

Adoption of E-Learning Technology for Anti-Money Laundering Training

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Abstract— E-learning technologies provide an ideal platform for corporate-wide compliance training for employees. This paper contributes in developing a complete model for studying diffusion of e-learning for anti-money laundering (AML) training in the banking workplace. We include factors from multiple perspectives, apply the model for AML training in United Arab Emirates (UAE) banks, and formulate its characteristics. Results indicate that only two factors, *Complexity* and *E-learning Readiness*, affect the use of e-learning for AML training in UAE banks workplace. The results suggest that both local and multinational banks in the UAE are at fairly early stages of e-Learning adoption for training in workplace.

Index Terms— E-learning, E-learning in AML Training, E-learning Readiness, Workplace learning, E-learning Adoption.

I. INTRODUCTION

While globalization has given rise to new economic interdependency with several benefits and business opportunities, it has created a new set of problems. Since 1980s, money laundering has been recognized as a serious crime by several countries. Money laundering has become a global concern mainly due to increasing integration of financial sectors [3,4,8,23]. The post-9/11 environment and the recent monetary penalties borne by banks engaged in money laundering activities make the adoption of these technologies even more impending. China uncovered 89 cases of money laundering involving a total of 28.8 billion Yuan (\$4.17 billion) in 2007, and a total of 350 financial institutions were fined for violations of anti-money laundering rules and regulations [5,11]. E-Learning technologies provide an ideal platform for anti-money laundering (AML) training in the banking workplace, in addition to other corporate-wide compliance training programs. The research develops a model for investigating the diffusion of E-Learning technologies in the banking sector.

According to the UAE central bank, UAE banking sector is one of the most competitive in the world, with nearly 47 banks operating in UAE in 2007. With intense competition, banks in the UAE have struggled to improve their customer service levels and to launch innovative products. Based on the data from the UAE central bank, there were more than 20,000 people working in the banks in 2004 who should be trained.

The Central Bank of the UAE established a special unit for investigating fraud and suspicious transactions in

July 1998. The promulgation of the Federal Law by the UAE authorities regarding the criminalization of money laundering took place on January 22, 2002. The law defines money-laundering as “any act involving transfer, conversion of deposit of property, or concealment or disguise of their true nature, knowing that such property is derived from any of the stated offences which include trade in narcotics, kidnapping, piracy or terrorism and offences in breach of international conventions to which the UAE is a signatory” [3,24].

E-learning can be considered as a preferred methodology to train employees for a variety of reasons, such as:

- e-learning leads to quicker, more accurate and consistent training from an anti-money laundering compliance viewpoint.
- e-learning is considered as a managed approach that allows for continuous learning, which enables the staff to monitor and report suspicious transactions.
- from a regulatory perspective, the audit trails of assessments prove to the regulator that effective training is indeed being conducted.
- from a cost perspective, e-learning is a long-term solution for cost control if we consider the rising cost of training to achieve the anti-money laundering focus that regulators want [1,6,7,9].

Organizations, such as commercial banks have enjoyed success with their e-learning project. As an example, First Niagara has a program to teach compliance procedures to about 4000 employees [13]. This project has been effective with over 95 percent success rate.

This research establishes the status of e-learning in the UAE banks and identifies the specific impediments to diffusion of e-learning in the context of the UAE. More specifically, this research is an explanatory study that explores the following research questions:

Question 1: What are the characteristics that distinguish the national banks from the multinational banks in adopting the e-learning training for anti-money laundering?

Question 2: What are the characteristics that significantly affect the banks who adopt e-learning from those who do not adopt e-learning for anti-money laundering training?

This paper is organized as follows. Section II outlines the theoretical framework for transfer of training in e-learning and provides a literature review. Section III describes the research model used in the paper. Section IV presents the survey design and validation techniques used. Section V discusses the results and section VI presents the conclusions.

II. THEORETICAL FRAMEWORK FOR TRANSFER OF TRAINING IN E-LEARNING

The diffusion of innovations (DOI) has been the basis of a wide-ranging body of research within the fields of information technology and information systems [10-17]. According to Rogers [18], innovation is defined as “an idea, practice, or object that is perceived as new by an individual...”. Rogers [19] describes diffusion as ‘the process by which an innovation is communicated through certain channels over time among the members of a social system’. Rogers [19] defines five innovation attributes that are typically identified as being important for rapid diffusion:

- **Relative Advantage:** For example, the benefit perceived by banks in adopting e-learning to conduct business as measured by lower business cost or wider market coverage.
- **Compatibility:** For example, how well banks think the new innovation (i.e., e-learning) will fit into their existing business process.
- **Complexity:** For example, what is the perceived difficulty of banks in adopting e-learning?
- **Trialability:** For example, e-learning is more trialable if business conversion can be carried out in phases and if grant is provided to cover high start-up costs.
- **Observability:** For example, the bank’s ability to see beneficial results of using e-learning by other businesses.

Different theories have been formulated to examine the adoption and diffusion of IT innovations. For example, IT innovation research has investigated a large number of theories, including Innovation Diffusion Theory, Innovation Diffusion Theory for organizations, Technology Acceptance Model (TAM), Theory of Planned Behavior, Perceived Characteristics of Innovating, Unified Theory of Acceptance and Use of Technology, and Diffusion/Implementation Model [10]. Moreover, these theories propose different variables, such as innovation characteristics, organizational characteristics, and environmental characteristics. Innovation characteristics include Relative Advantage, Complexity, Compatibility, Observability, and Trialability. Organizational characteristics include Top Management Support, Championship, Organization Structure, Centralization and Formalization, Internal Influence and External Influence, Organization Size, and Organization Slack [10]. Environmental characteristics include External Pressure, Competition, and Coercive Influence [15].

III. RESEARCH MODEL

To explore the essential factors that influence e-learning diffusion in UAE banks, Figure 1 demonstrates the model that is constructed based on the theories discussed in section II.

This model helps to improve the understanding of e-learning diffusion in UAE banks. The model consists of seven main entities namely, innovation characteristics, organization characteristics, environmental characteristics, e-learning readiness, stages for anti-money laundering, banks categories and degree of adoption.

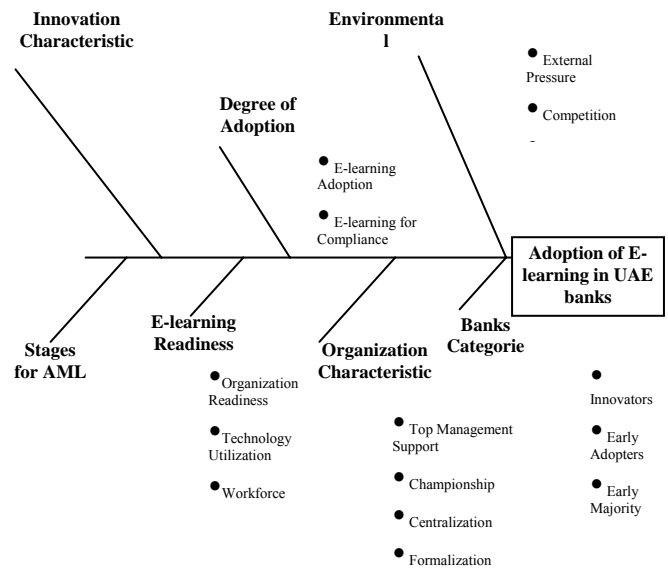


Figure 1: Research Model

A. Innovation Characteristics

The innovation characteristics include the following variables: *Relative Advantage*, *Compatibility*, *Complexity*, *Trialability* and *Observability*. This entity is mainly used to examine the innovation characteristics that will affect the adoption of e-learning for AML training.

Relative Advantage variable examines many issues; it checks whether e-learning for AML training improves the quality of training when compared with traditional training methods. *Compatibility* variable tests multiple issues, specifically if using e-learning for AML training is consistent with the bank’s existing values.

Complexity variable examines whether implementing e-learning to accomplish AML compliance training is easy. *Trialability* variable looks if it is easy for the bank to try various e-learning applications for AML training before making a commitment to buying or implementing. *Observability* examines if the bank’s management has learned new ways of using e-learning for AML training from competitive banks.

B. Organization Characteristics

Organization characteristics are the variables that consider organizational level issues for adoption such as,

Top Management Support, Championship, Centralization, Formalization, Internal Influence, External Influence and Organization Slack.

Top Management Support examines if the senior management pressure is one of the key reasons for the adoption of new IT innovations in the bank. The *Championship* variable investigates whether there is a well-placed champion who facilitates the acceptance and implementation of IT initiatives (e.g., introduction of e-learning for AML training) in the bank.

Formalization investigates if the AML compliance officer or equivalent role has the authority to choose and select different training models for AML. *Internal Influence* looks if the bank has a culture and tradition of using IT whenever appropriate.

External Influence checks if the bank feels that it will be left behind if it does not adopt technologies such as e-learning and if employees typically have the free time to attend workshops and other traditional training events. In addition, *Organization*

Slack tests if the bank has enough resources to invest in a long-term e-learning platform to handle the AML compliance training.

C. Environmental Characteristics

The environmental characteristics measure the following variables: *External Pressure, Competition* and *Coercive Influence*. *External Pressure* variable tests if there is pressure from banking industry to use technology to address AML compliance and if the employees feel pressured by their colleagues and peers to be effective in using IT technology in establishing AML compliance in the bank. *Competition* tackles if not using e-Learning for anti-money laundering training may have an impact on the bank's competitive edge. *Coercive Influence* checks if the bank is under pressure from the government and the international compliance agencies to implement AML training efficiently and in a timely manner.

D. Banks categories

The banks categories entity identifies the banks into five categories: Innovators, Early Adopters, Early Majority, Late Majority and Laggards. *Innovators* are the first to adopt a new idea. Specifically, the *Innovators* category tests if bank's management is innovative and eager to be the first to adopt new IT technologies. *Early Adopters* category measures whether the bank's management often uses other banks' experience of innovative uses of IT technology to gain more information and to make decisions. *Early Majority* investigates if the bank's management is willing to adopt new IT technology but is not willing to be a leader in the change process among other banks. *Late Majority* category measures if the bank's management is generally cautious about introducing new IT technology in the bank. *Laggards* are the last individuals to adopt an innovation. Specifically, this category checks if the bank's management typically show resistance towards

adoption of new IT technology or training program until they are sure that it will be successful.

E. E-learning Readiness

E-learning Readiness entity measures the readiness of the organization in terms of technology readiness, resources, cost and management. In particular, this variable checks how well the bank is in using (Internet and Intranet) technology to run its business, how well prepared (skills, knowledge, motivation) is the workforce to compete and win in the high-tech and new economy and how the bank does define "e-Learning?"

F. Stages for anti-money laundering

The stages for AML entity measure the application of AML in the banks. This variable checks if the bank requires reporting any suspicious client activities to the regulatory authority immediately and whether the bank has a written policy designed to combat money laundering. This variable also tests if the bank's board and senior management consider AML to be a high priority and whether they actively demonstrate their commitment to the bank's AML effort.

G. Degree of Adoption

Degree of Adoption entity examines whether the organization is ready to adopt a technology innovation or not. Specifically, this variable identifies if the bank uses e-learning and the year they started using it. In addition, the Degree of adoption variable checks if the bank develops most of the e-learning content internally (as opposed to buying off-the-shelf) and whether the bank outsource the development of customized e-learning content.

IV. SURVEY DESIGN AND VALIDATION

Based on the model discussed earlier, a research question survey was designed. A pilot test was run first, where a small focus group from three banks was picked and the first draft of the survey was sent to each member of the group. The purpose of this step was to get their feedback on the type of questions and whether they are relevant to the banking sector or not. The survey was judged to be reliable (Kendall's Coefficient of Concordance is 0.915 and p-value<0.005). Table I shows the primary constructs considered in the survey.

A. Analysis and Discussion

Data were collected over a six-month period and Minitab was used as a statistical analysis tool. Due to the small sample size (n=25), Binary Logistic Regression and ANOVA were used as the primary analytical tools. The items or variables in the survey were formed as a five point Likert scale ranging from "strongly disagree" to "strongly agree", where the minimum = 1 and the maximum = 5. An overall weighted average was used for each construct. For example, *Relative Advantage* variable had 5 questions. Weighted average of the Likert score

(e.g. 3) for each question was calculated to get one number that describes this variable. Tables I and II describes the structure and statistics of the survey. The Kolmogorov – Smirov p-value indicates that there is no evidence to reject the hypothesis that the data follows a normal distribution at α (0.05).

As Table II shows, with respect to the innovation characteristics, *Triability* (2.084/5) and *Complexity* (2.968/5) were generally not considered important for the adoption of e-learning for AML. On the other hand, there is a perception that e-learning has high *Compatibility* (4.608/5) from the perspective of its adoption. At the organization level, *Championship* (1.568/5) and *Formalization* (1.256/5) of roles were not present for e-learning adoption. This means that banks in the UAE are generally perceived to lack a champion who will facilitate the acceptance and implementation of the e-learning innovation and the bank staff such as the compliance officer is not given the authority to select different training models for AML. In contrast, *Top Management Support* (4.176/5), *Centralization* (4.16/5) and *Organization Slack* (4.04/5) are perceived to be high.

Table I : Structure of the Survey

Constructs / Variables	# Questions	Source
<i>E-Learning Adoption</i>	12	(Moore and Benbasat [12]), (Rogers [19])
<i>Banks Categories</i>	13	(Rogers [19])
Innovators	3	
Early adopters	2	
Early majority	3	
Late majority	2	
Laggards	3	
<i>Innovation Characteristics</i>	24	(Rogers [19])
Relative Advantage	5	
Compatibility	6	
Complexity	4	
Triability	3	
Observability	6	
<i>Organizational Characteristics</i>	14	(Rai et al., [17]), (Grover et al. [7]), (Loh and Venkatraman [12]), (Teng [21])
Top Mgmt. Support	5	
Championship	2	
Centralization	1	
Formalization	2	
Internal Influence	2	
External Influence	2	
Organization Slack	1	
<i>Environmental Characteristics</i>	4	(Iacovou et al. [9]), (Grover et al. [7])
External Pressure	2	
Competition	1	
Coercive influence	1	
<i>E-Learning Readiness</i>	20	(Rosenberg [20])
<i>Stages for AML Program</i>	16	(KPMG [11])
Total	103	

Table II : Statistics for e-learning variables

Factors	Variables	Mean	S.D	Kolmogorov - Smirov P-Value
Innovation Characteristics	Relative Advantage	3.6	0.81	>0.15
	Compatibility	4.608	0.926	>0.15
	Complexity	2.968	0.579	>0.15
	Triability	2.048	0.371	>0.15
	Observability	3.832	0.816	>0.15
Organization Characteristics	Top Mgmt. Support	4.176	0.578	>0.15
	Championship	1.568	0.293	>0.15
	Centralization	4.16	0.688	>0.15
	Formalization	1.256	0.262	>0.15
	Internal Influence	3.92	1.077	>0.15
	External Influence	1.336	0.399	>0.15
	Organization Slack	4.04	0.841	>0.15
Environmental Characteristics	External Pressure	1.4	0.231	>0.15
	Competition	3.68	0.802	>0.15
	Coercive Influence	4.2	1	>0.15
	E-learning Readiness	3.152	0.856	>0.15

This implies that the bank's management knows well and supports e-learning for AML training but still lacks a champion and due to high centralization of e-learning and high availabilities of resources, it is assumed that banks will adopt e-learning quickly.

In addition, *Coercive Influence* (4.2/5) was high meaning that banks feel that they are under pressure from the government and the international compliance agencies to implement AML training efficiently and in a timely manner. This is in contrast to *External Influence* (1.336/5) which was low meaning that banks do not feel that they should adopt e-learning because their competitors have done so. The E-learning Readiness (3.152/5) was somewhere in the middle, where some banks think that they are ready to use e-learning and others are not.

V. DISCUSSION AND FINDINGS

We now describe the research questions and discuss our findings.

A. Research Question 1

Q1: What are the characteristics that distinguish the national banks (NBs) from the multinational banks (MNBs) in adopting the e-learning innovation?

To answer this question, ANOVA F(1,22) was run on each variable where NB group included 13 national banks and MNB group included 11 multinational banks. Table III shows that *none of the variables significantly differed between the national banks from the multinational banks.*

Table III: Statistics for national vs. multinational Banks

Factors	Variables	F (1,22)	P-value
Innovation Characteristics	Relative Advantage	0.69	0.414
	Compatibility	1.63	0.215
	Complexity	0.00	0.960
	Triability	0.15	0.705
	Observability	0.02	0.877
Organization Characteristics	Top Mgmt Support	0.03	0.854
	Championship	0.34	0.564
	Centralization	0.03	0.861
	Formalization	3.51	0.075
	Internal Influence	1.62	0.216
	External Influence	1.67	0.209
Environmental Characteristics	Organization Slack	0.20	0.661
	External Pressure	1.61	0.218
	Competition	0.44	0.516
	Coercive Influence	0.46	0.505
	E-Learning Readiness	0.17	0.680
	Stages for AML	0.20	0.656
	Degree of Adoption	0.41	0.527

Since the results from ANOVA test showed no significant evidence on the characteristics that distinguish the national from the multinational banks, a K-means cluster analysis was carried out to define a new grouping schema. Multiple clusters were tried out using the 18 variables and the best distance centroid of clusters was for 2 clusters which was used to identify the groups where **CG1 (Cluster Group 1)** includes 12 banks (7 national banks and 5 multinational banks) and **CG2 (Cluster Group 2)** includes 12 other banks (6 national banks and 6 multinational banks). One bank was excluded because it was an outlier to the cluster of observation. The groups included a combination of national and multinational banks where there were no obvious similarities in the banks and the number of employees ranged from 100 to more than a thousand. The Kolmogorov – Smirnov p-value ($p < 0.01$) indicates that there is an evidence to reject the hypothesis that the data does not follow a normal distribution at $\alpha (0.05)$. Accordingly, Kruskal-Wallis Test (a non-parametric test) was run on the total number of employees versus k-means clustering groups. The test showed that there is no difference in the median ($p\text{-value} < 0.204$). Another Kruskal-Wallis Test was run on the net profit before tax versus k-means clustering groups. The test showed again that there is no difference in the median ($p\text{-value} < 0.149$).

ANOVA was run on the new grouping to explore if there are any characteristics that will distinguish between the groups and Table IV shows the result. The analysis revealed that *Top Management Support, Formalization, Internal Influence, External Influence, Organization Slack, E-learning Readiness* and *Stages for AML* are the significant variables that distinguish CG1 from CG2.

It seems that CG1 has more *Top Management Support* $F(1,22) P < 0.001$, less *Formalization* $F(1,22) P < 0.006$, more *Internal Influence* $F(1,22) P < 0.034$ and *External Influence* $F(1,22) P < 0.024$, more *Organization Slack* $F(1,22) P < 0.001$, more *E-learning Readiness* $F(1,22) P < 0.005$ and is advanced in *Stages for AML* $F(1,22) P < 0.001$ while CG2 had a higher *Formalization* $F(1,22) P < 0.006$.

Table IV: Statistics CG1 vs. CG2

Factors	Variables	F (1,22)	P-value
Innovation Characteristics	Relative Advantage	0.41	0.528
	Compatibility	3.60	0.071
	Complexity	1.08	0.310
	Triability	0.29	0.598
	Observability	0.28	0.601
Organization Characteristics	Top Mgmt Support	13.71	0.001*
	Championship	1.94	0.177
	Centralization	2.57	0.123
	Formalization	9.16	0.006*
	Internal Influence	5.14	0.034*
	External Influence	5.90	0.024*
	Organization Slack	13.42	0.001*
Environmental Characteristics	External Pressure	0.77	0.391
	Competition	0.00	1.000
	Coercive Influence	0.35	0.560
	E-Learning Readiness	9.63	0.005*
	Stages for AML	14.75	0.001*
	Degree of Adoption	1.79	0.195

In order to determine the causal relationship between *Banks Categories* and *Banks Nationality*, Binary Logistic Regression (BLR) [14] was carried out on each of the variables in the survey. Binary logistic regression is a technique for predicting the mean value of a binary response variable as a function of one or more covariates. This is used to determine factors that affect the presence or absence of a characteristic when the dependent variable has two levels. The analysis revealed that there is no causal relationship between the Banks Categories

(Innovators (p-value = 0.336), Early Adopters (p-value = 0.942), Early Majority (p-value = 0.193), Late Majority (p-value = 0.984) and Laggards (p-value = 0.141)) and the banks' nationality.

B. Research Question 2

Q2: What are the characteristics that significantly affect the banks that are using e-learning for anti-money laundering training from those who are not using e-learning?

Out of the twenty five banks that responded to the survey, five banks were using e-Learning for AML training and twenty were not. There were no obvious similarities in the banks that had adopted e-Learning; this group included both local and foreign banks and the number of employees ranged from 300 to more than a thousand.

The Kolmogorov – Smirnov p-value ($p < 0.01$) indicates that there is an evidence to reject the hypothesis that the data does not follow a normal distribution at α (0.05). Accordingly, Kruskal-Wallis Test (as non-parametric test) was run on the total number of employees versus UEL (Using E-learning) group and NEL (Non-using e-learning) group. The test showed that there is no difference in the median (p-value <0.118). Another Kruskal-Wallis Test was run on the net profit before tax versus UEL group and NEL group. The test showed that there is difference in the median (p-value <0.035) but this result does not indicate anything since this test is just comparing medians.

In order to determine factors that distinguished banks that do not use e-Learning (NEL group) from those who do use e-Learning (UEL group), ANOVA was carried out on each of the variables in the survey. The analysis revealed that *Complexity* (ANOVA $F(1,23)=4.81, p<0.039$) and *e-Learning Readiness* (ANOVA $F(1,23)=9.64, p<0.005$) are the significant factors that distinguished NEL group from UEL group. Table V shows the ANOVA results.

Since no previous research in the area of adopting e-learning for AML training in banks was found, the research findings will be related with previous research that was done on the adoption of IT/ICT. Bishop, Clark & Grand [2] recommended that available resources, management support and follow-up are important for the adoption of IT/ICT, and these variables showed no significant in our case. Dhanarajan [6] indicated that lack of existing infrastructure, lack of commitment from top management, low level of knowledge and skills and need to train intended users influence the adoption. These results are consistent with our study where these factors are considered in the *E-learning Readiness* variable.

Tronatzky and Klein [22] found that innovation characteristics have a relationship to the innovation adoption. They concluded that users are more likely to use the technology that has a high *Relative Advantage*.

However, in our research, *Relative Advantage* seems to have no effect of the adoption of the e-learning innovation. In [16], it was emphasized that *Compatibility* has a positive influence on the adoption, but in our case this variable has no influence in the adoption as well. It was also found that technology attributes such as speed, reliability, accessibility and top management support and allocation of adequate resources for technology investment have influenced the adoption. Similarly, our research showed that speed, reliability and accessibility, which are part of the *E-learning Readiness* variable, have a significant impact on the adoption. However, *top management support* was not significant in the analysis.

Table V: Statistics for NEL and UEL groups

Factors	Variables	F (1,23)	P-value
Innovation Characteristics	Relative Advantage	0.24	0.632
	Compatibility	1.38	0.252
	Complexity	4.81	0.039*
	Triability	0.56	0.462
	Observability	0.21	0.651
Organization Characteristics	Top Mgmt Support	0.94	0.344
	Championship	1.74	0.200
	Centralization	0.75	0.395
	Formalization	0.05	0.824
	Internal Influence	0.41	0.527
	External Influence	0.16	0.697
Environmental Characteristics	Organization Slack	3.01	0.096
	External Pressure	0.00	1.000
	Competition	0.99	0.329
	Coercive Influence	1.00	0.328
	E-Learning Readiness	9.64	0.005*
	Stages for AML	2.32	0.141
	Degree of Adoption	3.08	0.092

C. Complexity

Figure 2 shows a dot plot for *Complexity* where it is obvious that banks who perceive high *Complexity* use e-learning for AML. The *Complexity* variable is concerned with the ease of using, learning, and implementing the innovation. Therefore, the banks who perceive e-learning to be of low *Complexity* (i.e., high score of complexity in the dot plot), tend to use or implement e-learning to accomplish AML training.

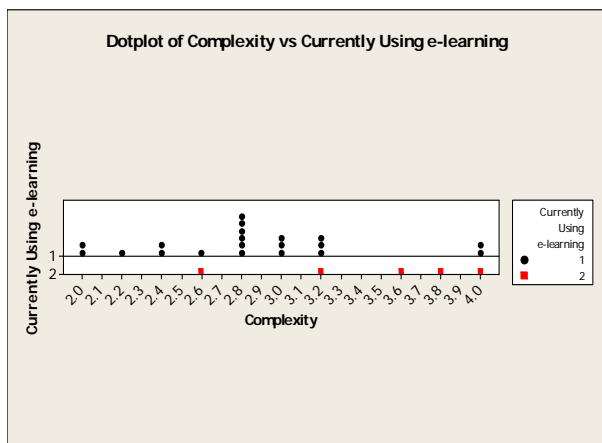


Figure 2: Dot plot for Complexity variable

The dot plot shows that use of e-learning becomes very high as the perceived *Complexity* becomes lower (beyond 3.3). Two banks that are not using e-learning (scoring 4) were local banks, and they were in CG2 of the k-means clustering.

D. *E-learning Readiness*

Figure 3 shows the dot plot for *E-learning Readiness*, where banks who perceive high *E-learning Readiness* tend to use e-learning for AML training. Also, *E-learning Readiness* indicates that the bank’s top management supports e-learning, bank have enough resources, existing IT infrastructure of the bank is ready and implemented, knowledge and skill of the employee bank is good enough, and a change management plan has been implemented. Three banks that are not using e-learning (scoring 4) were national banks.

Since *E-Learning Readiness* appears to be a common factor that distinguishes the groups, further in-depth analysis (ANOVA) was run on each question between the banks that are using e-learning for AML training versus the banks that are not, and the results are shown in Table VI. It can be concluded that the banks that are not using e-Learning for AML training differed from those that did even in the way they defined e-Learning (ANOVA $F(1,23)=8.85, p<0.007$). Access to the web (ANOVA $F(1,23)=4.90, p<0.037$) and bad prior experiences with e-Learning (ANOVA $F(1,23)=6.68, p<0.017$) were some other factors. These banks also tend to be laggards in training their employees for the digital age (ANOVA $F(1,23)=5.50, p<0.028$). These also have a perceived risk of e-learning threatening the traditional learning mechanisms within the bank (ANOVA $F(1,23)=4.07, p<0.055$). The banks not adopting e-Learning for AML training are also not clear on how to go about acquiring this technology in an intelligent manner (ANOVA $F(1,23)=7.43, p<0.012$). There is no clear change management plan for introducing e-learning for these banks (ANOVA $F(1,23)=4.26, p<0.05$). There is no budgeting process for these banks in order to invest in this technology (ANOVA $F(1,23)=6.68, p<0.017$). Finally, banks not using e-Learning were not convinced that e-Learning was the right way for their banks

(ANOVA $F(1,23)=4.73, p<0.040$). Other factor, such as bank’s ability to demonstrate business benefits of e-Learning, was not significant. Finally, the use of internet and intranets for normal business functions of the bank was not a distinguishing factor. This means that not all the core business functions are web-enabled and most internal work and the communications in the banks is not online.

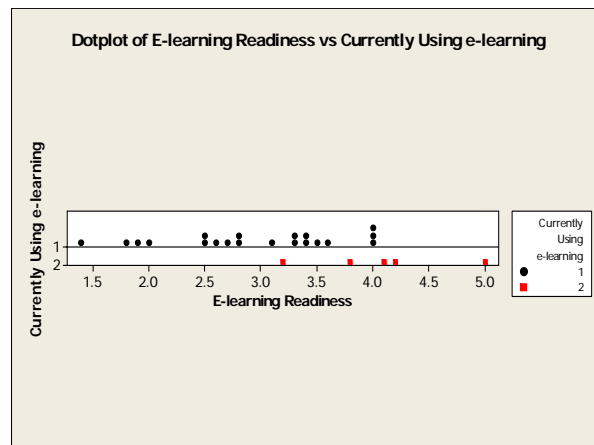


Figure 3: Dot plot for E-learning Readiness variable

From Tables VI and VII it seems that the banks that are classified in group NEL have the following characteristics:

- Are not aware of the existence of this technology.
- Have had prior bad experience in using technology-based training.
- Have limited access to the web which makes it complicated for them to use the technology.
- Have issues with their staff skills, so they need to focus on spending more time and money to upgrade their skills either through hiring or training.
- Prefer classroom training as a default delivery approach, so they have to start using a combined e-Learning and classroom strategy.
- Have minimum support from their senior management as they don’t appear to be interested, since it is a new approach.
- Do not have a change management plan in place to help the staff to adapt to the changes that are coming. Show a kind of resistance to learning at the workplace due to their lack in understanding that work and learning go hand-in-hand and learning can take place anywhere.
- Show that if e-Learning is going to affect or cut off the classroom business then they are not willing to implement it since they don’t have a plan to re-allocate their resources.
- Have not structured a budgeting process with their senior management to allow long-term funding of e-Learning.
- Do not have a good approach to vendor relationships and purchasing to evaluate quality.

Table VI: Significant statistics for E-Learning Readiness for NEL group and UEL group

Questions	F(1,23)	P-value	UEL group
How the bank does define "e-Learning?" (i.e.: traditional computer Based Training, knowledge management, performance support and other web-enabled distance learning approaches)	8.85	0.007*	↑
How will the bank overcomes any bad prior experiences you and others have had with technology based learning? (i.e.: blamed for past disappointments, experiences as lessons learned and we try to improve over time.)	6.68	0.017*	↑
How much access do people have to the web (anyone, anytime, anywhere)?	4.90	0.037*	↑
What is the level of the bank's expertise in instructional and information design? (pretty weak, growing, strong)	15.05	0.001*	↑
Is the bank ready to move beyond a predominant reliance on classroom training to a more balanced approach with e-Learning?	4.07	0.055*	↑
Does senior management support e-Learning?	12.60	0.002*	↑
Does the bank have a Change management plan for introducing e-Learning?	4.26	0.050*	↑
Does the bank have a plan to help the training function reinvent itself for the digital age?	5.50	0.028*	↑
What is the climate in the bank to learning in alternative locations, especially the work site?	9.66	0.005*	↑
Is the bank willing to allow e-Learning to thrive, perhaps at the expense of some of the more traditional parts of the training organization?	7.85	0.010*	↑
How prepared is the bank to invest in, and incubate e-Learning for several years in order to get it firmly established? (i.e.: is there a budgeting process)	6.68	0.017*	↑
Does the bank has a good handle on what it is buying in the e-Learning marketplace – can it differentiate quality products and weed out redundancies?	7.43	0.012*	↑
How committed are you, personally, to e-Learning? Are you ready?	4.73	0.040*	↑

Finally, individuals were asked if they are committed to e-Learning. The group NEL answered that they are not convinced that e-Learning is the right way for their banks, or they don't have enough capability to move forward towards implementing e-Learning strategy.

Table VII: Non-significant statistics for E-Learning Readiness for NEL group and UEL group

Questions	F(1,23)	P-value	UEL
How well is the bank using (Internet and Intranet) technology to run its business?	2.35	0.139	↓
How prepared (skills, knowledge, motivation) is your workforce to compete and win in the high-tech, new economy?	0.56	0.462	↓
Do you differentiate between instructional needs (training) and informational needs (knowledge management), and do you make the right decisions about when to use each?	2.78	0.109	↓
Can the bank demonstrate the business benefits of e-Learning?	1.65	0.212	↓
How prepared is the bank to deal with a large and increasingly complex e-Learning marketplace?	3.59	0.071	↓
Is the bank prepared to outsource its training functions and manage them externally so that it can concentrate its resources on more valuable areas?	0.53	0.473	↓

Four banks (out of five) that use e-learning for AML training were found to be in the same k-means group (CG1). This suggests that CG1 represent a set of variables that separates the banks who will adopt e-learning from those who will not adopt e-learning as shown in Table VIII. One bank was considered as an outlier.

From Table IX, *Complexity* variable was not significantly distinguishing CG1 and CG2 although this variable was significantly distinguishing NEL group and UEL group. In-depth analysis (ANOVA) was run on each question of the e-learning readiness for the k-means groups (CG1 and CG2) and the results are shown in Table IX.

Table IX illustrates the statistics for E-learning Readiness for CG1 vs. CG2 and by comparing these results with the statistics for NEL vs. UEL, both groups

agreed that the following variables were significantly important for the e-learning adoption for AML training:

- Having a definition for e-learning that includes alternatives such as knowledge management, performance support and other web-enabled distance learning approaches.
- Establishing a strong competency in the instructional and information design and maintaining the expertise in these fields.
- Top Management Support and commitment.
- Having and implementing e-learning and change management strategies to help bank employees adapt to the changes that are coming.
- Creating the environment for e-learning in the matter of location, especially at the work site.
- Bank management knows that e-learning will reduce the classroom business and they are prepared to re-allocate the resources accordingly.
- Having a well structured budgeting process to allow a long-term investment for e-learning with the support from the top management support.
- Implementing an agreement and good relationship with the vendors of e-learning where it will yield to an increased cost savings and experiencing less redundancy.

Moreover, both groups agreed that the following variables were not significantly important for the e-learning adoption for anti-money laundering training:

- Well prepared in the case of skills and knowledge.
- Differentiating between instructional needs (training) and informational needs (knowledge management) and making the right decisions about when to use each.

In addition, the following variables were significantly important for CG1 vs. CG2, while they were not important for NEL group vs. UEL group:

- Most core business functions are web-enabled and most internal work and communications are online.
- Demonstrating the business benefits of e-learning in the matter of cost savings and quality.
- Dedicating more time and resources to get the most out of the large e-learning industry.

Table VIII: Significant statistics for CG1 vs. CG2 (from K-means clustering)

Factors	Variables	F(1,22)	P-value
Organization Characteristics	Top Mgmt Support	13.71	0.001*
	Internal Influence	5.14	0.034*
	External Influence	5.90	0.024*
	Organization Slack	13.42	0.001*
	E-Learning Readiness	9.63	0.005*
	Stages for AML	14.75	0.001*

Table IX: Statistics for E-learning Readiness for CG1 vs. CG2

Questions	F(1,23)	P-value
How well is the bank using (Internet and Intranet) technology to run its business?	4.77	0.040*
How prepared (skills, knowledge, motivation) is your workforce to compete and win in the high-tech, new economy?	2.43	0.133
How the bank does define “e-Learning?” (i.e., traditional computer Based Training, knowledge management, performance support and other web-enabled distance learning approaches)	7.97	0.010*
How will the bank overcomes any bad prior experiences you and others have had with technology based learning?	1.18	0.288
How much access do people have to the web (anyone, anytime, anywhere)?	1.74	0.201
Do you differentiate between instructional needs (training) and informational needs (knowledge management), and do you make the right decisions about when to use each?	1.01	0.325
What is the level of the bank’s expertise in instructional and information design? (pretty weak, growing, strong)	4.96	0.037*
Is the bank ready to move beyond a predominant reliance on classroom training to a more balanced approach with e-Learning?	2.78	0.110
Does senior management support e-Learning?	4.78	0.040*
Does the bank have a change management plan for introducing e-Learning?	4.02	0.057
Can the bank demonstrate the business benefits of e-Learning?	7.18	0.014*
Does the bank have a plan to help the training function reinvent itself for the digital age?	9.27	0.006*
What is the climate in the bank to learning in alternative locations, especially the work site?	7.44	0.012*
Is the bank willing to allow e-Learning to thrive, perhaps at the expense of some of the more traditional parts of the training organization?	5.86	0.024*
How prepared is the bank to invest in, and incubate e-Learning for several years in order to get it firmly established? (i.e.: is there a budgeting process)	10.13	0.004*
How prepared is the bank to deal with a large and increasingly complex e-Learning marketplace?	7.54	0.012*
Does the bank has a good handle on what it is buying in the e-Learning marketplace – can it differentiate quality products and weed out redundancies?	9.32	0.006*
Is the bank prepared to outsource its training functions and manage them externally so that it can concentrate its resources on more valuable areas?	7.86	0.010*
How committed are you, personally, to e-Learning? Are you ready?	2.01	0.170

- Outsourcing the training functions and managing them externally so that they can concentrate the bank's resources on more valuable areas.

The following variables were significantly important for NEL group vs. UEL group, while they were not important for CG1 vs. CG2:

- Overcoming any bad prior experiences with technology-based learning and look at prior bad experiences as lessons learned and seek improvements over time.
- Accessibility to the applications and functions anytime and anywhere.
- Implementing a balanced approach between e-learning and classroom learning.
- Having a change management plan for introducing e-learning.
- Personal commitment from the bank's employees to adopt the e-learning innovation.

Through Binary Logistic Regression analysis, it was found that there was no causal relationship between the Banks Categories and the Adoption of e-learning.

VI. CONCLUSIONS

This paper investigates the use of e-learning for anti-money laundering (AML) training at UAE banks. The primary research objective is to develop a framework for banks to consider when formulating strategic plans for a successful diffusion of e-learning as a technology within their organizations. Specifically, the research examines various IT management factors affecting the adoption and utilization of e-learning for AML training in banks in the UAE. Pure technological factors (such as infrastructure planning, hardware and software) to support e-learning are not considered.

The most important finding from this work is that only two factors, *Complexity* and *E-learning Readiness*, affect the use of e-learning for AML in UAE banks. The *Complexity* factor is concerned with the ease of using, learning, and implementing the innovation. E-Learning is relatively new to the banking industry in UAE and, at this stage, industry may be unfamiliar with it. As such, the senior management may adopt a number of strategies to assist the bank's perceptions during this initial phase, including increased time for professional development, hiring of competent e-Learning resource developers and experts, and the provision of adequate user friendly infrastructure to facilitate the implementation and usage process.

The *E-Learning Readiness* factor appeared to be the most useful variable to measure the adoption of the technology in UAE banks. Although e-Learning helps to decrease costs in training function, it requires a significant investment to initialize and be maintained and the bank's management should be aware of this matter. The results suggest that both local and multi-national banks in the UAE are at fairly early stages of e-Learning adoption for training. The banks that are not adopting e-

Learning are either not ready for e-Learning or perceive the introduction of e-Learning to be a complex process.

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