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DEVELOPMENT AND VALIDATION OF A COMPREHENSIVE SURVEY INSTRUMENT TO ASSESS LEAN IMPLEMENTATION

Atul Agarwal, University of Illinois at Springfield

Sudeep Sharma, University of Illinois at Springfield

Venkata Sesa Sai Bharath Mannava, University of Illinois at Springfield

ABSTRACT

In last several years lean production has emerged as a new paradigm to achieve operational efficiency and competitive advantage for most manufacturing organizations. Lean implementation continues to be a major challenge for most manufacturing companies. Most of the research on lean production is uni-dimensional with a focus on the relationship between its implementation and performance benefits. Few empirical studies that exist on lean implementation tend to focus on a very narrow set of lean practices. These studies also lack tests of reliability and validity for their lean constructs used in the survey instruments.

The purpose of this study is to develop a survey instrument for lean assessment among mid-west auto manufacturing firms. The instrument is intended to include a comprehensive set of lean practices than had been previously been studied. We also establish the reliability of the survey items by testing its internal consistency and construct validity so that it can be universally applied across other industry groups.

INTRODUCTION

The term “lean manufacturing” was coined by Womack et al. (1990) and embodies many of the best manufacturing practices adopted by Toyota Production System. It focuses on eliminating seven different categories of waste in any organization and promises benefits of low inventory, pull driven flow based system, higher levels of quality, and lower lead times. Given that there is no one size fit all method to apply Toyota’s lean practices, every company has to find its own way for lean implementation. In spite of widely available knowledge on lean practices, many companies find it difficult to implement them.

With leanness as the centerpiece of both operations management practice and research, it is defined as the total removal of waste to achieve competitive advantages (Womack, Jones, and Roos, 1990). Proponents argue that, in addition to eliminating waste, the proper implementation of lean practices improves productivity, reduces lead time and cost, and improves quality and overall competitiveness (Lowe, Delbridge, and Oliver, 1997; Sriparavasta and Gupta, 1997, Womack & Jones, 2003). “Plants with lean production policies are able to manufacture a wide range of models but maintain high degrees of quality and productivity” (Krafcik, 1988, in

Panizzolo, 1998, p. 224). Still, others contend that lean practices are too difficult, time consuming, fragile, complex, and costly to implement successfully (Cooney, 2002; Fliedner and Vokurka, 1997; Mason-Jones, Naylor & Towill, 2000; Yuself and Adeleye, 2002). For example, one of the most difficult issues is resolving human resource issues as workers strain to adjust to change and cost cutting measures (Albino & Garavelli, 1995; Bamber & Dale, 1999). Some researchers advocate a systems approach emphasizing the need for lean practices in all functions of an organization including, for example, product development. In short, lean must be organization-wide to be effective (Karlsson & Ahlstrom, 1996a; Womack & Jones, 1994).

To date, there have been spotty attempts to determine, especially across manufacturing industries, the portion of companies that are engaging in lean practices. The empirical research by Fullerton et al. (2003) examined JIT implementation within an organization using just ten lean practices. Doolen and Hacker's (2005) study was limited to twelve firms in the electronics industry in the northwest region of the U.S. Doolen and Hacker (2005) reviewed seven industry instruments and five academic research surveys to design a comprehensive tool to assess lean production practices. While the most comprehensive survey found to date, we modified the survey to include newer fundamental competitive technology-drive systems which were not included in the original survey. Doolen and Hacker found that all twelve of the manufacturers had implemented lean practices to some extent. For example, electronic manufacturers ranked highest in shop floor management, new product development and supplier management.

Sanchez and Perez (2004) surveyed 350 service companies but only received 108 useful responses from a single geographic region near Aragon in Spain. Their goal was to discover the use and usefulness of lean operations indicators. While restricted by limited sample size, they also concluded that company size was the most important factor in determining the extent to which service companies expressed the use of lean indicators. Panizzolo's (1998) earlier efforts included only twenty seven international firms. They concluded that to fully implement lean practices, the most important factors are the integration and management of external relationships, i.e., suppliers.

Wemmerlov and Hyer (1989) studied 53 U.S. metal working firms. They measured the benefits and extent of cellularization, i.e., the number and size of cells. Of the 53 surveyed, 32 used cellular manufacturing to varying degrees and were able to achieve gains through it. The only major support dimension for lean manufacturing considered in this study was human resources. Wemmerlov and Johnson (1997) conducted a similar follow-up study nearly ten years later. They found that of 46 plants studied, most found cellular manufacturing to be a benefit with regard to lead time, customer response time, and quality. However, organizational and human resource issues continued to be the most problematic. Prior to Wemmerlov et al (1989, 1997), there were some limited studies of companies using cellular manufacturing. These included Ham and Reed (1977), Levulis (1978), Burbridge (1979), and Hyer (1984). Again, these very early studies were limited in the number of participating plants or companies and focused primarily on group technology applications. Most of these empirical studies predated the development of useful research model for lean practices. These earlier studies did not rely on a comprehensive model nor did they measure most of the elements studied in the Doolen and Hacker research. In addition, most of these studies did not perform tests of reliability and

construct validity to confirm internal consistency of survey items with respect to various lean practice constructs used in the survey instrument.

While all of these studies have made important contributions to the body of lean literature, the question still remains, “What percentage of firms are actually using lean practices and to what degree across manufacturing industries? To what degree various lean practices are prevalent among manufacturing industries?” Therefore, the primary goal of this research is to develop a comprehensive lean survey instrument, test the validity and reliability of the survey items as measures of various lean constructs, and to study the extent of lean implementation among mid-west manufacturing organizations in United States.

METHODOLOGY

A comprehensive set of 29 representative lean practices was developed after reviewing relevant research literature, and reviewing surveys and assessment tools (Wemmerlov, Roos, & Jones, 1990; James-Moore and Gibbons, 1997; Panizzolo, 1998; Benteley, Nightingale, and Taneja, 2000; Karlson and Ahlstrom, 1996). Each lean practice was further divided into 3-5 follow on sub-practices. Respondents were asked to use a 5 point Likert scale to answer questions related to each of the lean sub-practice. The survey was made available online using www.monkeysurvey.com web site which hosted the survey. The link for the survey was made available to 200 manufacturing companies in the Midwest region. The names of these companies were procured using a variety of sources such as published directory of manufacturers and the listings available with the local Chamber of Commerce. Of all the completed surveys received, only 140 were found to be complete and usable. The next section summarizes results for testing the reliability and validity of the survey instrument which was a major shortcoming of the previous surveys on lean implementation. Initial results related to the extent and range of lean practices employed by mid-western auto manufacturing companies is also provided. Further analysis of the survey data is still in progress.

RESULTS

An exploratory factor analysis was conducted to identify the best items for each lean practice, resulting in a more manageably sized measure. Because the goal was to examine item loadings as one heuristic for selecting survey items rather than for the purpose of exploring the factor structure of overall lean process itself, our analytic strategy was similar to what previous research has suggested in selecting items (Gorsuch, 1983; Kline, 1992) - To examine each lean practice separately in a principal components analysis with varimax rotation containing only the items intended for that factor. Such procedure for item selection followed three criteria: (a) high loading on its intended process, (b) content assessing unique aspects of that particular lean process, and (c) maximum inter-item correlations. We used scree plot as the criterion for selecting number of factors, and found that the one-factor solution was the most suitable for each lean practice. The analysis of scree plot illustrated a strong linear (descending) trend after the

first eigenvalue. This trend provides mathematical support for a one-factor solution for the data (Bentler & Yuan, 1998, Reise, Waller, & Comrey, 2000). Exploratory factor analysis revealed that items related to specific lean practice explained satisfactory level of variance, with maximum 85.10 % of variance for Design for manufacturability practice and minimum 39% of variance for Multi skilled workers practice.

Table 1			
EXPLORATORY FACTOR ANALYSIS ON LEAN PRACTICES			
	Lean Practices	Reliability assessment (Cronbach alpha)	Validity assessment
1	Setup time reduction	0.67	44.0%
2	Work standardization	0.76	69.0%
3	Cellular manufacturing	0.70	77.2%
4	Value-add analysis	0.80	50.4%
5	Mistake proofing (Poka Yoke)	0.90	77.5%
6	Total preventive maintenance	0.77	47.3%
7	Cycle time reduction	0.77	69.0%
8	Total quality management	0.80	46.2%
9	5-S application	0.87	80.2%
10	Autonomation	0.83	86.0%
11	Production scheduling improvement	0.75	40.1%
12	Visual control implementation	0.78	82.0%
13	Small lot sizes	0.87	73.0%
14	Integrated flow operations (Nagara)	0.80	72.3%
15	Parts standardization	0.76	68.0%
16	Pull flow system	0.86	79.0%
17	Concurrent engineering	0.81	66.5%
18	Design for manufacturability	0.91	85.1%
19	Supplier evaluation	0.76	68.1%
20	Supplier total cost evaluation	0.79	62.0%
21	Supplier information exchange	0.83	55.3%
22	Supplier long term relationships	0.75	60.0%
23	Delivery performance	0.81	65.3%
24	Demand stabilization	0.73	66.0%
25	Product value enhancement by services	0.72	56.0%
26	Customer requirements analysis	0.85	70.2%
27	Product customization	0.79	62.0%
28	Multi skilled workers	0.68	39.0%
29	Employee empowerment	0.60	56.4%

Table 1 contains the percentage variance explained for each lean practice. It also lists the resulting reliability among items for each lean practice. The reliability coefficients for all the

lean practices were above satisfactory level, with the highest Cronbach alpha of .91 for Design for manufacturability practice and the lowest of .60 for Employee empowerment practice. The high reliability coefficients for all the lean practices suggest that the measure for each practice is coherent and internally consistent. Table 2 provides the percentage of respondent organizations using each of the lean practices and the degree to which those are implemented.

	Lean Practices	Percentages	Average	Standard Deviation
1	Setup time reduction	85%	2.37	0.71
2	Work standardization	97%	2.55	0.56
3	Cellular manufacturing	65%	2.17	0.74
4	Value-add analysis	83%	2.35	0.75
5	Mistake proofing (Poka Yoke)	78%	2.55	0.62
6	Total preventive maintenance	79%	2.28	0.80
7	Cycle time reduction	81%	2.50	0.63
8	Total quality management	88%	2.33	0.79
9	5-S application	73%	2.54	0.62
10	Autonomation	48%	2.32	0.65
11	Production scheduling improvement	80%	2.38	0.72
12	Visual control implementation	80%	2.46	0.59
13	Small lot sizes	63%	2.44	0.69
14	Integrated flow operations (Nagara)	33%	2.05	0.72
15	Parts standardization	74%	2.28	0.72
16	Pull flow system	58%	2.63	0.66
17	Concurrent engineering	74%	2.32	0.74
18	Design for manufacturability	68%	2.15	0.74
19	Supplier evaluation	86%	2.52	0.67
20	Supplier total cost evaluation	66%	2.12	0.78
21	Supplier information exchange	88%	2.47	0.66
22	Supplier long term relationships	77%	2.12	0.74
23	Delivery performance	90%	2.50	0.66
24	Demand stabilization	59%	2.50	0.83
25	Product value enhancement by services	77%	2.45	0.72
26	Customer requirements analysis	82%	2.39	0.72
27	Product customization	76%	2.44	0.66
28	Multi skilled workers	85%	2.35	0.69

UNDERSTANDING THE COMPUTER ASSISTED AUDIT TECHNIQUES ACCEPTANCE OF CPAs IN THAILAND: A CONCEPTUAL PAPER

Khajit Konthong, Mahasarakham University, Thailand
Krittaya Sangboon, Mahasarakham University, Thailand
Nath Srimuangtong, Mahasarakham University, Thailand

ABSTRACT

Conforming to the continuously development of information technology, the computer based system is implemented into business processing in most large and medium sized enterprises. Transaction data was electronically recorded in an organization database. Therefore, auditors adopt their audit procedures in accordance with the rapid change of information technology. To achieve the goal of auditing, auditors apply computer assisted audit techniques (CAATs) that are the certain software that can be used as part of the audit procedures to process data of audit significance contained in client computer information system. This study proposes a conceptual framework illustrated for the relationships among the factors of CAATs usage, CAATs usage, and audit performance. In addition, five factors of CAATs usage are posited based on the literature reviews related to technology acceptance model (TAM) and unified theory of acceptance and use of technology (UTAUT), including computer self-efficacy, perceived ease of use, perceived usefulness, social influence, and facilitating conditions. A construct of audit performance is also provided. Finally, this study ends with contributions and directions for future research.

Keywords: computer assisted audit techniques, CAATs, CPA, technology acceptance model, audit performance

INTRODUCTION

Certified public accountant (CPA) is a key person who attests to the reasonableness of disclosed reports, the freedom from material misstatement, and the adherence to the applicable generally accepted accounting principles (GAAP) in financial statements. The main responsiveness of professional auditor is related to assurance services or financial audit services. To ensure the reliability of published financial statements and maintain the public interest, CPA has a primary duty to provide an auditor's opinion that related to the evaluation of financial statements performed on a legal entity that able to be used for practical purposes of stakeholders such as investors, customers, creditors, and regulators. Basically, the audit processes include audit planning, obtain understanding of internal control and assess control risk, perform substantive test, complete the audit, and provide audit report. However, nowadays the audit processes are shifted according to the intensity of information technology (IT). The advantages of computer-based transaction processing, applied by client, are consisted of the characteristics such accuracy, reliability, timely, relevant, and economize the storage cost. The transaction data is recorded into the flat file which is easy to transfer and retrieve. In the audit procedures, CPAs must alter their audit techniques by implementing IT into the procedures to conform with the automatically processes based on the computer system of client's transaction processing, which the related evidences are recorded into

database. The most acceptable technique is called “Computer Assisted Audit Techniques (CAATs)” that improves the competency of professional auditors. Specifically, the well-known tool of CAATs is “Generalized Audit Software (GAS)”.

Generalized audit software is the application software created to read, retrieve, process, and store data with the help of functions performing specific audit routines and with self-determined conditions. The functions of GAS include importing computerized data, thereafter such data can be browsed, reviewed, sorted, statistically summarized, categorized, analyzed, taken samples from, calculated, and other operations with. By using GAS to analyze the involved evidences, auditors can boost their audit performance by increasing or even examine the data and transactions. To protect the authenticity of records, however, the data in GAS is locked down as read-only file, different from using spreadsheet software, that auditor cannot change and delete. Furthermore, auditors can recalculate and design the audit conditions for examining account balance, posting, and financial reports. Empirically, prior research indicated that implementing CAATs enhanced the quality of auditor (Coderre and Warner, 1999; Braun and Davis, 2003; Janvrin et al., 2008).

Determining the acceptance of CAATs, this paper develops the acceptance factors based on technology acceptance model (TAM). TAM stated that when users are presented with a new IT, the acceptability of IT is determined by two main factors consisted of perceived usefulness and perceived ease of use (Davis, 1989). Davis (1989) defined perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Perceived ease of use was defined as “the degree to which a person believes that using a particular system would be free from effort”. Based on TAM, Venkatesh et al. (2003) also developed the unified theory of acceptance and use of technology (UTAUT) that included four factors influencing the acceptance of IT, including performance expectancy (perceived usefulness), effort expectancy (perceived ease of use), social influence, and facilitating conditions. Furthermore, as the suggestion of Bandura (1977) the more a system is easy to use, the greater should be the user sense of self-efficacy. Therefore, this study also purposes self-efficacy as a factor influencing perceived ease of use and perceive usefulness. For the consequence of CAATs usage, audit performance, this study develops the construct of audit performance categorized by seven dimensions including performance in audit planning, staffing and conducting, IT and other tools usages, consultation and advice, evidence and documentation, supervision and review, and reporting and follow up.

Thus, the main objective of this paper is to construct the conceptual framework presenting the relationship between CAATs acceptance factors, CAATs Usage, and audit performance. The remainder of this study is organized as follows. The first section discusses the theoretical foundations and literature reviews. The second section provides the conceptual framework and proposition development. The third section describes the contributions and directions for future research. Then, the last section provides the conclusion of the study.

THEORETICAL FOUNDATIONS AND LITERATURE REVIEWS

The purpose of this study is to develop the conceptual framework related to the factors that influence CAATs usage and its consequence based on technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT). Therefore, this section reviews the literatures related to these theories as followings.

Technology Acceptance Model

Technology acceptance model (TAM), was tested by Davis et al. (1989) in an educational environment using MBA students. TAM is based on the theory of reasoned action (TRA) proposed by Fishbein and Ajzen (1985). TRA explains the behavior of members of organizations in specific situations. Accordingly, TAM applies TRA into the information technology acceptance situations. It is widely developed in information system research to describe the information technology acceptance process. TAM posits that the acceptance of information system is determined by two main factors including perceived ease of use and perceived usefulness. Also, intention to use information system serves the actual use. Moreover, this theory also posited that perceived usefulness is directly affected by perceived ease of use (Davis, 1989).

Davis (1989) asserted that perceived usefulness and ease of use represent the beliefs that lead to such acceptance. For the definitions, perceived usefulness is defined as “the degree to which a person believes that a particular information system would heighten his or her job performance” such as by reducing the time to achieve job or providing timely information. Perceived ease of use is defined as “the degree to which a person believes that using a particular information system would be free of effort”. Prior researches are generally extended TAM in three approaches including introducing factors from related models, introducing the alternative belief factors that impact intention to use, and investigating the antecedents of the existing belief factors (Wixom and Todd, 2005).

Shih (2004) investigated the influences of perceived factors, consisting of perceived ease of use and perceived usefulness, on attitude to use internet technology. The results indicated that perceived usefulness, attitude to use internet technology, and perceived performance are determined by perceived ease of use. Accordingly, perceived usefulness has a positive effect on perceived performance. Moreover, the investigation also found that relevance, the extended construct, has a significant role as the determinant of perceived factors and behavioral constructs. Likewise, Kerimoglu et al. (2008) investigated the organization adoption of ERP, according to TAM. They posited both perceived factors, perceived ease of use and perceived usefulness as the antecedents of ERP adoption satisfaction. Also, the designated common actors of ERP project including technology, user, organization, and project management as the factors influenced both perceived factors. For the results, they found that organizational adoption can only be accomplished if the satisfaction with the ERP system is achieved by competency and flexibility of the technology along with the special efforts of project management during project implementation. The investigation not only handles problems of ERP from a new perspective, but also provides researchers and managers with insight about adopting the ERP software across the organization.

Yi and Hwang (2003) investigated the critical factors influencing individual intention to use a web-based technology. They posited perceived ease of use and perceived usefulness as the factors influencing behavioral intention to use web-based information systems. In addition, they also posited self-efficacy, enjoyment and learning goal orientation as the determinants of perceived factors. The results indicated that such determinants positively affect both original perceived factors and the perceived factors also influence behavioral intention to use and actual use of web-based information systems, according to TAM. Furthermore, Wu et al. (2011) utilized TAM in understanding the determinants of user intention to use wireless technology in the workplace. Hence, the results indicated that TAM is successful in explaining user intention to use wireless technology in organizations.

Additionally, Ha and Stoel (2009) extended TAM with the integration of e-shopping quality, enjoyment, and trust into TAM to understand consumer acceptance of e-shopping.

The results revealed that e-shopping quality determined perceptions of usefulness, trust, and enjoyment, which in turn influence consumers' attitudes toward e-shopping. Consumer perceptions of usefulness and attitude toward e-shopping positively influenced intention to use online shopping, while perceived ease of use did not influence attitude toward e-shopping. Shopping enjoyment and trust played significant roles in consumers' adoption of e-shopping.

In addition, previous research investigated the acceptance of mobile technology using TAM framework. Hence, generally the results are related to TAM (Wu and Wang, 2005). Extensionally, previous researchers determined system quality, information quality, and service quality as the independent variables of perceived factors (Lederer et al., 2000; Ahn et al., 2007; Kerimoglu et al., 2008; Kim et al., 2008; Ha and Stoel, 2009). For the social network service acceptance, Hossian and de Silva (2009) and Kwon and Wen (2010) examined the validity of TAM in the acceptance of online social network service. Especially, Hossian and de Silva (2009) revealed behavioral intention to use social network service is depending on perceived ease of use and perceived usefulness. They also found that behavioral intention positively affects actual use of social network service.

Unified Theory of Acceptance and Use of Technology

Unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) developed through a review of the constructs of models that earlier research had employed to explain information systems usage behavior (theory of reasoned action, technology acceptance model, motivational model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, model of personal computer use, diffusion of innovations theory, and social cognitive theory). UTAUT describes user acceptance of IT toward a unified view and explain the factors affecting intention to use an IT and subsequent usage behavior. Four key constructs are proposed as determinants of IT acceptance including performance expectancy, effort expectancy, social influence, and facilitating conditions. It also postulated that the first three factors directly impact usage intention and behavior, and the fourth factor directly affects use behavior.

Martins et al. (2014) applied UTAUT in internet banking usage. They posited that first three determinants according to UTAUT affect intentional use of internet banking service and the last affects internet banking service usage. The results indicated that performance expectancy, effort expectancy, and social influence positively related to behavioral intention. Also, they found that the relationship between facilitating conditions and usage behavioral is not significant. Tarhini et al. (2013) posited that perceived ease of use and perceived usefulness affect behavioral intention to use web-based learning system. Social norm and quality of work life are also posited as determinants. Moreover, self-efficacy and facilitating conditions are postulated as determinants of actual usage. The results indicated that all determinants have positively effects on dependent variables. Mahzan and Lymer (2008) found that performance expectancy and facilitating conditions affected internal auditor's intention to adopt CAATs. Likewise, Baptista and Oliveira (2015) found that performance expectancy, hedonic motivation, and habit positively impacted intention to use mobile banking. Moreover, they also found that facilitating conditions and habit positively impacted actual use. In addition, cultural moderators affected the relationship between behavioral intention and actual use.

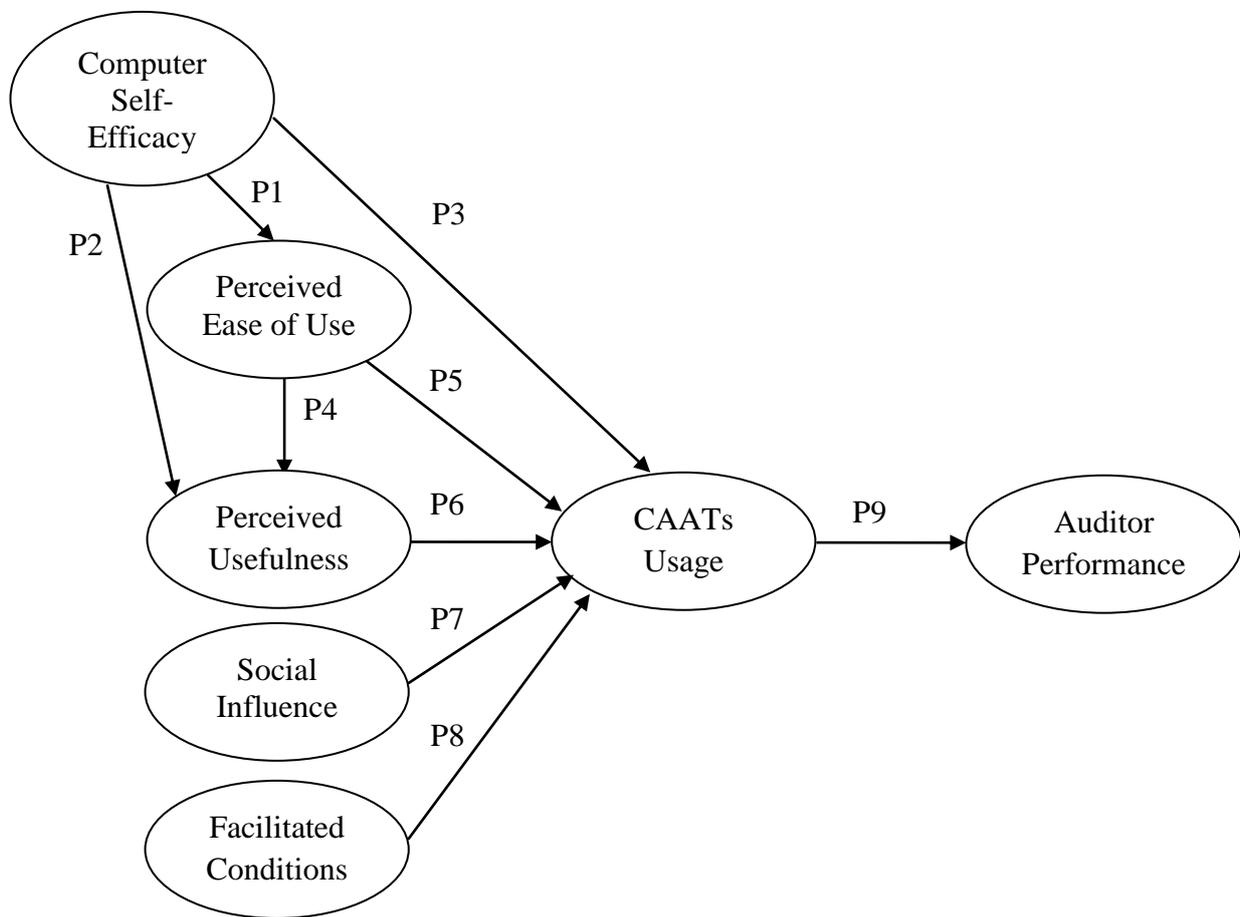
In auditing domain, Lian (2015) developed the construct of UTAUT into cloud based e-invoice service and also included perceived risk, trust, and security concerns as independent variables of behavioral intention. The results indicated that social influence and perceived risk positively impacted behavioral intention to use cloud based e-invoice service.

Additionally, Beirstaker et al. (2014) found that performance expectancy and facilitating conditions positively affected CAATs usage. Furthermore, Curtis and Payne (2014) adopted UTAUT into CAATs acceptance. They also include budget period as a determinant of intention to utilize CAATs.

CONCEPTUAL FRAMEWORK AND PROPOSITION DEVELOPMENT

This study proposes the relationship among five determinants of CAATs usage, CAATs usage, and auditor performance. Five determinants were developed through a review based on technology acceptance model (TAM) and unified theory of acceptance and use of technology (UTAUT). Thus, a conceptual framework of the relationships is illustrated as Figure 1. The related propositions are also provided thereafter.

Figure 1
CONCEPTUAL FRAMEWORK



Computer Self-Efficacy

Self-efficacy is the type of self-assessment that helps understanding behavior and performance in a certain task. In this study self-efficacy refers to people belief in their capacity to execute behaviors necessary to produce specific performance attainments (Bandura, 1977). Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behavior, and social environment. This study purposes computer self-

efficacy as a factor influencing perceived ease of use and perceive usefulness. Bedard et al. (2003) found that increases in computer efficacy are positively associated with shifts in system ease of use perceptions of auditors and increases in preparers' task. Computer efficacy is also positively associated with shifts in their ease of use perceptions of auditors. Therefore, this study proposes the following propositions.

Proposition 1: Self-Efficacy will be positively influence perceived ease of use.

Proposition 2: Self-Efficacy will be positively influence perceived usefulness.

Proposition 3: Self-Efficacy will be positively influence CAATs usage.

Perceived Ease of Use

Perceived ease of use refers to the degree to which people believes that using a particular information system would be free of effort (Davis, 1989). As perceive ease of use, effort expectancy is defined as the degree of ease associated with the use of the tool (Venkatesh et al., 2003). Prior research suggested that perceived ease of use of IT is the most significant factor of technology acceptance for accountants and auditors. Kim et al. (2009) found that when the information system has more features and complexity the intention to use of internal auditors is decrease. Likewise, Danila and Abdullah (2014) proposed that perceived ease of use positively affects satisfaction of e-government usage. Therefore, this study proposes propositions as follows.

Proposition 4: Perceived ease of use will be positively influence perceived usefulness

Proposition 5: Perceived ease of use will be positively influence CAATs usage.

Perceived Usefulness

Perceived usefulness is the degree to which a person believes that a particular information system would heighten his or her job performance (Davis, 1989). Consistently, Venkatesh et al. (2003) also defined performance expectancy in UTAUT model, as the degree to which people believe that using the tools will help them better achieve desired outcomes. By using CAATs, auditors can analyze large volumes of data looking for anomalies effectively. CAATs helps auditor complete review of all transactions when data volumes are huge, thus, reduces the number of hours spent conducting tests of controls and substantive testing. Therefore, CAATs usage enhances audit performance. Danila and Abdullah (2014) suggested that perceived usefulness positively affects satisfaction of e-government usage. Also, Bierstaker et al. (2014) found that perceived usefulness positively impacts auditor's acceptance of CAATs. Hence, the proposition is postulated.

Proposition 6: Perceived usefulness will be positively influence CAATs usage.

Social Influence

Social influence is defined as the degree to which people perceive that important others believe them should use the new system (Venkatesh et al., 2003). Lian (2015) found that social influence positively related to user's intention to use cloud based e-invoice service.

In an accounting context, Lee et al. (2010) found that social influence positively affects intention to use activity based costing and management system.

Proposition 7: Social influence will be positively influence CAATs usage.

Facilitated Conditions

Facilitated condition is defined as the degree to which people believe that an organizational and technical infrastructure exists to support them to use the system whenever necessary (Venkatesh et al., 2003). Using CAATs requires some skills such as using spreadsheet software and statistical analysis software. Auditor who has access to a favorable set of facilitating conditions such as software tutorial, demos, or other supports will have a greater intention to use CAATs. Bierstaker et al. (2014) found that facilitated conditions positively impacts auditor's acceptance of CAATs. Hence, the proposition is postulated.

Proposition 8: Facilitated conditions will be positively influence CAATs usage.

Computer Assisted Audit Techniques Usage

Computer assisted audit techniques (CAATs) is a significant tool for profession auditors, that is referred to the use of certain software that can be used by auditors to perform audits and to achieve the goal of auditing. It is advantageous for analyzing data contained in a client's computer information system which is the business processes of client driven by computer system. CAATs can be classified into four board categories; data analysis software, network security evaluation software, OS and DBMS security evaluation software, and software and code testing tools (Sayana, 2003).

Data analysis software is the most popular of the four and is loosely referred to as audit software. The generic products are term as general purposes audit software, as known as generalized audit software (GAS). GAS can extract any kinds of electronic file, such as flat file or tables within organization database. It can be used by auditors during their reviews with data processed from any application software on any platforms of operating system (OS) or any database management system (DBMS). GAS can import client's transaction data into audit software and operating with such data; such as fraud evaluations, indentified journal entries, data stratification, sample extractions, sorting and missing sequence identification, statistical analysis and calculation, and data comparison. Further, this software also can perform operations after combining and joining the files and tables and also test an entire population instead of sample. Hence, it can be designed the situations and specific conditions for effectively reviews to find out the extraordinary items. Prior research found that using CAATs influence auditor performance (Kogan et al., 1999; Olasanmi, 2013). Hence, the proposition is postulated

Proposition 9: CAATs usage will be positively influence auditor performance.

Auditor Performance

Auditor performance is competency of public accountant to effectively achieve the audit goal with the aim to determine whether the financial statements are present without biases and represent the actual financial position in accordance with generally accepted accounting principles (GAAP). Larkin (1990) suggested that auditor performance includes ability, professional commitment, motivation, and job satisfaction. Choo (1986) determined

the overall performance of auditor consisted of twelve performance dimensions, including maintaining quantity of work, maintaining quality of work, communication orally, communication in writing, accepting responsibility and initiating action, exercising professional skills and care, following policies and procedures, planning and organizing work, adapting to new or different situations, getting along with others within firm, dealing with clients outside the firm, and supervising others.

CONTRIBUTIONS AND DIRECTIONS FOR FUTURE RESEARCH

Managerial Contributions

As aforementioned above, this research leads auditor to light on factors that influence the acceptance of particular audit techniques, CAATs. The importance factors include computer self-efficacy, perceived ease of use, perceived usefulness, social influence, and facilitating conditions. Computer self-efficacy positively impact auditor's acceptance, hence auditors should develops their computer skills to clarify how to use and to perceive the advantage of technologies and also resulting in the intention to adopt such technologies. Moreover, social influence directly impacts technology acceptance, because auditor has a significant role to ensure and give the opinions whether those financial statements are provided appropriately. For facilitating conditions, it intends audit firm to provide the proper facilities for auditors such as training, computer skill enhancement, and the related computer hardware. Finally, this study suggests that auditor performance can be enhanced by using CAATs.

Theoretical Contributions

This study uses the contributions of two theories of technology acceptance, technology acceptance model (TAM) and unified theory of acceptance and use of technology (UTAUT), to shade up the significant factors influencing the acceptance of CAATs. The significant factors consist of perceived ease of use, perceived usefulness, social condition, and facilitating conditions. Based on literature reviews, this study also enhances the computer self-efficacy as the determinant of CAATs acceptance. In detail, computer self-efficacy positively affects perceived ease of use, perceived usefulness, and CAATs usage. Clearly, the conceptual framework of this study is provided. Furthermore, this study introduces the construct of auditor performance that is resulted from CAATs usage, consisted of planning and organizing, communication, initiation and adaptation, supervising others, and consultation and advice.

Directions for Future Research

This study suggests some directions for future research. First, further research should examine the relationships among influence factors, CAATs usage, and auditor performance using the various statistical techniques, such as structural equation model (SEM), regression analysis, or path analysis. Second, some factors can be added into the conceptual framework as determinants of CAATs usage, such as system trust, perceived risk, and perceived fund. Finally, to measure the dependent variable, the construct of auditor performance should be developed and its validity can be tested using confirmation factor analysis (CFA).

CONCLUSION

This study introduces the conceptual framework of the relationships among the influence factors, CAATs usage, and auditor performance. The model was developed based on two theories TAM and UTAUT and the reviews from previous research. Influence factors consist of computer self-efficacy, perceived ease of use, perceived usefulness, social influence, and facilitating conditions that positively impact CAATs usage. This study also posits that CAATs usage positively affect auditor performance. Accordingly, nine propositions are postulated. Moreover, this study provides the construct of auditor performance. Contributions and some directions of future research are also discussed.

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IMPACT OF DRIVING SIMULATION TRAINING ON ATTITUDES OF ADULT DRIVERS TOWARDS TEXTING-WHILE-DRIVING

Maheshwari, Sharad, Hampton University

ABSTRACT

Use of electronic devices, especially cell phones while driving, is causing havoc on US highways. USDOT reports over 5000 fatalities due to driver inattention; a vast majority of inattention is due to cell phone use. Research shows that Texting While Driving cause longer inattention thus more dangerous. Young and adult drivers alike are increasingly using cell phones for various activities while driving. Majority of states and localities in US have enacted rules putting some kind of restrictions on Texting While Driving. Besides law enforcement, educational and/or public service efforts are also being made to curb Texting While Driving.

This research is address one of the issues in educational efforts. Main objectives of the research are (1) to measure the cell phone usage by the adult drivers in a local area, and (2) to measure impact of driving simulation experience on attitude of adult drivers towards cell phone usage during driving. A field experiment was designed to investigate these two objectives. 100 randomly selected adult drivers participated in the study. In general, majority of drivers reported increased awareness towards Texting While Driving. This was largely due to the fact that participants saw reduction in the driving performance on the simulator screen. Detail data analysis show variations based on demographic factors age group, gender, etc. as well as some other factors.

MOBILE ADVERTISING AND PAYMENT

Pankaj Nagpal, Central Connecticut State University

ABSTRACT

In recent years, mobile advertising has shown strong growth. Apple, Facebook, and Google are key actors in this market. Mobile payment is a nascent field, on the cusp of growth. Apple, Google, and Samsung have announced their payment products at this time. Along with smaller players, these interrelated markets comprise key networks that will affect the evolution of mobile space as an advertising and payment medium. We use Actor Network Theory (ANT) as a lens to study the coming 'wars' among versatile multi technology companies such as Apple and Google, and specialists Facebook and Samsung. While this well reported categorization suggests very different strengths and disparate strategies, additional analyses suggest that there are some similarities among these four key players. Mobility related networks have additional implications for so called emerging markets where mobile phones have leapfrogged desktops as a device of choice. Theoretical implications, limitations, and conclusions are also discussed in the paper.

Keywords: Mobile phones, Advertising, Strategy, Payment, Actor Network Theory.

SUSTAINABLE INFORMATION TECHNOLOGY

Santosh Venkatraman, Tennessee State University

ABSTRACT

The relentless advancement and adoption of information technology in all aspects of our lives is a fantastic advancement, but also brings with it a unique set of environmental and sustainability problems. Sustainable information technology is the study and practice of environmentally responsible use of computers and related resources. Growing concern over global warming and related natural disasters have raised public concern towards green energy.

Modern IT systems rely upon a complicated mix of people, networks, and hardware; as such, a sustainable information technology initiative must cover all of these areas as well. A solution may also need to address end user satisfaction, management restructuring, regulatory compliance, and return on investment (ROI). There are also considerable financial motivations for companies to take control of their own power consumption. Several individual companies have an open industry standards that allow an operating system to directly control the power-saving aspects of its underlying hardware.

There are many ways to make IT more sustainable. The adoption of cloud technologies, for example, utilizes the most power efficient data centers and server technologies as the cloud provider update their facilities and servers for maximum efficiency in the interest of reducing their own costs and maximizing profits. Similarly, virtualization of servers within an organization leads to much better server utilization rates, and hence results in the purchase, operation, and maintenance of fewer computers. It is also important to responsibly dispose older technology equipment and not add to the already big problem of global electronic waste or e-waste.

The purpose of this article is to examine the budding field of sustainable information technology, and study the potential strategic and financial advantages to a company adopting green computing technology. This paper will be prove very beneficial to business managers as it will show them how to make their information technology more cost efficient and sustainable; which in turn will allow them to compete successfully in an increasing complex, global, inter-connected, data-driven world. IT academic researchers will gain a solid understanding of the potential of sustainable information technology, and be prepared to conduct research in this rapidly developing new field. Furthermore, IT educators will be able to prepare their students to go out and use sustainable IT to enhance not only their employers' bottom line and social responsibility, but also increase their own marketability.

AGILITY IN LARGE VOLUME, SMALL LOT MANUFACTURING

Andrew Yao, California State University, Northridge
Seung-Kuk Paik, California State University, Northridge

ABSTRACT

Changing market demands for improved services and product variations require flexibility in the production system by its personnel, production methods, changeover tooling and scheduling. Thus, many high volume production systems must assume the dual identity of both being lean and agile. One company in particular in the furniture industry has been very successful in meeting the challenges of both approaches through embracing and implementing the concepts of on-line, real-time communication, continuous improvement, and constant vigilance of customer needs. The company daily encounters a multitude of interactions with dozens of retailers, suppliers of the hundreds of fabrics and other components, and the numerous activities involved in production changeovers to meet delivery promises. In spite of severe space, scheduling and material handling constraints, the company closely monitors its supply chain, production and customer expectations within a fairly complex environment. The most significant factor in maintaining and increasing agility has been the reduction in production lot sizes. This has simultaneously led to the more effective use of labor, material, equipment and space. A simulation developed represents an existing production system. It generates expected outputs under conditions of operation variability, queue lengths (buffers) and batch changeover (set-up) times over a range of 3 uniform and feasible batch sizes. Thus, the real-time status and location of components and subassemblies consigned to a specific production batch is essential for maintaining and improving quality and utilization of personnel, space, material and other resources.