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Information Technology Adoption and Implementation in Higher Education: evidence from a case study in Lebanon

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Abstract

Purpose – Research has shown that information technology has a tremendous effect on higher educational institutions. The purpose of this paper is to develop a framework that would depict and highlight on the financial, cultural, political, and social difficulties that affect the adoption of technology in higher educational institutions.

Design/methodology/approach – In this study it is hypothesized that cultural, political, and financial resources of the university administrative body, together with the employees' background in terms of academic experience and education shape the approach to a successful IT adoption. To investigate the proposed framework, a survey targeting employees, and an interview targeting IT managers were conducted.

Findings – The results indicate that the university structural framework together with IT knowledge and awareness at the university administrative level restrain any individual cultural and political effects on the IT adoption even if it is implemented partially.

Research limitations/implications – First, the respondents were selected using the convenience sampling technique. Second, the data were collected through self-report questionnaires.

Practical implications – The study results are important for university administrators, technology suppliers, and donors, as this may contribute to better understanding of the factors that could influence the adoption, management, and use of ICT resources for enhancing the knowledge of the university capabilities.

Originality/value – This study is the first one to address the integration of IT in higher educational institutions in the region; the results have implications for IT adoption in such institutions. More importantly, the study suggest a framework that reveals multiple levels of influence that impact the adoption and implementation of IT in the institutions.

Keywords Information Technology, Higher Education, IT adoption, IT implementation, social ecological model, social cognitive theory.

Paper type Research paper

1. Introduction

Higher education at universities is going under conflicting durable pressure for further change (Altmann 2012). Today, the higher education environment is transforming in response to the globalization of the economy (O'Brien and Sidorko 2000), the changes in administration regulations (Cloete et al. 2006; Alan et al. 2011), the commercialization of knowledge, and the advances in information technologies (Kankaanpää and Isomäki 2013). Information technology is providing new management and learning opportunities that lead to a non-traditional global competition among universities. Further, the universities stakeholders' expectations of service and demand for quality are increasing and changing. Universities can no longer assume they have a guaranteed enrolment of students from a particular geographic area or region, nor can they not consider the importance of emerging new management and learning methods offered by technology. In fact, universities that can undergo transformational change, using the information technology advances, will have a better chance of surviving and growing (*Yin et al. 2011).*

Thus, a challenge that faces university educational systems is to adapt to the needs of the twenty-first century societies; such adaptation is totally based on technology as a key factor for creating significant enhancements in higher educational institutions. Further, these days there exists massive amount of information to be communicated with the students in every academic topic. Thus instructors are not able to use only the blackboard to explain such topics. Further, students are not willing to take notes anymore; even students are not willing to read books anymore, and this is a fact. Means of communication is dramatically changing; the use of a board, paper and pen is almost becoming similar to cave paintings and pictograms for the new generations. Here comes the significance of our research to overcome the above mentioned problems. We need to review the strategies and find solutions to obstacles that face the adoption and usage of technology in communicating education.

Lebanon, as many other developing countries, is increasingly adopting IT to solve its developmental problems. This fact reflects Harris and Davison study (1999) that shows that over 90% of all World Bank's lending in developing countries went into IT components. It is also estimated by Anadarajan and Anakwe (2002) that total annual worldwide expenditure on IT probably exceeds 1.5 trillion US dollars per year and is growing at about 10% compounded annually. A major part of this expenditure goes into universities. In Lebanon, most universities are struggling to integrate technology in their administration and educational system to improve quality of higher education. However, many difficulties are faced, such as:

- Cultural resistance, which forces the change to be very slow
- Financial support, which strongly affects the ability of educational systems to adjust to the demands of modern societies
- Lack of Clear vision in integrating technology
- Lack of Strategies that are updated with technology changes and development.

The purpose of this work is to study the relationship between information technology and higher education with evidence from Lebanese universities. It focuses on difficulties faced by universities when aiming for successful adoption and implementation of IT systems. These difficulties may ascend as a result of deploying technologies without setting clear goals, poor management, lack of financial resources, cultural, political, social, and other organizational systemic and environmental pressures. Thus, this work studies various categories of universities with a twofold goal. First, is to highlight on the financial, cultural, political, and social difficulties faced by the universities who integrated technology in their education; and second, is to analyse the effect of the above mentioned difficulties on the adoption and implementation of information technology. Based on the aforementioned purpose, the study addresses the following questions:

1) What is the relationship between background of instructors and staff on one hand and IT adoption and implementation on the other?
2) What is the relationship between the culture and structure of a university and the implementation of technology in higher education?
3) What role does funding play in adopting the best IT solution?
4) What is the effect of partial integration of technology on the university knowledge creation?

The motivation for this research was to find answers, raised by several universities in Lebanon, for worries related to IT adoption. It was proven that, among all the technologies of this time, the progress in IT has no doubt had and continues to have the greatest influence on higher education (Gumport and Chun 2005), making it possible to collect, process, and transmit information at breath-taking speed. This study is therefore a modest yet significant attempt to explore the importance of the role which IT currently is playing in the universities and its impact on universities improvement. Findings from this study will allow researchers to define factors that affect information technology and integrating it in higher education.

The remaining of this paper is organized as follows. The next section presents the theoretical framework that the study draws upon. This is followed by a literature review related to IT adoption, and organizational performance in an attempt to probe important relationships and derive the study hypotheses. Based on the analysis of the literature and the hypotheses derived, a conceptual model will be proposed. After this, the study design and methodology, along with the variables examined, the data used, and the analysis performed to test the study hypotheses and the conceptual model will be presented and discussed. The results of the data analysis and the evaluation of the hypotheses in light of the findings will then be reported and interpreted. Finally, the study implications, along with the limitations and the recommendations will be presented.

2. Theoretical framework

Several researchers in the field of information technology adoption studied users' behaviours towards information systems (Ives, & Olson, 1984; Venkatesh, Morris, Davis, & Davis, 2003; Wallace, &

Sheetz, 2014). A number of research studies on IT adoption at the firm level were based on two important models: Diffusion of Innovation (DOI), and the Technological, Organizational and Environmental (TOE) framework (Oliveira, 2011). DOI proposes that individual characteristics, internal characteristics of organizational structure, and external characteristics of the organization are important antecedents to organizational innovativeness. The TOE framework identifies three aspects of firm's context that influence adoption and implementations of innovative technologies: environmental context (not included in the DOI theory), organizational context, and technological context (Baker, 2012). On the other hand, literature shows that significant work in explaining individual acceptance of information technology is based on the Technology Acceptance Model (TAM) (Davis et al. 1989). TAM theorizes that individual's beliefs about usefulness and ease of use are the major determinants of adoption and use of information technology in any organization. TAM is rooted from another well-known theory in human psychology, the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Ajzen, 2005). TRA proposed that individual's beliefs will influence their attitudes which in turn influence their intention and then generate the behaviour.

Another model that studies factors affecting user behaviour through social environments is the social ecological model (SEM) (Bronfenbrenner 1999). This model was introduced as a conceptual model in the 1970s, formalized as a theory in the 1980s, and continually revised by Bronfenbrenner until his death in 2005. SEM helps to understand factors affecting behavior and also provides guidance for developing successful programs through social environments. The principles of social ecological models are consistent with social cognitive theory (SCT) concepts which suggest that creating an environment conducive to change is important to making it easier to adopt healthy behaviours (Bandura 1986). In fact, social cognitive theory explains human behavior in terms of a three-way, dynamic, reciprocal model in which personal factors, environmental influences, and behavior continually interact. SCT synthesizes concepts and processes from cognitive, behavioristic, and emotional models of behavior change. A basic premise of SCT is that people learn not only through their own experiences, but also by observing the actions of others and the results of those actions. Accordingly, the social ecological models emphasize multiple levels of influence (such as individual, interpersonal, organizational, community and public policy) and the idea that behaviors both shape and are shaped by the social environment.

The above discussion applies well to this study. In fact, an important key for IT adoption is to understand the cultural context and traditions of individuals and organizations; and therefore for IT integration to be successful, various proficiencies must exist (Usun 2004). It is important that the circumstances and environment of education delivery are taken into account to ensure that the objectives of adoption of ICT in Higher Education are met (UNESCO 2002). Further, UNESCO (2002) and Intel Information Technology (2006) argue that lack of financial resources to support IT infrastructure such as Hardware, broadband connectivity, backbone infrastructure, also policy and political factors, cultural and attitude factors and lack of capacity and skills influences the effective realization of the full impact in adoption the technology in Higher Education especially in developing countries. Thus, based on the above discussion, the conceptual model of the study is visualized in Fig.1.
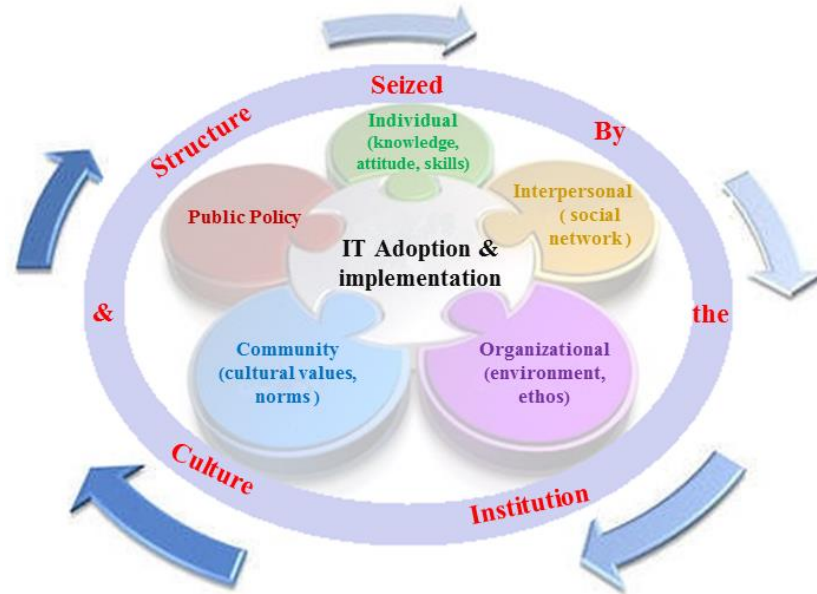
Fig. 1 HEIT Adoption and Implementation Model

The model corresponds to Higher Education IT adoption and implementation (HEIT). In German, the word HEIT means AWARENESS, which is the core of our model. The figure reveals multiple levels of influence (such as individual, interpersonal, organizational, community and public policy) that impact the adoption and implementation of IT in the institutions. These levels are seized by the university culture and structure and its administrative board to enhance the IT adoption in the institution.

3. Literature review and hypothesis

Information Technology has a great impact on university activities such as teaching, learning, research, and administration; it is a powerful tool for diffusing knowledge and information (Khan 2012). Previous research has shown that factors like employees' education and experience tend to adopt new technologies faster than those with less education (Riddle and Song 2017; Lleras-Muney and Lichtenberg 2002; Krueger 1993; Wozniak 1987). Wozniak (1987) found that such factors reduce adoption costs and increased willingness to adopt IT, and thus makes early IT adoption and usage faster. Researchers in IT adoption (John, 2015; Krueger, 1993) found that educated and experienced employees were more likely to use IT on their job. Although previous research found a clear relationship between the level of education and technology use and adoption, however, such a relationship could be confused by unobserved factors that are correlated with both variables; for example, employees' motivations and intuitive abilities to adopt new technologies could also lead to have better education. Hence we suggest the following hypothesis:

H1: The individual employees background in terms of academic experience and education shape the approach to a successful IT adoption.

H2: The individual employees background in terms of academic experience and education shape the approach to a successful IT implementation.

It is also known that the impact of IT on organizational knowledge creation processes is high (Dawson et al., 2010; Davenport 2007). In their book, Nonaka et al. (1996), state that "every business organization that wants to prosper in the knowledge society should fuse synergistically IT as knowledge-creation tools and human beings with collaborative knowledge creation capabilities to become a knowledge-creating company". Yet, up to our knowledge, partial integration of technology is not well studied by researchers. This leads us to come up with the following hypothesis:

H3: Improvement of knowledge in higher educational institutions could be reached with partial integration of technology.

Further, according to kellick and Wilson (2000) and Zhu and Engels (2014), appropriate identification of the culture and the structure of the university facilitate the creation, storage, sharing, adoption and application of information technology that enables a corporate strategic advantage for the university. The organizational culture is defined in terms of four key factors; the clan culture, hierarchy culture, adhocracy culture, and market culture (Cameron and Quinn 1999). In their study, Cooper and Quinn (1993), Smit et al. (2012) found that there is a big relation between IT and the culture of the university. Janz and Prasarnphanich (2003) argued that universities that offer a friendly culture encourage technology integration and knowledge flowing more than any other university. Further, Universities without the magical support structure will soon find that investment in IT does not produce the benefits they strived for (Walczak 2005). In fact, organizational structure controls how people coordinate their actions and use resources in order to reach the organizational goals. The structure must involve the environment strategic goals (Saiti et al., 2018), and four pillars of knowledge management as discussed by Stankosky and Baldanza (2001). Rick Suttle (2015) classified organizations into different structures such as, functional structure, divisional structure, and matrix structure. It is important in such a research to identify the structure of the universities under study so that we understand the means of communication, coordination and integration of efforts; and also the means of governance that leads to decision making like IT adoption. Another important factor that might affect IT adoption is financial support (Farhadi 2012; Donnelly, 2004; Lanford, 2016; Liu, 2016). Research on the financial impact on IT adoption is discussed by Levine (1997), where he argues that positive correlation found between financial development and growth. Such finding that the need for financial institutions to support technology changes was also emphasized by Stoneman (1995). With this in mind, the following hypothesis could be suggested:

H4: The culture and politics of the university administrative body is a major factor in integrating the appropriate IT strategy.

H5: Financial resources have a significant impact on integrating technology in universities.

H6: The university structural framework that controls the employees' attitude has a significant impact on integrating technology.

Based on the above, the research model could be depicted as follows in Fig. 2.
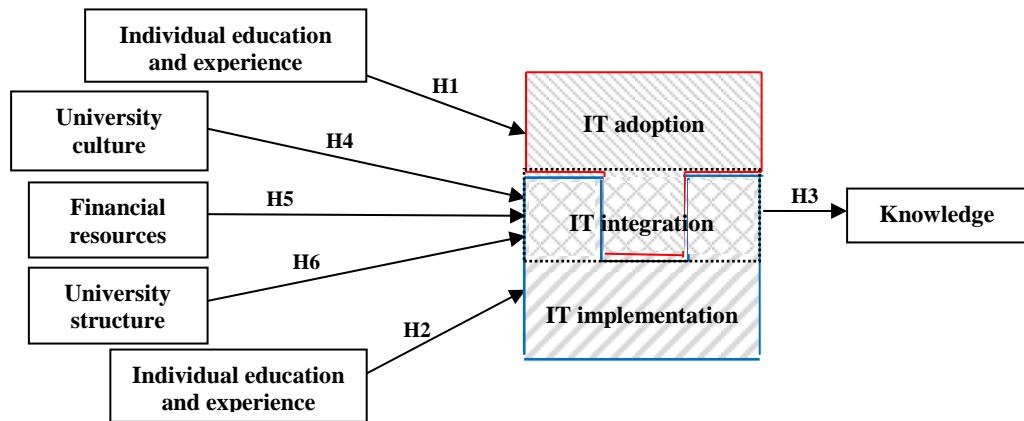
Fig.2 Research Model

4. Methodology

The site of this study was in four universities in Lebanon; the Islamic University of Lebanon (IUL), the Lebanese American University (LAU), the American University of Science and Technology (AUST), and the Lebanese International University (LIU). At IUL, most of the faculty members and staff come from a French system background. The majority of faculty members at IUL serve on a part-time basis. The university is administered by university president, the general secretary, the board of trustees, and other administrative bodies. As for LAU, most of the faculty and staff at this university come from an American system background. The majority of these faculty members and staff serve on a full-time basis. This university is administered by Executive officers, faculty, staff, and student representatives who serve on several dedicated councils, committees, and other bodies. As for AUST and LIU, the background of faculty and staff is a mixture from the American and the French system. A large number of faculty members serve on a part-time basis. The university is administered by university president, the university vice-president, the provost, and other administrative bodies. It is clear from the above discussion that the structure of the four universities is different; that is, the means of decision making, and the process of communication and coordination and integration of efforts across departments at LAU is totally different from that at IUL, and is also different from how it is done at LIU and AUST. Further, based on the cultural classifications of universities mentioned in Cameron & Quinn (1999) work, it is worth mentioning that the LAU falls under the Clan culture, IUL fall under the hierarchy culture; however, the AUST and LIU fall under the Market culture.

4.1. Study Design and Data Collection

Sample

In order to answer our research questions and to prove the related hypothesis, we performed a correlation design study that targeted three groups of participants, the first includes the instructors, the second includes the staff, and the third includes the IT managers. To assess the

implementation and adoption of technology by the first two groups (instructors and staff) in the four universities mentioned above, a draft questionnaire was constructed based on the literature review and observations from the field. The instrument used was pilot tested on a selection sample of three instructors and five staff for clarity of the questions and content validity. Needed modifications were introduced and the final tool was developed. In this research, the instrument for assessment of organizational culture and IT implementation was adopted from Al-Khalifa and Aspinwall (2000) who based their instrument on Organisational Culture Assessment Instrument (OCAI) by Cameron and Quinn (1999). Other researchers also used the same instrument like Stock et al. (2007) and Zu et al. (2009). Further, the scale was tested for both construct loadings and reliability, and the scale and its subscale items proved to have high loadings (>0.5) and high reliability (Cronbach's $\alpha > 0.7$) (Hair et al. 2006). The questionnaires were distributed randomly since diversification is needed in this study; further, it was an analytical survey so that it could answer the research questions and test the hypothesis. This study uses two kinds of questionnaires. The first addresses the instructors. It consists of 31 questions distributed over five sections: General Socio demographic, adoption of technology, implementation of technology by instructors, implementation of technology by students through the course of study, and the communication between the instructors and staff. The second kind of questionnaires addresses the staff. It consists of 27 questions distributed over four sections: General Socio demographic, adoption of technology, implementation of technology in administrative work, and communication between staff and instructors. These questionnaires answered the first two research questions.

Following ethical approval, the LIU University agreed to participate only in the interview part of this study; and thus questionnaires were distributed to a total of three universities in Lebanon. Follow up phone calls were made to elicit support for the study and to answer questions. Each university had 100 questionnaires for instructors (full time and part time) and 50 questionnaires for staff making a total of 300 instructor and 150 staff to participate in the study. Out of the 450 questionnaires, 244 (144 instructor and 100 staff) were returned yielding a response rate of 54.3 percent. Data entry and analysis was performed using SPSS.

As for the third group, a structured interview was conducted with the concerned IT managers. The interview design was based on open-ended questions. The adapted scales and the validity of the questions in terms of content, clarity and structure were sought from researchers and academia with six selected prominent quality practitioners and academics. The interview approach is selected because we need to understand the IT manager's experience, ideas, beliefs and values; such a qualitative approach enabled us to get a very good idea of the variety of ideas and views the managers have. Each of the universities was contacted prior to data collection. The nature of the study was explained to the administration and their approval was obtained to approach the educators and the administrators.

The interviews are based on purposive sampling which covered the IT managers at the four mentioned universities. In this study we used the personal interview, because we wanted to work directly with the respondent so that we have the opportunity to probe or ask follow-up

questions. The interview consists of 13 main questions each of these questions was open to more than one follow up questions. The motivations that lead us to conduct this interview were to understand the following concerns. The first was to understand the cultural and political effect on the implementation of technology in universities. Another concern was to know the consequence of partial integration vs. complete integration of IT in higher educational institutions. A third concern was to know to what extent funding affects the integration of IT. Finally, the last concern was to know the effect of faculty support and cooperation on the integration of IT.

4.2. Descriptive Analysis for Instructors' Questionnaires

The final sample size for "survey for instructors" consisted of a total of 144 participants currently working in three universities: IUL, LAU and AUST. 76.4% of these are males and 23.6% are females, whose highest average age is between 35 and 44. Out of these instructors, 62.5% are PhD holders, 34.7% hold a Master degree and only 2.8% hold a Bachelor degree. Further, Only 100 out of these 144 participants specified their university of graduation where 26.6% graduated from universities in Lebanon, 20.7% graduated from universities in Europe, and 22.1% graduated from universities in USA and Canada. Further, the highest percentage of these instructors (38.9%) had more than 11 years of experience. Accordingly, we suppose that faculty members under study are highly experienced, with high calibre and were much exposed to different kinds of educational levels throughout their academic study. Further, the University of Origin where instructors graduated was almost evenly distributed among Lebanon, Europe and USA and Canada; still, the highest percent of the faculty members graduated from Lebanese universities were mostly teaching at IUL and AUST. However, USA and Canada graduates were mainly teaching at LAU. These numbers might help us in reading how the educational background of instructors affects IT adoption in higher education. In looking at the mean of instructors' answers in all universities for questions related to the other four sections of the questionnaire, we found the following results summarized in Table 1.

Table 1 Summary of Instructor Questionnaires

Questionnaire Sections	LAU Responses	IUL Responses	AUST Responses
Adoption (B)	most of the time	most of the time	most of the time
Implementation (C)	some of the time	some of the time	a little
Students Implementation (D)	a little	a little	a little
Instructor/staff com. (E)	most of the time	some of the time	most of the time

As for the adoption of technology which was addressed in research question #1, the Pearson correlation (PC) between experience and adoption of IT shows 0.116; and between education and adoption of technology shows a negative correlation, -0.090; still both of these values are close to zero, this means there is a weak relationship between these two variables. Therefore, changes in one variable (experience/educational background) are not correlated

with changes in the second variable (adoption). This result was further verified with the Sig. value of 0.330(experience) and 0.453(educational background), these values are much greater than 0.05; this means there is no statistically significant correlation between experience/ educational background and adoption of technology.

Further, it is worth mentioning that the Analysis Of Variance tool (ANOVA) for instructors questions related to the adoption of technology shows a very close mean among the three universities (LAU: 3.625, IUL: 3.507, and AUST: 3.600); still, to know whether the results of the means is significant or not; we had to look at the 1-Way Between Subjects ANOVA which showed a sig. value of 0.509 which is far greater than 0.05; therefore, we conclude that there is no statistically significant relation between the means, and the values are likely close due to chance.

As for whether the instructors' implementation of technology is affected by the experience and educational background of the instructors; the PC between experience and instructors' implementation of IT is 0.08, and between educational background and implementation of IT is 0.107. These values are close to zero; this means there is a very weak relationship between these variables. Therefore, changes in one variable (experience/education) are not correlated with changes in the second variable (implementation). This result is further verified with the Sig. value of 0.449 (experience) and 0.370 (educational background), these values are much greater than 0.05; this means there is no statistically significant correlation between the experience/educational background and implementation of technology.

Moreover, ANOVA shows different mean among the three universities for questions related to the implementation of technology (LAU: 2.706, IUL: 2.816, and AUST: 2.468); and the 1-Way Between Subjects ANOVA shows a Sig. value of 0.052 which is very close to 0.05; therefore, we conclude that there is a statistically significant difference between the means that shows the implementation of technology among all universities, and the values are not likely due to chance and are probably due to experience or education. Still, the Sig. value indicates that there is a significant difference between some of the means. It just cannot tell us which ones. This could be resolved by conducting the Post Hoc Tests to compare the results between the three universities as shown in Table 2.

Table 2 Multiple Comparisons – Post Hoc Test

Dependent Variable	(I) Workplace	(J) Workplace	Mean Difference (I-J)	Std. Error	Sig.
C	LAU	IUL	-.11016	.14020	.435
		AUST	.23750	.15553	.131
	IUL	LAU	.11016	.14020	.435
		AUST	.34766*	.14020	.016
	AUST	LAU	-.23750	.15553	.131
		IUL	-.34766*	.14020	.016

The Sig. column in Table 2, shows that IUL and AUST are significantly different in terms of implementing technology (Sig. <0.05).

Once more, the ANOVA analysis for questions related to the means of communication between administration and instructors, shows different means among the three universities (LAU: 3.290, IUL: 2.950, and AUST: 3.460); the 1-Way Between Subjects ANOVA, also shows a Sig. value of 0.00 (<0.05); therefore, we conclude that there is a statistically significant difference between the means that shows the effect of the culture of the university in implementing technology among all universities. In order to know more which ones have the main differences, we used again the Post Hoc Tests as shown in Table 3.

Table 3 Multiple Comparisons – Post Hoc Test

Dependent Variable	(I) Workplace	(J) Workplace	Mean Difference (I-J)	Std. Error	Sig.
E	LAU	IUL	.34000*	.10389	.002
		AUST	-.17000	.11526	.145
	IUL	LAU	-.34000*	.10389	.002
		AUST	-.51000*	.10389	.000
	AUST	LAU	.17000	.11526	.145
		IUL	.51000*	.10389	.000

Table 3 shows that the Sig. value of LAU with IUL is 0.002, and that of AUST with IUL isf 0.00. Thus, we can conclude that LAU and IUL, also IUL and AUST are significantly different in terms of implementing technology which is not due to a chance, but due to university cultural and structural differences.

4.3. Descriptive Analysis for Staff Questionnaires

The final sample size for staff questionnaires consisted of 100 respondents currently working in the universities under study. The sample consisted mainly of females (58%). The majority (64%) belong to the age range 25-34. Fifty percent of staff holds a Bachelor degree as a highest level of education, 42% hold a Master degree, and 8% hold a PhD. The staff members were classified into 14% as secretaries, 37% as administrative staff and 12% as head of departments. As for the university they graduated from, 82% distributed almost equally between universities in Lebanon and 18% from universities abroad. Further, 84% of the respondents are full timers and 54% had experience for 1-5 years, and 32% had 6 to 10 years of experience. The above information shows that our target sample of staff is diverse, of a good calibre, and is qualified to respond objectively.

To start with, the staff adoption, staff implementation and instructor-staff communication among all universities under study, using ANOVA, the mean of all universities were similar as shown in Table 4.

Table 4 Summary of Staff Questionnaires

Questionnaire section	LAU Responses	IUL Responses	AUST Responses
Adoption (B)	most of the time	most of the time	most of the time
Implementation (C)	most of the time	some of the time	most of the time
Instructor/staff com. (D)	some of the time	some of the time	some of the time

As for whether the adoption of technology by staff is affected by the experience and their educational background, the PC between IT adoption and experience is -0.057, and between IT adoption and staff educational background is -0.242. These values are again very close to zero, this means there is a very weak relationship between these variables. Therefore, changes in one variable (experience/educational background) are not correlated with changes in the second variable (adoption). This result was further verified with the Sig. value of 0.696 (experience) and 0.091(educational background), these values are much greater than 0.05; this means there is no statistically significant correlation between the experience/educational background and IT adoption.

Once more, in checking staff questions related to the adoption of technology, ANOVA shows a very close mean among the three universities (LAU: 4.214, IUL: 4.187, and AUST: 4.237); the 1-Way Between Subjects ANOVA shows a Sig. value of 0.939 which is far greater than 0.05; therefore, we conclude that there is no statistically significant relation between the means, and the values are likely close due to chance.

In answering research question to know whether the implementation of technology by staff is affected by their experience and educational background; the PC is -0.057(experience) and -0.125 (educational background). These values are again very close to zero; this means there is a very weak relationship between these variables. Therefore, changes in the variables (experience/educational background) are not correlated with changes in the second variable (implementation). This result was further verified with the Sig. value of 0.695(experience) and 0.386 (educational background), these values are much greater than 0.05; this means there is no statistically significant correlation between experience, education and implementation of technology.

Again, in comparing the three universities when answering the questionnaire questions regarding the implementation of technology by staff, ANOVA shows a slight different mean among these universities (LAU: 3.326, IUL: 2.938, and AUST: 3.199); We used ANOVA to determine if the means are statistically different. As mentioned before, this could be easily known by comparing the means; however, we need ANOVA to determine if the differences between means are significant. Again, the 1-Way Between Subjects ANOVA shows a Sig. value of 0.204 which is far away from 0.05; therefore, we conclude that there is no statistically significant difference between the means, and the values are likely close due to chance.

As for communication between staff and instructors using IT, again, using the ANOVA we noticed similar means among the three universities (LAU: 2.77, IUL: 2.74, and AUST: 2.79); We used ANOVA to determine if the means are statistically related. The 1-Way Between Subjects ANOVA shows a Sig. value of 0.969 which is greater than 0.05; therefore, we conclude that there is no statistically significant relation between the means.

4.4. Descriptive analysis for Interviews

Summary of results for interview conducted at LAU

At LAU the IT department is divided into four divisions. Divisional dedication for its domain of expertise was one of the main factors that led to their success. Here it is worth to mention that because of the Clan culture that LAU operates in, we find employees operate and cooperate together to fulfil the stated aim of their department mission and vision and accordingly the university mission and vision. The IT department at LAU didn't face any cultural problem; still, with each project they have to manage the change it comes with by introducing it in stages such as training to the community. Further, there wasn't any financial obstacle to implement the infrastructure. The IT department always budget every year ahead. They have a huge infrastructure and they always have extra place for growth where administration understands the importance of growth. The IT department at LAU considers facing obstacles as part of its job. LAU IT department implements strategies incrementally so that they absorb the social resistance. They present the new service to the end-user and provide several trainings. The IT department provides integration between their systems, for some it is partial integrations. The IT department might face some minor resistance with the staff which they think it's usual. There is no university policy to force the staff to cooperate; however, the system at LAU established an electronic communication environment that all should be involved in otherwise they will be obsolete. Concerning the funding for IT strategy, the IT department thinks it is good, yet they would always push for more, but they do understand there are other priorities that LAU needs to fund as well.

Results of the interview conducted at IUL

IUL IT department thinks that there is always a cultural problem or what they called "Environmental resistance". The IT department at IUL believes that there is a need for a certain level of "IT knowledge at the administration level". There is a resistance for a change, thus IT department try to convince the users, slowly and patiently, and to introduce easy to use IT solutions and trainings. The IT at IUL satisfied the needs of the University. As for the IT infrastructure, it was designed to support the IT strategy. The IT department faced a "harsh resistance at the very beginning from the administration (users) and especially from the top level management as everybody dislikes the change". In fact not all departments used the IT system at the same time, some departments used the full developed system, other departments continued doing their job using generic IT tools like excel, while others tried to start their own IT system before they failed to do that and thus understand that the integration was recommended and no other alternative. From a political point of view, especially some offices loosing authority, there were some obstacles that hindered IUL IT department strategy. In implementing their strategy, it is done incrementally. At IUL there was no university policy to force the end user to cooperate. The administration didn't show any hesitation about funding the steady IT strategy especially when the IT strategy takes into consideration the financial situation of the organization. Still, lately, when the administration decided to move into a new

credit system "funding factors together with other factors hindered the launching of that new system".

Results of the interview conducted at AUST

The main reason for the success at the IT department at AUST was the massive demand and support from the university administration to integrate technology in every aspect especially that the administration is completely convinced that technology is the base of teaching excellence. Any cultural problems faced were reported to the administration to resolve that issue. The implementation of IT at AUST was done in two levels, part was insourced, and another was outsourced. The IT infrastructure was able to support the proposed strategy since AUST is a newly built university. It is worth mentioning that there is no financial obstacles faced in IT department work, this is because the ITD reports directly to the VP, who is totally knowledgeable about the importance of IT to build this institution. AUST IT department didn't face any political obstacle. In implementing their strategy, it was implemented in an incremental way. In fact, they used the pilot project methodology. And within every pilot project they built it incrementally to control any errors. The AUST believes that complete integration would be the aim of every IT department. In fact, at AUST they went into partial integration. Partial integration was necessary since they did in-sourcing for some systems and out sourcing for others, taking into consideration the correct integration of the completed systems. Still, with partial integration they were able to fulfil the university needs. At AUST there is a procedure that requires all faculties to cooperate, and this procedure is monitored by the department chair. The IT department budget at AUST is mainly open if administration is convinced about its necessity.

Results of the interview conducted at LIU

The IT department at LIU didn't face any cultural problem in implementing their strategies. The goals of the IT department were implemented up to 70%. The IT infrastructure was definitely upgraded and enhanced to support the proposed strategy. There were challenges in finding the most suitable solution within the allocated budget for the IT Department. The support from the upper management was the main reason behind the IT department success. There were no political problems faced by IT department at LIU as administration is centralized similar to the structure of the IT Department. The IT department did implement some parts on incremental basis. But this was not done to absorb the social resistance as the new upgrades were for the benefit of the internal stakeholders. The main point that helped the IT department in integrating a lot of their systems together was that their system (SIS) was internally developed. They had complete power to do anything they find suitable. The IT department had integrated their SIS with other systems. The systems at LIU ensured governance of university policies. Things were done electronically across all campuses especially academic issues. At LIU, there was no hesitation about funding; rather there was prioritization of projects. Moreover, funding sometimes caused the rescheduling of implementation for some phases.

5. Discussion and Conclusion

In fact, the participants in the study belong to different educational and social backgrounds. Also, our sample regarding the highest degree achieved was divers. Besides, the results shows that the instructors and staff in all universities adopt technology 'most of the time'; further, the Pearson Correlation shows that there is a weak correlation between cultural background of instructors and staff with the adoption of technology. This result was further verified by the Sig. value which shows that there is no statistically significant correlation between the above mentioned variables. This leads us to conclude that hypothesis #1 is rejected.

Although our study showed a difference in the implementation between IUL and AUST, still, the Post Hoc Tests proved that this difference was by chance and not statistically related. Moreover, the Pearson Correlation shows that there is a weak correlation between the cultural background of instructors and staff with the implementation of technology. Further, this result was proved by the Sig. value that shows there is no statistically significant correlation between these variables. Therefore, hypothesis #2 is rejected.

In fact the interviews were the main source for evaluating the other hypotheses. These discussions are presented below. Interviews show that LAU is a student-centred university; and they deploy their IT systems in an incremental way so that they integrate it with other systems smoothly, and to minimize the risk of errors, and to make sure that the new system performed all tasks as required. Furthermore, the IUL integrates their in-sourced IT system partially with other system, the main reason is that they built the complete system as set of sub-systems and they couldn't create the whole system as one bunch, otherwise. As for the AUST, the partial integration was necessary since they did in-sourcing for some systems and outsourcing for others. They started partial integration with the accounting system, and then the HR and the library systems, then student registration, moved to attendance system and other systems are followed due to the priority of the administration. Finally, at LIU the main point that helped the IT department in integrating a lot of systems was that their IT system was internally developed. They had complete power to do everything that they find suitable. Consequently, the four universities asserted that full integration is the aim of every IT department. However, all the four universities applied partial integration in their systems for different reasons mentioned above; still, the result of the partial integration proved to be successful in increasing the knowledge about the university resources and improved decision making. This result proves hypothesis #3 to be true.

Based on the interviews, LAU, AUST, and LIU didn't face any cultural problems since the administrations of the three universities were cooperative and supportive. However, the IUL did face cultural problems or what they called environmental resistance. The IT department at IUL considers the IT a little difficult to cope with and need certain level of IT knowledge at the administrative level. Regarding the political obstacles, the LAU, which is known to have a Clan Culture, didn't face any political obstacles such as offices hindering the implementation of IT; on the contrary, the community was looking forward to have the a complete integration of the IT system. Besides, the IT at LAU was always available to help the end user to use any

new system they implement and this task was performed by ongoing communication. Further, IT department at LAU provided several trainings of implementation and they were always available for any inquiry they might have. As for IUL, known to have the Hierarchal Culture, the IT department faced political obstacles. In fact, at the very beginning, some offices felt they are losing authority and thus they hindered the IT integration to an extent that some departments continued doing their job using generic IT tools like excel, while others tried to start their own IT system; still, the IT department at IUL integrated their strategy slowly with the educational process to avoid the huge shock that may lead to the failure of the whole system. As for AUST and LIU, known to have Market Culture, didn't face any political obstacles. The administrative framework at AUST was aware of the necessity of the IT strategy and they supported the massive change done to the database in the year 2008. The AUST used the pilot project methodology that was built incrementally to avoid any errors. Furthermore, LIU did implement their strategy on incremental bases. LIU didn't face any political problem since the administration structure was centralized similar to the structure of the IT department. Based on the above discussion and knowing that culture is a broad term used to describe workplace attitudes, reactions, activities and mind-sets, we can conclude that cultural and political difficulties greatly affect the integration of technology in universities. Thus, hypothesis #4 is proved to be true.

As for funding the IT department, at LAU it is good and fully supportive because it was based on a predefined budget submitted at the beginning of every year, which is also goes under a long term strategic budget developed by the IT department; still, the IT department always pushes for more, yet they do understand the priorities that the LAU needs to fund as well. The IUL administration didn't show any hesitation about funding the steady IT strategy especially when the IT strategy takes into consideration the financial situation of the organization. However, based on the interview discussion above, it was clear that one of the main factors that hindered the movement into the new Information System was the budget which was expensive in case of outsourcing and still not acceptable by the administration in case of in-sourcing. As for the AUST, the IT department budget is mainly open if the administration is convinced about the necessity. At LIU the administration didn't hesitate about funding; rather there was prioritization of projects. Again, the discussion above shows clearly that there is a major effect of funding on the process of IT integration. This brings us to the conclusion that hypothesis #5 is true.

Finally, from the interviews we knew that there is no university obligation at LAU and IUL to force the faculty/staff to cooperate in IT integration; however, the culture at LAU and its structural framework requires the faculty and staff to cooperate, otherwise they will be obsolete. At IUL, it is noticed that not all departments used the IT system at the same time, some departments (business department) used the developed system fully, other departments continued doing their job using generic IT tools like excel, while others tried to start their own IT system before they failed to do that and thus understand that the integration was recommended and no other alternative would lead to the success of the university community. With such an experience at IUL, we observed that there is no structural framework to hold

back the behaviour of different departments. Whereas at AUST and LIU there is a procedure that requires all faculties to cooperate and this procedure is monitored by the department chair. All IT directors at the four universities believe that the faculty/staff support should be controlled because it is very essential for the success of the IT integration. Thus, we can conclude that hypothesis # 6 is true. These results are summarized in Table 5.

Table 5 Summary of Results

Hypothesis	Supported (Y/N)
H1: Individual background in terms of experience and education is positively related to IT adoption.	NO
H2: Individual background in terms of experience and education is positively related to IT implementation..	NO
H3: Partial IT integration enhances organizational knowledge creation.	YES
H4: University culture and politics is positively related to IT integration..	YES
H5: Financial resources is positively related to Technology Integration in universities.	YES
H6: University structural framework is positively related to Technology Integration.	YES

6. Research implications, recommendations and conclusion

The main contribution of this study is the development of a model that reveals multiple levels of influence such as individual knowledge and skills, interpersonal social network, organizational environment and ethics, community cultural values and norms, and public policy that impact the adoption and implementation of IT in the institutions. It also explains how university culture and structure and its administrative board can enhance the IT adoption and implementation.

Our study has both theoretical and practical implications. At the theoretical level, the social ecological model and the social cognitive theory (SCT) concepts are used to explain the continuous interaction between environmental influences, human behaviour, and personal factors to make it easier to adopt and implement ICT in higher educational (HE) institutions. With this theoretical integration, this research could examine the impact of university structure and culture, individual background and experience and financial resources on the ICT integration in HE institutions, and the impact of this integration on knowledge about resources and decision making. The results showed high significant levels. This is important for academics in the technological entrepreneurship and information systems disciplines. At the practical level, the study results are important for university administrators, technology suppliers, and donors, as this may contribute to better understanding of the factors that could influence the adoption, management, and use of ICT resources for enhancing the knowledge of the firm capabilities. It is worth mentioning that relying on the results of this research the IUL is in the process of restructuring the university administration taking into consideration

different units like fund raising and policy writing to enforce IT adoption in order to enhance knowledge and resource management that leads to a better decision making.

Despite the contribution and the significance of this work, a limitation of this study is that it is conducted in only four universities in Lebanon; still these four universities represents four different categories where almost all other universities in Lebanon are classified under.

In conclusion, this study adds to the literature of IT integration in Higher Education. It provides baseline information for future studies. Accordingly, based on the analysis of the results and the discussion performed in this study, we recommend that higher educational institutions need to improve their organizational quality by integrating technology into their institutions and tear down barriers that may face this integration process. In fact we recommend adopting a university structural framework that should hinder the cultural and political obstacles and force the employees to operate under the mission of the university which implicitly addresses the Information Technology. In addition to that, it's essential to mention that technology is expensive and needs much funding; however, investing in technology is a major requirement for education. Therefore, we recommend the needed funding to support IT implementation with a condition to have a clear long-term strategy which is detailed in sub-short term plan of action. Further, we have to increase the IT awareness of the university administration. The above drive us to the following concluding statement:

It is essential to have a clear interactive university structural framework that put into action the university mission and vision and restrain any cultural and political effects on the implementation of technological strategies. Information Technology knowledge and awareness at the university administrative level should be our foremost objective and thus the needed financial support would be provided to enhance the IT integration even if it is implemented partially.

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