the dimensions underlying the perception of lifestyle indices similar to VALS inventories in Hong Kong, an exploratory factor analysis was conducted using 25 modified VALS items from SRI. A principal component factor analysis with Varimax rotation resulted a six-factor solution with eigenvalues greater than 1.0, explaining 58.2% of total variance (see Table 1).

Factor 1, Experiencers (eigenvalue = 6.43, variance = 25.72%, Cronbach's alpha=.86) consisted of nine items reflecting how this lifestyle group like excitement, thrill, new things, challenges, and seek varieties. They quickly become enthusiastic about new possibilities. This group may spend a comparatively high proportion of their income on fashion, entertainment, and socializing. Factor 2, Strivers (eigenvalue = 2.04, variance = 8.16%, α = .79) contained four items describing people of this group as trendy, fashionable, and fun loving. They favor stylish products. As they are motivated by achievement, they concern very much about the opinions and approval of others. However, they do not have enough financial ability to meet their desires. Factor 3, Innovators (eigenvalue = 1.83, variance = 7.31%, α = .72) comprised four items characterizing themselves as change-leaders and take-charge people with high self-esteem and abundant resources, who are the most receptive to new ideas and technologies. Since they have abundant resources, they exhibit all three primary motivations in varying degrees. Factor 4, Believers (eigenvalue = 1.61, variance = 6.43%, α = .69) consisted three items depicting people in this group as conservative and conventional. Their income, education, and energy are modest but sufficient to meet their needs. Factor 5, Survivors (eigenvalue = 1.47, variance = 5.89%, α = .47) comprised three items classifying people in this group as those who are limited and living narrowly focused lives. They are chronically poor, ill-educated, and low-skilled. Their primary concern is safety and security.

Finally, factor 6, Makers (eigenvalue = 1.17, variance = 4.66%, α = .57) contained two items indicating that people of this group are practical who express themselves and experience the world by working on it, e.g., building a house or fixing a car. Makers have constructive skills and value self-sufficiency.

By large, these six lifestyle types were conceptually consistent with the theoretical expectations stated in VALS by SRI (SRI Business Intelligence, 2003). The 10 items eliminated after the pretest was probably due to the cultural and geopolitical differences between the East and the West. Nevertheless, this study verifies that a deeply held lifestyle system, similar to the United States, does exist in the Hong Kong culture. However, because the last two factors, namely survivors and the makers, were with low reliability, they were excluded for further analyses.

< Insert Table 1 About Here >

Hypotheses Testing

To test the four hypotheses on how ESD attributes, namely, relative advantages, compatibility, complexity, and observability, are related to ESD adopters' usage of e-services, correlational analyses were run. Among the variables of ESD attributes tested, only relative advantage ($r = .29$, $p < .01$) was significantly linked to ESD use. Thus only H1 was supported. This suggests that ESD users will use the service as long as they find it safe, secure, timesaving, bringing them convenience, and improving ways to obtain government information. No other significant relationships were found between other ESD attributes and ESD use.

Differences between ESD Users and Non-users

To examine how ESD users differed from non-ESD users in terms of lifestyles,

Internet usage pattern, and demographics, a canonical discriminant analysis was run. The goal was to test the discriminating effects of these variables and to seek a multidimensional profile of the ESD users. The overall analysis was significant ($p < .001$; Wilks's Lambda = .85). More than 68 percent of the cases were correctly classified. Standardized discriminant coefficients for the ESD users are shown in Table 2. Results suggest that the ESD users were distinguished by a higher educational background, being an experiencer and/or an innovator, a frequent user of the Web, and have been using the Internet for some time. More specifically, ESD users have used the Internet about 1.56 years longer ($t = -5.66$, $p < .001$) and 5.81 hours per day more ($t = -4.67$, $p < .001$) than non-ESD users. In terms of education, ESD users are more educated ($t = -2.87$, $p < .01$) with .6 mean category more. In addition, ESD users are more of the experienecer ($t = -2.71$, $p < .01$) and the innovator ($t = -3.12$, $p < .01$) types in lifestyle than the non-users. This means that they are more receptive to new ideas and innovations. They like excitement, new things, challenges, and seek varieties. Most important, ESD users have abundant resources and are change-leaders.

< Insert Table 2 About Here >

Turning to the last research question, the analysis of this study focused on how lifestyles, ESD attributes, Internet use, and demographics can predict (a) ESD use for the adopter and (b) the likelihood to use ESD for the non-adopters.

Predicting the Use of ESD Services

Regression results in Table 3 show that being an innovator ($\beta = .28$, $p < .05$) was a significant predictor for ESD use. This indicates that frequent users of ESD are innovative, successful, sophisticated, take-charge people with high self-esteem and abundant resources. They have a wide range of interests and are characterized by richness and diversity. In addition to lifestyles, compatibility ($\beta = -.50$, $p < .05$), non-complexity ($\beta = .41$, $p < .05$), and

relative advantages (β = .38, p <.05) were significant predictors from the ESD attributes. This suggests that regular users of ESD were motivated by the simplicity and ease-of-use in ESD services. They also found ESD services convenient, safe and reliable, simple, timesaving, and may even save Government expenditure. Furthermore, the less ESD services they used, the more they perceived that ESD fits Hong Kong lifestyle (β = -.50, p < .05). This rather unusual relationship may mean that although people may feel that ESD services may help in a fast-pace lifestyle in Hong Kong -- people could do a lot of things without leaving the home -- they are still not confident or comfortable enough in the security of the ESD system for them to use the services regularly. The regression equation accounted for 31 percent of the variance.

< Insert Table 3 About Here >

Predicting Likelihood to Adopt by Non-ESD Users

As most of the respondents were non-ESD adopters, this paper also attempts to examine how likely these non-adopters would consider adopting the service if certain improvements were made to ESD attributes. Regression results in Table 3 indicate that Striver (β = .28, p < .01) and Experiencer (β = .19, p < .05) lifestyle types significantly predicted likelihood to adopt ESD. This suggests that strivers who love trendy and fashionable things are likely to adopt the service. Similarly, experiencers who look for excitement and new things are likely to consider the service if improvements were made. Despite the fact that Internet is getting more and more popular these days, many people still regard it as a symbol of ‘knowledge’ and ‘fashion’. That explains why even ESD has been put into use for more than two years, the experiencers and strivers, who treasure knowledge and value trendy things still consider adopting it.

Among the attribute variables or reasons for non-adoption, complexity (β = -.24, p

< .5) was the only significant predictor. This reveals that non-ESD adopters will consider adopting the Scheme if E-cert is not required and ESD service could be less complex. No other variables were found significant predictors from Internet use and demographics. A total of 25 percent of the variance were accounted for.

Conclusions and Discussion

This study sought to identify a set of VALS types similar to the one proposed by SRI in Hong Kong. We found six lifestyle types which by large conceptually confirm the theoretical expectations stated in the U.S.-based VALS (SRI Business Intelligence, 2003). Finding suggests that Internet users in Hong Kong can be placed into six segments based on their self-orientations in principle, status, and action; as well as a full range of resources in psychological, physical, demographic, and material means. Lifestyle types include innovators, experiencers, strivers, believers, survivors, and makers. Due to cultural and geopolitical differences between the East and the West, only six lifestyle types were identified instead of the original eight. Furthermore, regression results also show strong support for our expectation that lifestyles would be associated with ESD usage and likelihood to use. Specifically, being an "innovator" had a significant impact on level of ESD use; while being an "experiencer" or a "striver" would increase the likelihood of considering ESD adoption.

In examining how ESD users differed from non-users, discriminant function confirms that lifestyles are useful predictors in differentiating the two. Being an "experiencer" and/or "innovator" was found to have significant effects on whether they are an ESD user or not. From these two predictors, we know ESD users are more receptive to new ideas; they like new things, excitement, varieties, and have abundant resources. As expected, ESD users are longtime and frequent Internet users. More important, ESD users are better educated, as many of the e-services available on ESD target upper middle class with services such as vehicle

registration, government fees handling (e.g., property rates and taxes), and ID and passport applications.

Despite the fact that network security affects most people's consideration of using ESD or not, this study found that ESD attributes, namely relative advantage, complexity and compatibility are strongly linked to people's adoption decision. For heavy ESD users, they use the service because it brings them convenience, saves time and money, and it is reliable and secure. For non-users, they will consider adopting ESD if the service were not complicated. This means that if E-cert is not a requirement in the application and the services are highly recognized by the public, non-adopters will consider adopting ESD. The negative relationship between compatibility and ESD use may suggest that the lack of confidence in security and safety of conducting business via the Internet still hinders their low level of ESD usage despite many agreed that ESD helps avoid the hectic fast-pace lifestyle in Hong Kong. This important finding indicates that ESD users are still not confident or comfortable in the security of the ESD system to promote regular use. Government officials should take the security obstacle seriously if ESD scheme should bring us to the last two stages of a truly efficient, cost-effective, and more accountable e-government.

Turning to the relationship between Internet use habits and adoption decision, results clearly show a null relationship. Although ESD adopters tend to be longtime and frequent Internet users, experience and amount of Internet use bear no significant effect on the level of ESD use and likelihood of use. As regards the relationship between demographics and adoption decision, it is worth noting that the lack of significance clearly supports Atkin's (1993) and Sparkes and Kang's (1986) claim of a "leveling off of socioeconomic effects" in predicting both ESD adoption and likelihood to adopt. Although ESD Scheme in the e-government concept has been online for about two years, it might still be a novel innovation for some. The fact is that it has services designed for people with any

socioeconomic backgrounds. Some might use it for making reservation for sports facilities, processing a library loan, but others may use it for renewing a vehicle registration or paying property rates.

Finally, online security is, of course, very important to a website, especially the one with transaction function. However, a website with excellent security is not sufficient in meeting the needs of the users and the potential users. Users and potential users may look for other things such as design, content, and services. Since the paper reveals that ESD users and non-users may perceive the attributes differently, it may serve as an indicator for the Government to refine the Scheme. For example, the Government may consider enhancing security system to retain the users. At the same time, it may also kick off some promotional activities for the site to bring the observable benefits of the site to the awareness of Hong Kong people so as to attract more users. Moreover, it could also study ways to simplify all necessary procedures involved in using the ESD to lure the non-adopter to try the service.

On the whole, each of the two theoretical constructs – lifestyles and technology attributes from diffusion of innovations – performed reasonably well in helping to explain ESD use and likelihood to use among the Internet users. However, there are limitations in this study: First, the data were gathered through a snowball sampling method of 367 Internet users. Of which, only 120 (32.7%) were ESD users. The limited sample size and the convenience sampling method are the weakest link of the study that may lead to generalization problem. Second, the direct transplant (though with slight amendment to the wordings of some questions) of the U.S.-based VALS items may not perfectly fit the psychographic profiles of Hong Kong people even though Hong Kong lifestyle is becoming more and more westernized. Future study should devise a well-tested and culture-sensitive VALS system for Hong Kong with high validity and reliability. Third, the quantitative method employed in the present study may only give a micro perspective in understanding

the association between innovation attributes, lifestyles, and adoption of ESD. However, future studies may include a macro view using qualitative tools on assessing other motivating, enabling, limiting or inhibiting factors that may add to the limited explanatory power of the regression models.

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Table 1
Factor Analysis of (principal components, Varimax rotation)
25 lifestyle indicators (N=367)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Experiencers						
I like the challenge of doing something I have never done before	.76					
I like trying new things	.72					
I like a lot of excitement in my life	.72					
I am always looking for a thrill	.66					
I like doing things that are new and different	.66					
I like outrageous people and things	.60					
I often crave excitement	.59	.42				
I like learning about things even if they may never be of any use to me	.58					
I like a lot of variety in life	.57					
Strivers						
I follow the latest trends and fashions		.74				
I like to dress in the latest fashions		.74				
I want to be considered fashionable		.72				
I dress more fashionably than most people		.72				
Innovators						
I like being in charge of a group			.74			
I have more ability than most people			.73			
I consider myself an intellectual			.69			
I like to lead others			.64			
Believers						
I like to make things I can use everyday				.80		
I would rather make something than buy it				.74		
I like to make things with my hands				.71		
Survivors						
I am really interested only in a few things					.63	
I must admit that my interests are somewhat narrow and limited					.71	
I like my life to be pretty much the same from week to week					.66	
Makers						
I like to look through hardware or automotive stores						.82
I am very interested in how mechanical things, such as engines, work						.62
Eigenvalues	6.43	2.04	1.83	1.61	1.47	1.17
Variance explained (%)	25.72	8.16	7.31	6.43	5.89	4.66
Cronbach's Alpha	.86	.79	.72	.69	.47	.57

Note: The scale used: 1=strongly disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly agree

Table 2
Discriminant Analysis of ESD Adopter with Lifestyles, Internet Use, and Demographics as Predictors [a] (N=367)

Predictors	Structure Coefficients
Lifestyles	
Experiencers	.38***
Strivers	.05
Innovators	.42***
Believers	-.01
Internet use	
Web experience (in years)	.79***
Time spent on web per wk (excluding work) [b]	.72***
Demographics	
Gender (male=1)	.26
Age	-.21
Education	.44***
Personal monthly income	.12
Eigenvalue	.18
Canonical correlation	.39
Degree of freedom	10.00
Wilks' Lambda	.85
Significance	$p<.001$
Group Centroids	
ESD users	.58
Non-ESD users	-.31
Cases correctly classified	68.8%

Notes: a. ESD adopter was dummy coded with adopter=1, else=0.
b. Time spend in the Web per week was coded with "1"=less than 3 hours a week; "2"=4 to 7 hours a week; "3"=8 to 10 hours a week; "4"=11 to 14 hours a week; "5"=15-21 hours a week; and "6"=22 hours a week or more.
$p < .001$

Table 3
Regression of Lifestyles, ESD Attributes, Internet Use, and Demographics on ESD Usage and Likelihood to Adopt ESD (N=367)

Predictors	ESD Usage (ESD adopters) (n=120)		Likelihood to Adopt (Non-ESD adopters) (n=247)	
	r	*beta*	*r*	*beta*
Lifestyles				
Experiencers	*n.s.*	*n.s.*	.22**	.19*
Strivers	*n.s.*	*n.s.*	*n.s.*	.28**
Innovators	*n.s.*	.28*	*n.s.*	*n.s.*
Believers	*n.s.*	*n.s.*	*n.s.*	*n.s.*
ESD attributes				
Relative advantage	.29**	.38*		
Compatibility	*n.s.*	-.50*		
Non-complexity	*n.s.*	.41*		
Observability	*n.s.*	*n.s.*		
Reasons for non-adoption				
Relative disadvantage			*n.s.*	*n.s.*
Incompatibility			*n.s.*	*n.s.*
Complexity			*n.s.*	-.24*
Non-observability			.19*	*n.s.*
Internet use				
Web experience (in years)	*n.s.*	*n.s.*	*n.s.*	*n.s.*
Time spent on web per wk (excluding work)	*n.s.*	*n.s.*	*n.s.*	*n.s.*
Demographics				
Gender (male=1)	*n.s.*	*n.s.*	.15*	*n.s.*
Age	*n.s.*	*n.s.*	*n.s.*	*n.s.*
Education	*n.s.*	*n.s.*	*n.s.*	*n.s.*
Personal monthly income	*n.s.*	-.34#	*n.s.*	*n.s.*
R^2		.31		.25

Notes: #$p \leq .1$; *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$