Factors That Determine Attitudes Toward the Use Technology to Plan for Retirement: An Empirical Analysis

C. Augusto Casas, PhD
Associate Professor
St Thomas Aquinas College
Sparkill, NY 10976 USA

Abstract

This paper presents the results of a research project that applied Davis' (1980) Technology Acceptance Model (TAM) to measure individual's acceptance and intention to use retirement planning software. The results of the study indicate that perceived usefulness, ease of use and subjective norm determine intentions to use retirement planning technology. These results are consistent with other studies that adopted TAM to measure user acceptance of different information technologies.

Introduction

A major concern among Americans is their financial wellbeing during retirement. Until a few years ago, Americans relied on defined benefits plans and Social Security as the main sources of retirement funding. However, defined benefit plans are being replaced with defined contributions plan in which the benefit received at retirement is uncertain.

The solvency of the U.S. Social security is at risk (Congressional Budget Office, 2005), making the projection of retirement benefits from the Social Security program uncertain as well. These factors have led individuals to look for alternative sources of retirement funding and for effective tools to plan for their retirement. To develop retirement plans individuals rely on financial institutions, financial professionals such as financial planners, accountants and attorneys, their employers, and friends and family.

In addition, there is technology available that can help individuals develop financial planning strategies to prepare for retirement. This technology includes Web-based tools and financial planning and money management software. Technology is playing and increasing role in retirement planning. Financial institutions and financial planners rely on technology to design and present financial plans to their clients as well as to monitor the progress of those plans. On the other hand, individuals are increasingly using the same or similar tools by themselves.

This paper presents the results of a research project that measured individual's acceptance of technology as a tool to support retirement planning. Acceptance was measured using Davis' (1989) Technology Acceptance Model (TAM). This paper is organized as follows: A brief description of TAM is presented followed by a review of previous research with applications of the model. The hypotheses and methodology are then explained followed by an analysis of the results and conclusions and suggestions for additional research.

Paper presented at the Academy of Financial Services 2010 Annual Meeting
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Technology Acceptance Model

Davis (1989) developed the Technology Acceptance Model (TAM) to explain computer user behavior. Several studies have confirmed that TAM consistently explains a substantial portion of variance in usage intentions and behavior among different information technologies (Gardner & Amorodo, 2004; Khalifa & Liu, 2003; Koufaris, 2002; Bhattacherjee & Premkumar, 2004; Chau & Hu, 2002; Hong et al., 2002; Money & Turner, 2004; Chismar & Patton, 2002).

The goal of TAM is to

> *"provide an explanation of the determinants of computer acceptance that is general, capable of explaining using behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified"* (Davis et al., 1989).

The next section presents a review of prior research that used TAM, which suggests that the model is suitable for measurement of individual's intention to use retirement planning software.

The original TAM model (figure 1) hypothesized technology usage is a direct function of use behavior, which is a weighted function of attitude toward usage through Perceived Ease of use (PEOU) and Perceived Usefulness (PU). Venkatesh and Davis (2000) modified the original TAM incorporating social influences (figure 2). Specifically, TAM2 (the updated model extended in 2000), incorporate three social forces into the model: subjective norm, voluntariness and image. The components of TAM2 are described below:

Subjective Norm: "person's perception that most people that are important to her/him think she/he should or should not perform the behavior in question" (Fishbein and Ajzen, 1975).

Image: "degree to which use of an innovation is perceived to enhance one's status in one's social system" (Moore and Benbasat, 1991).

Job Relevance: "individual's perception regarding the degree to which the target system is applicable to his/her job" (Venkatesh and Davis 2000).

Output Quality: "Individual's perceived quality of output provided by the system" (Venkatesh and Davis 2000).

Result Demonstrability: "Tangibility of the results of using the innovation" (Moore and Benbasat, 1991).

Voluntariness: Determination of whether the use of the new system is mandatory or not.

Experience: Change in attitude as the individual experience using the system.

Perceived Ease of Use (PEOU): Direct determinant of perceived usefulness (Davis et al., 1989)

Perceived Usefulness (PU): Individual's opinion of level of system's usability

Intention to use: Will determine if indeed the technology is used.

User Behavior: Final user acceptance or rejection of the new system.

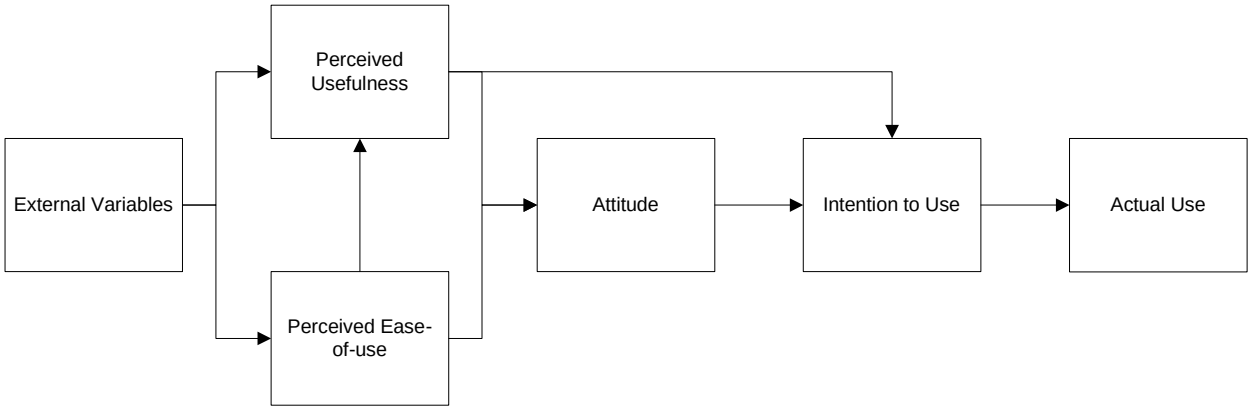

Figure 1 - Original technology Acceptance Model (Davis, 1989)

A modified TAM2 was used to measure acceptance of technology to support retirement planning. Three inputs were removed from the model. When considering retirement planning software, voluntariness is always present as individuals have the option to use or not to use the technology. Since this was a cross-sectional study, one that observes a subset of the population at a defined time, experience was not applicable. Job relevance does not apply either as retirement planning is done to prepare for life after the working years. These three inputs, voluntariness, experience and job relevance were not included in this analysis.

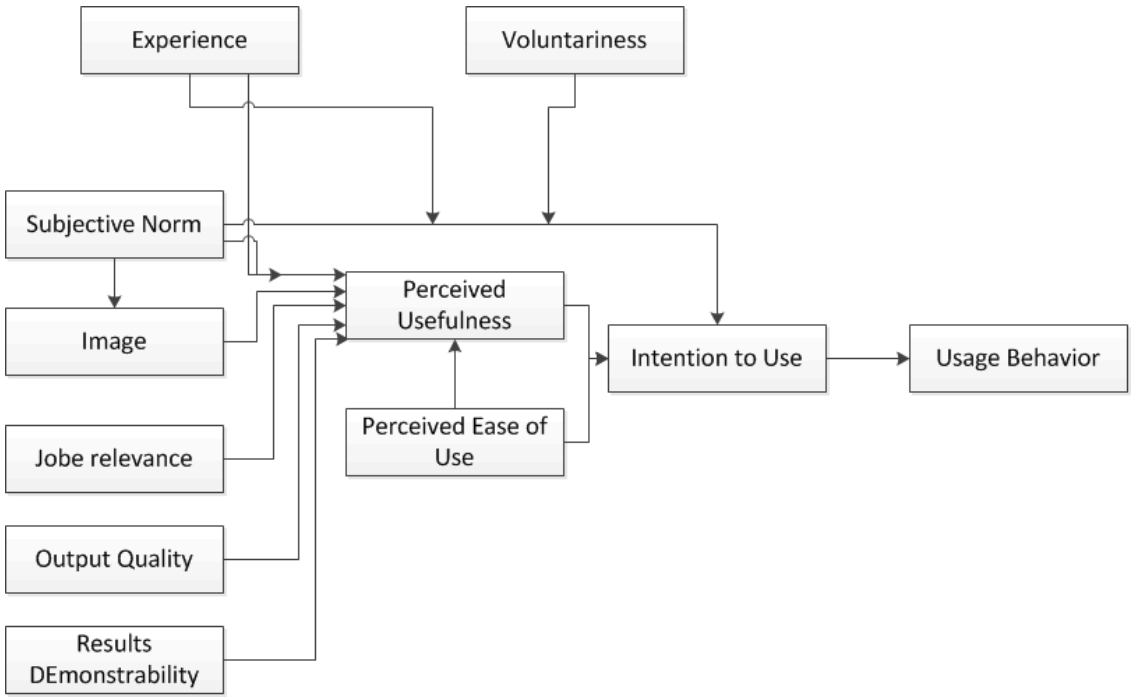

Figure 2 _ Modified technology Acceptance Model (Venkatesh and Davis, 2000)

Technology Acceptance Model Prior Research

TAM has been widely used in the research community to investigate acceptance of a variety of technologies. Davis et al (1989) first tested to measure acceptance of a basic test editor. Mathieson (1991) used it to research acceptance of spreadsheet software. In 1994 Subramanian conducted a study with a voice mail system. Taylor and Todd (1995) used TAM to study acceptance of a university computing resource center. Keil et al. (1995) measured acceptance of configuration software among 118 sales people. Szajna (1996) measured acceptance of electronic mail among college students. Jackson et al. (1997) used TAM to analyze acceptance of spreadsheet, database and word processor software among college students. Igbaria et al. (1997) measured acceptance of personal computers in small firms surveying 596 PC users. Lukas and Spliter (1999) used TAM to evaluate acceptance of a multifunctional brokerage station among 54 brokers and 81 assistants at a financial brokerage firm. In 1999 Karahanna et al. studied user acceptance of the Windows 3.1 operating system. Hu et al. (1999) conducted a study of acceptance of telemedicine tools among 407 physicians. Chismar and Patton (2002) presented a study of acceptance of internet use among pediatricians using TAM2. Hong et al. (2001) used the technology acceptance model to identify the determinants of acceptance of digital libraries. In 2004 Garner and Amoroso presented a TAM based instrument to measure acceptance of internet technology by consumers.

The above and many other studies published in referee journals and conferences support the general acceptance of Davis' (1989) technology acceptance model as a valid tool among the academic and research communities. The work presented here is an additional contribution to the previous research but different in that the model is applied in a new field: retirement planning technology.

Hypothesis

Based on the Technology Acceptance Model the following hypotheses are formulated:

H10: Perceived Usefulness of retirement planning technology is negative related, or not related, to intention to use technology

H1A: Perceived Usefulness of retirement technology software is positive related to intention to use technology

H20: Perceived ease of use of retirement planning technology is negative related, or not related, to intention to use technology

H2A: Perceived ease of use of retirement planning technology is positive related to intention to use technology

H30: Subjective norm technology is negative related, or not related, to intention to use retirement planning technology

H3A: Subjective norm technology is positive related to intention to use retirement planning technology

On these hypotheses intention to use (ITU): is the dependent variable. "Intention to use" is defined here as the desire to use retirement planning technology, including software and Web-based applications. To test the hypotheses data were collected by means of questionnaires based on Davis' (1989) model. The questions used are presented on Exhibit 1. The population selected for this study includes American workers between the ages of 20 and 70. The

independent variables are the external variables in the modified model (Figure 3).

Methodology and Results

Descriptive Statistics

For the statistical analysis the following values were assigned to each answer: Strongly Agree, 5; Agree, 4; Neutral, 3; Disagree, 2 and Strongly Disagree, 1. Range, minimum, maximum mean and standard deviation are shown on table 1. Histograms of the answers are shown on appendix 2

The modified TAM used is shown on figure 3. 100 surveys (appendix 1) were distributed and 68 were returned. The results of the Cronbach alpha coefficients, which measure the reliability of the questions, were calculated and are shown on table 2. All alpha coefficients were higher than 0.7 confirming the reliability of the survey (Nunnally, 1987).

A regression analysis was used to determine the relative importance of each variable on intention to use. Table 3 shows the results of the regression analysis. Consistent with prior studies, the results indicate that perceived ease of use and perceived usefulness are strong determinants of intention to use. Interestingly subjective norm, image, output quality and result demonstrability share the same moderate level of impact on intentions to use. This contrasts with other studies where results indicated that subjective norm and image are not significant predictors of intention to use

Table 1- Cronbach Alpha Coefficients

Using computer technology I will be able to better prepare for my retirement	Perceived ease of use	0.909
I find these types of computer based tools useful to help me prepare for my retirement	Perceived usefulness	0.852
People important to me think I should use computer technology to plan for my retirement	Subjective Norm	0.761
Prestigious People use computer technology to plan for their retirement	Image	0.716
I am usually satisfied with the quality of the output I get from these computer based tools	Output Quality	0.709
I have no difficulty telling others about the results of using computer technology to plan for retirement	Result Demonstrability	0.745

Demographics

60% of the respondents were male and 40% female. The age groups distribution is shown on table 4. Crosstab analysis was conducted to determine whether any of the model inputs had a more or less significant level of impact on intention to use the technology, depending on gender or age. The results indicated that there is no significant difference among different age groups. Similarly, the analysis showed that intention to use does not change with gender. However, ease of use was a stronger predictor of intention to use among men, while all other parameters were equally important between men and women.

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Table 2- - Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
I find these types of computer based tools useful to help me prepare for my retirement	68	5.00	.00	5.00	3.7353	1.11459
If I have access to a computer, I will to use it to help me plan for my retirement.	68	4.00	1.00	5.00	4.0735	1.01211
Using computer technology I will be able to better prepare for my retirement	68	4.00	1.00	5.00	3.9412	1.04927
People important to me think I should use computer technology to plan for my retirement	68	4.00	1.00	5.00	3.2059	1.15331
Prestigious People use computer technology to plan for their retirement	68	4.00	1.00	5.00	3.3676	1.06371
I am usually satisfied with the quality of the output I get from these computer based tools	68	4.00	1.00	5.00	3.5000	.92236
I have no difficulty telling others about the results of using computer technology to plan for retirement	68	4.00	1.00	5.00	3.4118	1.10946
Valid N (listwise)	68					

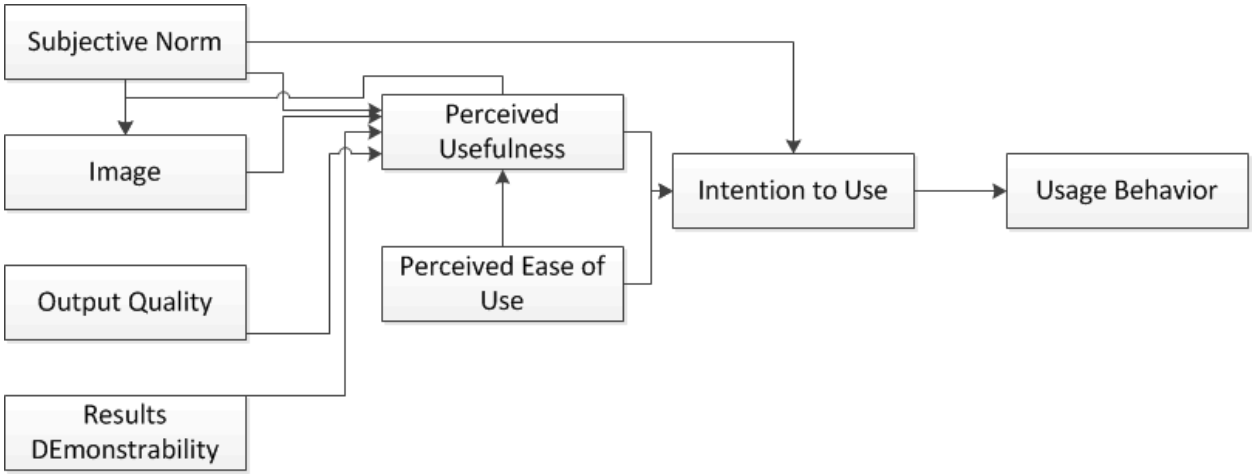

Figure 3 - Modified TAM for this Study

Conclusions

The Technology Acceptance model was extended to measure individual acceptance of information technology to plan for retirement. The results of the study presented here confirm the validity of the Technology Acceptance Model. Hypotheses H1A, H2A and H3A were validated. Perceived usefulness and perceived ease of use are the two most important determinants of intention to use computer based technology to plan for retirement. Subjective norm, image, output quality and result demonstrability showed to have a moderate impact on ITU. Crosstab analysis indicated that there are no significant differences on the results between male and females or among different group ages.

Additional research needs to be conducted incorporating crosstab analysis based on education level, geographic location and ethnicity. In addition, longitudinal studies over a period of time may be conducted to incorporate experience as a possible determinant of intention to use. The results of these analyses will help marketers of retirement planning software to develop products and strategies that better meet the demands of the marketplace.

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Table 3 - regression Analysis explaining Intention to use

Question	Model Input	R^2	β
Using computer technology I will be able to better prepare for my retirement	Perceived ease of use	0.694	0.833
I find these types of computer based tools useful to help me prepare for my retirement	Perceived usefulness	0.555	0.745
People important to me think I should use computer technology to plan for my retirement	Subjective Norm	0.248	0.498
Prestigious People use computer technology to plan for their retirement	Image	0.199	0.446
I am usually satisfied with the quality of the output I get from these computer based tools	Output Quality	0.440	0.440
I have no difficulty telling others about the results of using computer technology to plan for retirement	Result demonstrability	0.228	0.478

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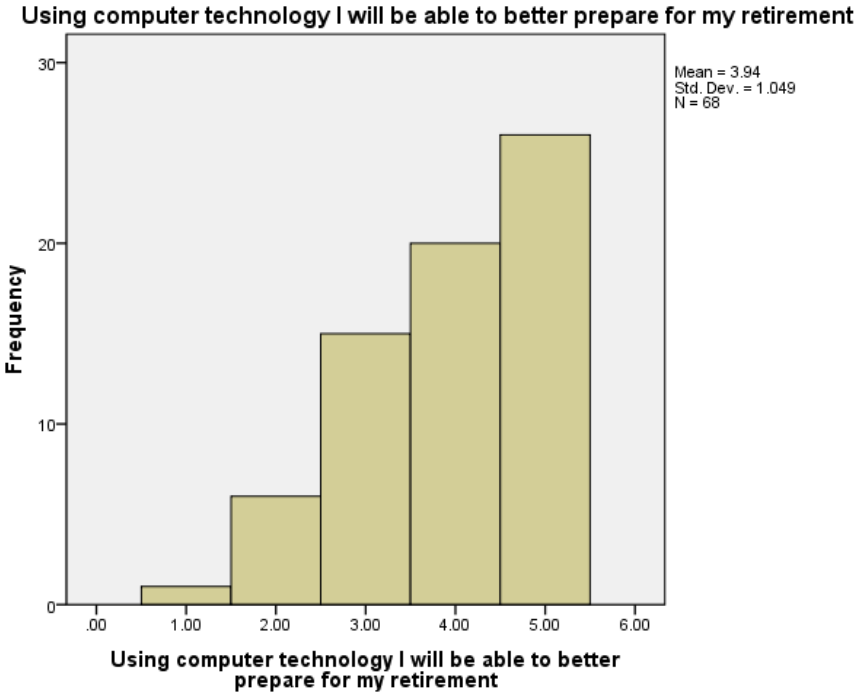
Table 4 - Age Distribution

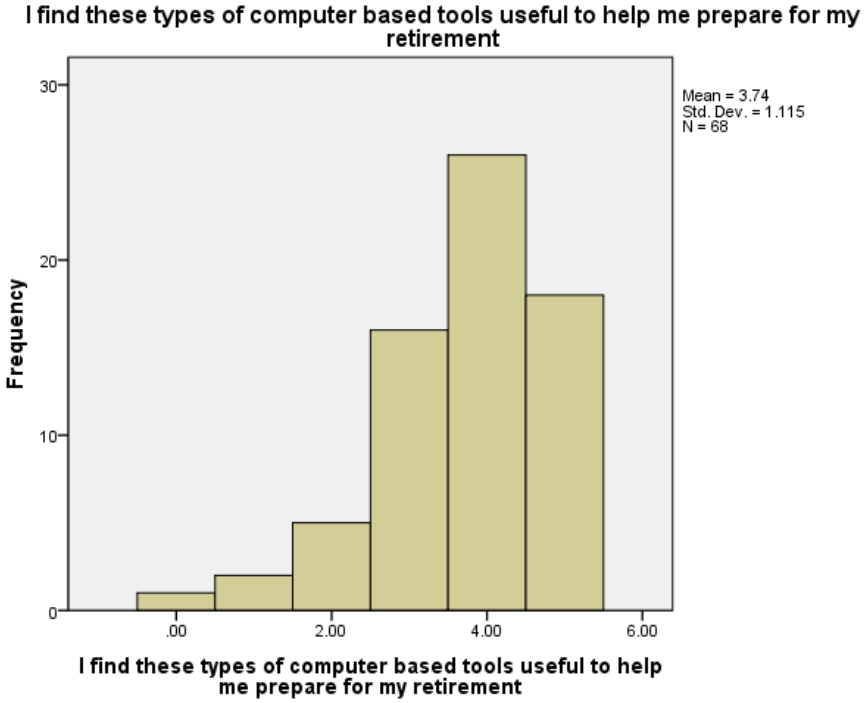
Age	Count	%
21-30	8	11.80%
31-40	6	8.80%
41-50	15	22.10%
51-60	**23**	33.80%
61-70	14	20.60%
>70	2	2.90%

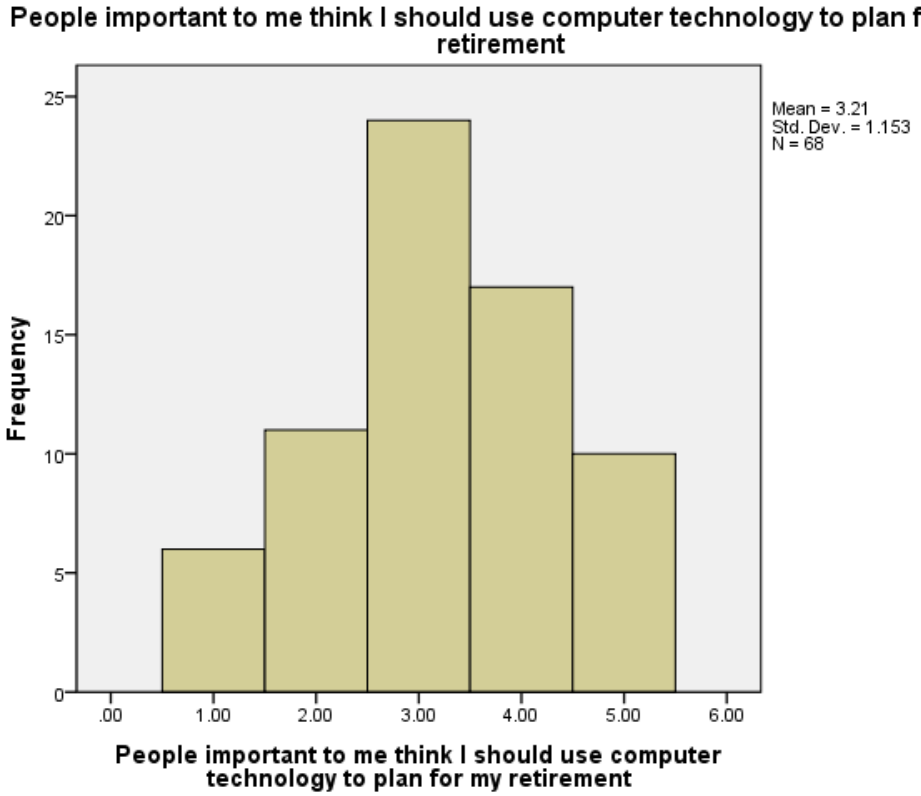
Appendix 1 - TAM Survey

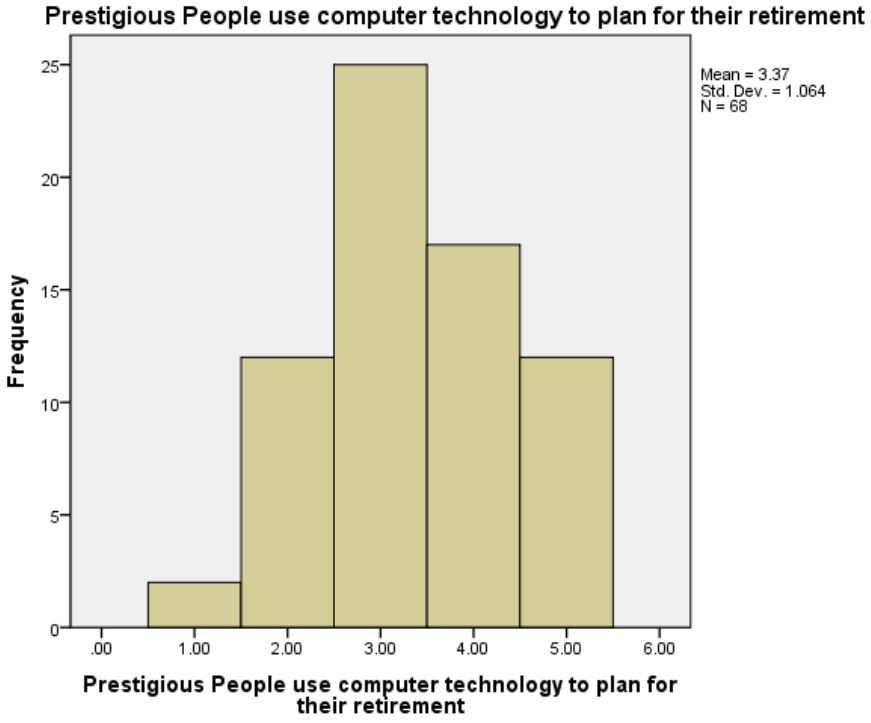
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
If I have access to a computer, I will to use it to help me plan for my retirement.	☐	☐	☐	☐	☐
Using computer technology I will be able to better prepare for my retirement	☐	☐	☐	☐	☐
I find these types of computer based tools useful to help me prepare for my retirement	☐	☐	☐	☐	☐
People important to me think I should use computer technology to plan for my retirement	☐	☐	☐	☐	☐
Prestigious People use computer technology to plan for their retirement	☐	☐	☐	☐	☐
I am usually satisfied with the quality of the output I get from these computer based tools	☐	☐	☐	☐	☐
I have no difficulty telling others about the results of using computer technology to plan for retirement	☐	☐	☐	☐	☐

Appendix 2 – Survey Histograms






People important to me think I should use computer technology to plan for my retirement
Mean = 3.21
Std. Dev. = 1.153
N = 68
Frequency
25
20
15
10
5
0
.00
1.00
2.00
3.00
4.00
5.00
6.00
People important to me think I should use computer technology to plan for my retirement


Prestigious People use computer technology to plan for their retirement
Mean = 3.37
Std. Dev. = 1.064
N = 68
Frequency
25
20
15
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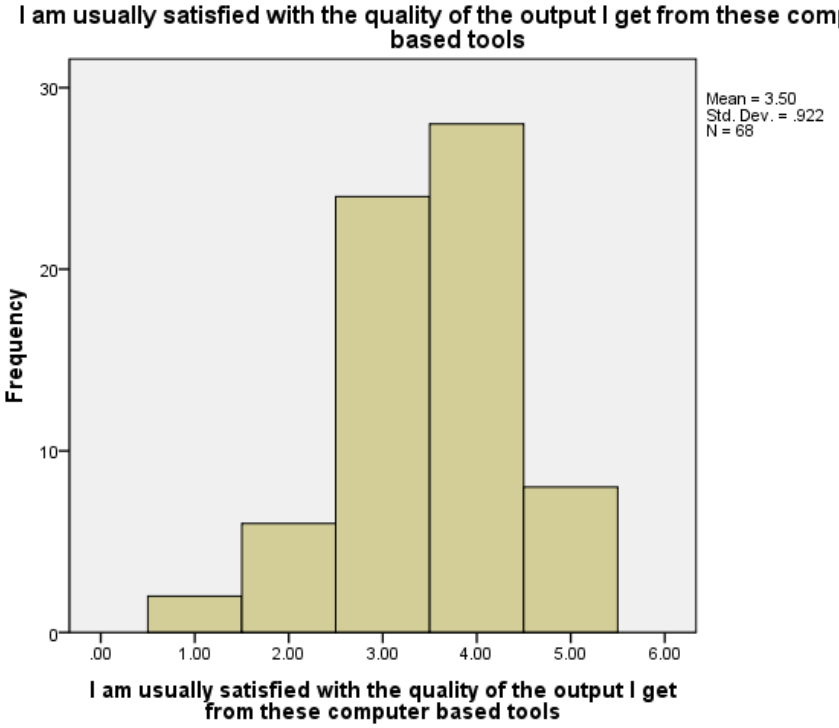
6.00
Prestigious People use computer technology to plan for their retirement


I am usually satisfied with the quality of the output I get from these computer based tools
Mean = 3.50
Std. Dev. = .922
N = 68
Frequency
30
20
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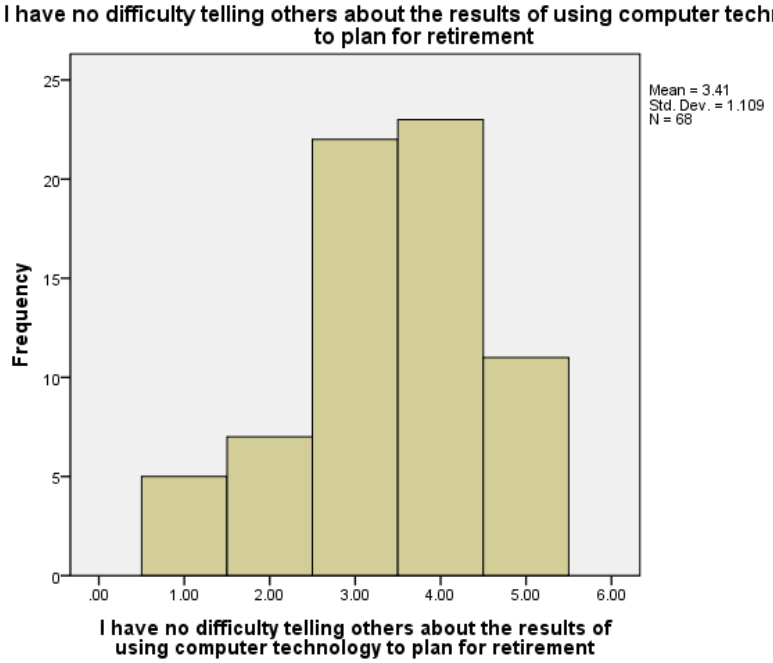
I am usually satisfied with the quality of the output I get from these computer based tools


I have no difficulty telling others about the results of using computer technology to plan for retirement
Mean = 3.41
Std. Dev. = 1.109
N = 68
Frequency
25
20
15
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6.00
I have no difficulty telling others about the results of using computer technology to plan for retirement