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Moderating Effect of Information and Communication Technology Tools on the Relationship Between Networking Services and Incubator Success

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Abstract: The main aim of this study is to explore the moderating effect of information and communication technology tools on the relationship between networking services and Business Incubator (BI) success in Palestine. Business incubators are considered to offer important guidance that can help young firms to survive during their early stages. Many developing countries are currently suffering from a critical economic situation, especially, Arab countries where the unemployment rate is very high and the gross domestic product is very low compared to developed countries. Many success models have been proposed to measure the success of Business Incubators (BIs) in developed and developing countries. Also, many studies have examined the impact of ICT tools on economic and business development but very few have been conducted in Palestine. Therefore, this study investigates the role of networking services as a critical success factor in the performance of BIs in Palestine and also determines whether ICT tools moderate the relationship between networking services and BI success because it has been argued that ICT tools facilitate economic growth by accelerating knowledge sharing and increase the new product development activities and competition in the marketplace. This study adopted a descriptive survey consisting of six main stages that were administrated in 22-79 incubator managers, team members and experts in Palestine. The results show that networking services were one of the important factors that are affecting the incubator success in Palestine and the ICT tools moderate the relationship between networking services and incubator success.

Key words: Information and communication technology tools, success factors, networking services, incubator success, Palestine, performance

INTRODUCTION

Lately, Arab countries, especially, those in Bilad El-Sham (the Levant), have been facing a very bad economic situation because of the poor global economic situation in general and the outbreak of various wars in the region that have led to an increase in the unemployment rate and a decrease in the Gross Domestic Product (GDP) compared to that in developed countries. The political and economic situation in Palestine is also very bad for the same reasons and the unemployment rate is very high and the value of per capita income is very low (Alzaghal and Mukhtar, 2017). One of the solutions to this situation is to develop new Small and Mid-sized Enterprises (SMEs) through the Business Incubator (BI) process.

Business incubators are considered to provide important guidance for entrepreneurs, especially in their early stages of developing their business and they are also considered to be a very strong tool to promote innovation, entrepreneurship, generating economic development and promoting new business creation (Blok *et al*., 2017; Al-Kasasbeh *et al*., 2017). The use of BIs is also a good strategy by which to develop new social and economic opportunities for developing new business models which leads to several elements such as creativity, innovation and entrepreneurship that in turn intersect with business incubation models (Alon and Godinho, 2016; Alzaghal and Mukhtar, 2017).

Small and mid-sized enterprises are an important tool in enhancing innovation, productivity, competitiveness and employment growth by developing new firms, providing employment opportunities and fostering innovation and entrepreneurship. Thus, BIs can help in the creation of new firms including SMEs and help them to survive during their first stages of development which is the most vulnerable stage of their existence (Grimaldi and Grandi, 2005; Al-Mubaraki and Busler, 2010; Dee *et al*., 2011; Al-Mubaraki *et al*.,, 2013; Elmansori, 2014; Theodorakopoulos *et al*., 2014; Lose and Tengeh, 2015; Hong and Lu, 2016; Alzaghal and Mukhtar, 2017).

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Many types of success models and success factors have been proposed and used to measure the success of BIs but not all them can be applied to all countries and all incubators. Some of these factors can be considered as success factors in some countries and at the same time cannot be considered as success factors in others. In this study, many success factors were tested and proposed for BIs in Palestine and some of them were accepted while others were rejected. One of the most important factors that was proposed and accepted was networking services.

Networking is considered one of the most portant value-added services offered by incubators for not only incubatees also start-ups and external actors because it allows start-ups to identify innovation parties and transform them into innovation partners (Cantu, 2015).

Information and Communication Technology (ICT) tools have spread rapidly and have been applied in different fields. Therefore, many studies have examined the impact of ICT developments and especially, the economic impact of ICT tools. Such tools facilitate economic growth by accelerating information and knowledge sharing, increasing the amount of new product development and competition in the marketplace and improving job matching (Lee and Lio, 2017).

MATERIALS AND METHODS

Due to the importance of incubators as identified in the literature, the number of incubators is increasing in developed and developing countries. Palestine also believes that one of the important ways to address the bad economic situation there is to direct attention towards supporting the BIs that are running in Palestine to offer good-quality services. Currently, there is rapid industrialisation, particularly in developing countries, so, studying the effectiveness of incubators is a promising way to understand and improve the industrial development process and also to determine whether incubation programmes can effectively facilitate the economic growth of communities (Mubaraki and Schrodl, 2012; Alzaghal and Mukhtar, 2017).

Incubators; Definitions and history: The first business incubator was established in 1959 in the United States. After that there were just 12 incubators in 1980 in the USA increased to over 1250 by the end of 2012. At the end of 2012, there were more than 7000 business incubators and programs worldwide, increased to 9000 business incubators at the end of 2013 worldwide (Alzaghal and Mukhtar, 2017).

In Palestine, the first two BIs were established in 2004, one located in Ramallah and the other at the Islamic University in Gaza. Currently, there are 22 incubators and incubation programmes running in Palestine that are offering incubation facilities (Alzaghal and Mukhtar, 2017).

Business incubators are seen as a good environment in which to provide a variety of resources to new businesses to help them succeed because they stimulate the growth and development of these businesse's new processes in their early stages by improving their opportunities to acquire resources and facilitating the development and commercialization process (O'neal, 2005).

Information and Communication Technology (ICT): Information and communication technology is defined as a way of accessing information through telecommunications which is similar to the definition of information technology but is also concerned with communication technology. Information and communication technology is considered an important tool in the creation and development of new businesses and services which can be applied in different businesses areas such as online services, outsourcing and international competitiveness. These tools can increase productivity and transparency in all types of businesses in all sectors (Veronice, 2015; Veronice *et al*., 2015; Alzaghal and Mukhtar, 2017).

Through using ICT tools, incubators can provide useful access to all business services in a professional way. Thus, these tools and services can help entrepreneurs and incubator staff set up their business models and processes in a professional way (Annonymous, 2009).

Networking services: There are many different factors that influence the success of an incubator that have been identified by many case studies but more studies are still needed to solve some of the difficulties encountered in developing incubator success models (Al-Mubaraki and Busler, 2014). The following provides some information derived from the literature about one of the important factors in incubator success networking services which was selected for this study framework.

Networking services has been identified and used as an important success factor in many studies and models in the literature, since, the 1980's and its importance has increased in recent years, especially, since, the huge spread and development of ICT tools for much of our daily activities.

Networking is defined as connected bilateral relations where a group of nodes takes the form of roles, individuals or organisations (Johannisson, 2000). As stated above, the main task of incubators is to support entrepreneurs (the incubatee) in achieving their business objectives inside and outside incubators. In order to achieve these objectives, entrepreneurs require a lot of links or relationships inside the incubator with staff, other incubatees, experts and others and also outside the incubator among a variety of institutions, organisations, markets and others. These links and relationships can be offered by networking services that allow entrepreneurs to access more opportunities to find ways to meet their needs and solve their problems in an efficient way and to help their new ventures to survive and grow (Smilor, 1987; Alzaghal and Mukhtar, 2017).

According to Blok *et al.* (2017) internal and external networking services between like-minded entrepreneurs and professionals are one of the main four categories of support that are offered by incubators and that affect the incubation process. This study's results indicate that internal networking and external networking are, respectively, the fourth and fifth most important factors that affect the incubation process in new technology-based firms in a positive way.

Another important finding by Pettersen *et al.* (2015) is that start-ups usually depend on private external networking to access their critical resources.

Most studies in the literature found, that networking services as a concept was an important factor in the incubation process, since, 1987 but it's important as an effective factor started at the beginning of the 21st century with appearing and developing of ICT tools and networking. Currently, networking services is one of the most important services offered by incubators and is also an important element in the incubation process.

The problem statement: As mentioned above, Arab countries are facing a bad economic situation, the unemployment rate is very high and the GDP is very low. In Palestine as an example there are many incubators running there that are offering good facilities and services, thousands of graduates are graduating from Palestinian universities each year and thousands of innovation ideas are being presented by entrepreneurs every year.

However, the impact of incubator outcomes in Palestine on the number of jobs created and the value of GDP has been limited and there have only been a few success stories. To solve these problems, one of the proposed solutions is to create jobs through SMEs that have graduated from an incubator (Al-Mubaraki *et al.*, 2015; Gozali *et al.*, 2015; Sungur, 2015).

Furthermore, while numerous studies have been conducted in many developing and developed countries to study the success of incubators, only a limited number have been performed in the Middle East and North Africa (MENA) countries and especially in Palestine (Alshukri, 2012; Al-Mubaraki and Busler, 2014; Elmansori, 2014; Theodorakopoulos *et al.*, 2014; Lose and Tengeh, 2015). Therefore, this research intends to fill this gap in the literature.

Currently, ICT is a crucial tool that can encourage the creation and development of new businesses (Anonymous, 2009, 2015; Almakenzi *et al.*, 2015). All types of studies on networking services that are offered by incubators show that firms that have good networking ties with related actors have a higher survival rate than firms that do not have any networking activities (Sungur, 2015). So, the current study will attempt to investigate the importance of networking in the success of incubators.

Model and hypotheses development: A conceptual framework is defined as a set of principles and ideas extracted from relevant fields of inquiry that is used to organise and structure a subsequent presentation. It is also defined as a diagrammatic representation that displays the relationship between dependent and independent variables (Eshun, 2009). Based on the results reported in (Alzaghal and Mukhtar, 2017) a conceptual framework and a group of hypotheses were extracted and developed for the current study as shown in Fig. 1.

From a survey of the relevant literature, it was found that there are no studies specific to Palestinian incubators that investigate the moderating effect of ICT tools on the relationship between networking services and incubator success. This study was therefore, conducted in order to fill this clear gap in the literature. It does so by studying the variables that influence the effect of networking services on the success of incubators in Palestine. Therefore, the study hypothesised that:

- H_1: there is a positive relationship between networking services and incubator success
- H_2: information and communication technologies tools moderates the relationship between networking services and incubator success

The research methodology: This study was adopted a mixed mode or multi-method approach to collect the data needed and propose a research model, the quantitative element of the research involved the use of a questionnaire and the qualitative aspect involved interviewing some leading figures in Palestine.

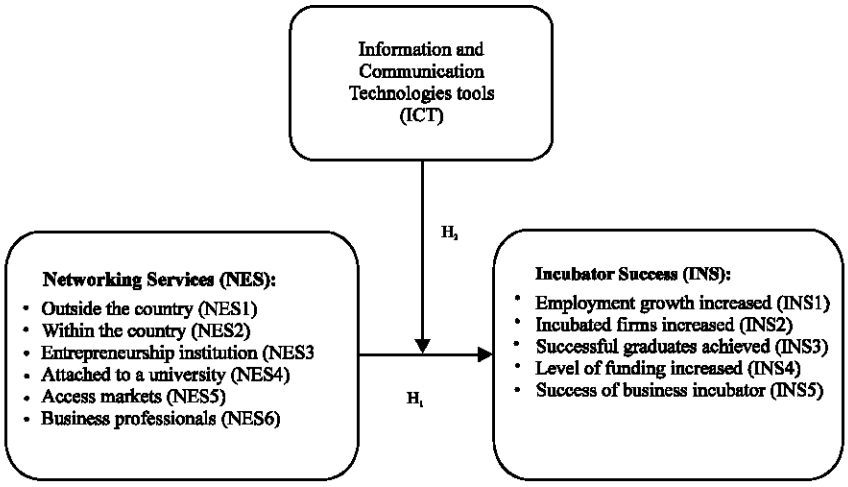

Fig. 1: The conceptual framework

Using a multi-method approach is beneficial because the survey method can provide information that is lacking from the case study and vice versa (Gable, 1994). The research methodology consisted of six stages.

Literature search: This stage involved finding relevant works in this domain including models, case studies, various definitions and types of incubators and data on the success of incubators worldwide. As stated above, a lot of studies have been conducted all around the world, especially in developed countries but in the case of Arab countries and others in MENA there are a very limited number of studies on incubator success.

In this stage, the search focused on looking for reputed journals and practitioner literature related to the research topic that had been published, since, 1985 as well as theses and other related research papers and conference papers that discussed the success of incubators, the effectiveness of incubators and any best practices among incubators around the world. Many databases were used in this search such as Emerald, IEEE, Scopus, Science Direct, Springer, Pro Quest and Google Scholar.

Many keywords were used in this search such as success factors, incubator success, incubator effectiveness, incubator measurement, indicators, business incubators, ICT, ICT incubator, organisational success and others.

Problems and objectives: In this stage, gaps were identified and defined based on the literature review and the situation on the ground in Palestine. Then the research problems and objectives were identified based on those gaps.

E-mail interview: In this stage, all the incubators in Palestine were studied to determine the identities of the stakeholders and the types of incubators. An email interview was conducted with 31 stakeholders and incubator managers to collect information on the factors and indicators that are perceived to affect the success of incubators. Some of these factors were discussed through an online discussion with two managers using Facebook and Skype. The factors were compared with the factors and models identified in the literature review, to validate them and make sure that they could be used in developing countries such as Palestine and some other countries in the Middle East.

The proposed research model: In this stage, the factors and indicators for the success factor were identified and the preliminary research model was designed based on the knowledge obtained from the previous three stages. Then the hypotheses were derived based on the research model.

The selection of the factors consisted of three steps. The first involved reviewing the literature to extract the main success factors and models that have been used worldwide during the period 1985-2016. The second step was the email interview stage described above which gathered together all the success factors from key stakeholders in Palestine, from which the factors with the highest scores was selected. The third step in developing the proposed research model was based on the previous two steps in which the success factors were selected depending on the highest rates of the literature found and the stakeholder's opinion in both previous stages results. These were then discussed in detail many times with two international experts in Palestine and the proposed research model was finalised.

Data collection: In this stage, the study population was defined as Palestinian incubators currently running in Palestine in the West Bank and Gaza. These incubators were divided into four types; Nine incubators and accelerators, four centres of excellence at universities, three Venture Capital (VC) programmes and six incubation and pre-incubation programmes at universities.

Then, a focus group was identified consisting of managers, decision-makers, evaluators, steering committee members and directors from all incubators, accelerators, centres of excellence, VC programmes and incubation and pre-incubation programmes as well as any other relevant persons who had good experience in this field or who had participated in any of the incubators and incubation activities.

Thus, the scope of this study covers all of the types of incubators that are running in Palestine inside and outside universities, formal and informal organisations, incubation and pre-incubation programmes and VC programmes. There are 22 incubators running in Palestine in total.

After defining the population and the focus group, the survey stage commenced. The survey is a strategy or a tool used in management and business research usually to collect data by asking questions, so, researchers can collect data from a large population in a low-cost way, which also have two instruments used frequently, questionnaire and interview (Saunders *et al*., 2009).

There are several different steps that need to be followed when developing a questionnaire such as constructing drafts, identifying pre-testing information, validating and revising, etc (Churchill Jr and Iacobucci, 2010). In this study, in the first draft of the questionnaire that was developed, all of the independent constructs were measured using a Likert scale ranging from 1-5 points where 1 = not at all important and 5 = very important. Each section for each factor in the questionnaire started with a brief description of the definition of the factor. After that many questions were collected from different research studies. These questions were arranged in many separate tables according to the individual success factor.

After developing the first draft of the questionnaire, it underwent pre-testing by two experts the first expert was from an academic field and was a prolific and versatile researcher with many publications and a lot of experience in this field. The second expert was from the practical field in Palestine and was one of the international experts in the field of incubators. The experts selected the most suitable questions based on their experience and most of the questions were discussed in detail and commented on during personal interviews with the experts concerned. Then the questions on which the experts agreed the most were selected for use. After that the modified questionnaire was validated by another two academic experts. Then, the final questionnaire was created in light of the valuable comments and discussion with the previous experts.

After this version of the questionnaire had been created, a pilot study was conducted to guide the main study in the collection of data from the focus group which consisted of a sample of the target population of the study and other relevant persons in the same field. A pilot study is used to validate the measurement instrument, refine the survey questions and reduce the risk of bias in the final study. Furthermore, a pilot study can also be used to examine specific a spects of the main research and whether they are proceeding as planned or not (Zikmund *et al*., 2013). In this research, the pilot study was conducted in August 2016 through an online survey of a small group of all managers and team members from all the incubators in Palestine. A total of 35 participants were selected to provide their feedback in terms of their understanding of the questionnaire. Out of this number, 26 respondents answered it correctly. All the participants who chose to participate in the pilot study were from the overall study population and focus group and all of them were aware of the incubation process and the objectives of the study. The Cronbach's alpha statistic for all independent and dependent variables should be greater than 0.70. The total Cronbach's alpha value for all the items in the questionnaire was 0.838 which meant that all the items had relatively high internal consistency. After conducting the pilot study, the data was analysed, then the result was discussed with some experts in order to finalise the questionnaire, so that, it could be implemented in the final study.

The final questionnaire was administrated to all types of Palestinian incubator. It was distributed randomly to all incubator managers, team members and experts in Palestine as the target sample via the online Survey Monkey website, email and face-to-face meetings. The target group consisted of 96 persons and the final questionnaire was sent to all members of the targeted group. From these, 82 questionnaires were collected but only 79 of them were suitable for use in analysis.

Data analysis: To validate and refine the proposed model, Structural Equation Modelling (SEM) was performed using the SMART-PLS tool Version 2.00. In addition, to test the hypotheses of this research model and analyse the preliminarily collected data, the Statistical Package for the Social Sciences (SPSS) was used to analyse the structural model of this study. Structural equation

modelling was used because it is a second-generation statistical technique that employs a range of techniques including covariance structural analysis, causal models, path analysis and confirmatory factor analysis. In other words, it is a family of statistical models that seek to explain the relationships among multiple variables (Hair, 2006).

The Partial Least Squares (PLS) technique is a part of SEM and in this study, it was applied to analyse the causal relationships between constructs using Smart-PLS. One of the main advantages of SEM is its ability to assess the construct validity of measurements (Hair, 2006). In this study, PLS was used instead of AMOS for the following reasons PLS can handle smaller sample sizes (like the one in this study) there are no underlying assumptions about the distribution of the data and AMOS can create some problems in the data analysis. The PLS technique also allows the use of true moderation variables model as interaction terms whereas AMOS employs the maximum likelihood estimation which cannot model interaction terms (Hair *et al*., 2011).

In this study, of the 79 completed and useable questionnaires, 61 were received from male (77.2%) and 18 from female (22.8%) respondents. Therefore, the sample of this study was predominately male.

In the questionnaire, the variable Networking Services (NES) consisted of six measurement items: linkages with other incubators outside the country (NES 1), Linkages with other incubators within the country (NES 2), affiliation of the incubator with entrepreneurship institutions public and private (NES 3), Attached to a university (NES 4), facilitation to enter/access markets (NES 5) and referrals to business professionals and experts (NES 6). The variable Incubator Success (INS) consisted of five measurement items: employment growth increased (INS 1), number of incubated firms increased (INS 2), Successful graduations achieved (INS 3), level of funding and grants increased (INS 4) and the level of business incubator success (INS 5).

Data screening is important in data analysis because it ensures to that the most suitable respondents participate in the study and that the data is correctly entered free from missing values and outliers and also confirms the normality of the distribution of the variables (Tabachnick and Fidell, 2007). The first step in data screening involves replacing the missing values. However, in this study, there were no missing values because an online survey tool called Survey Monkey was used which prevents participants from moving to the next page or step if they have not answered all the required questions. As regards the final survey statistics, 96 surveys were distributed, 82 surveys were collected and after cleaning 79 surveys were suitable for data analysis. Thus, the survey collection rate was 85.4% and the valid survey rate was 96.3%. The accumulated Standard Deviation (SD) was calculated for all variables. Any SD value less than 0.5 was suspected and cleaned. The excluded cases amounted to just one case.

Outliers are defined as any observations that have an unusual value for any variable (Tabachnick and Fidell, 2007). Identifying outliers is very important in data analysis because their presence can alter the results of the analysis. In this study, both univariate and multivariate outliers were detected. For univariate outliers, the Z-scores were calculated for all cases. The Z-score for the research variables ranged from -4.250-2.885, indicating that, one of the items exceeded the threshold of ±4. So, this case was cleaned. The other 79 cases had no univariate outliers.

After calculating the outliers, the data normality was calculated. The results showed that the skew and kurtosis of all 79 items fell between ±2 and ±7, respectively. This confirmed that the data for all items was well-modelled by a normal distribution which skewed values in a range between -2.135 and 1.068 and the kurtosis values ranged between -1.846 and 1.986.

The descriptive statistics showed that the mean score for all the variables in the study was >3 and the SD was also near to or <1 which means there were positive evaluation scores. For the NES variable, three of the six items got a high positive evaluation score of more than 3 and items (NES 1) and (NES 3) got the two highest values of 3.633 and 3.835, respectively. Furthermore for the INS variable, three of the five items got a high positive evaluation score of more than 3 and the items (INS 2) and (INS4) got two highest values of 3.405 and 3.418, respectively.

RESULTS AND DISCUSSION

The objectives of this study were to determine whether networking services influence incubator success. The following sections discuss the evaluations of the measurement model and the structural model.

Evaluation of the measurement model: The measurement model is a statistical technique used to discover and test the relationships between manifest or observed and latent or unobserved variables (Ho, 2006) and it is the first stage of a SEM analysis. The following discusses the development of the measurement model including all the values and tests of the outer loading reliability, internal consistency, convergent validity, discriminant validity and structural model assessment techniques that are always used in a PLS-SEM analysis with Smart-PLS 2.00.

After conducting indicator (outer loading) reliability tests, one indicator (NES 6) was deleted from NES because its value fell below the acceptance level 0.708. No indicators were deleted from the INS.

To test the internal consistency and reliability, composite reliability and Cronbach's alpha were calculated. The composite reliability value depicts the degree to which the construct indicators indicate the latent construct. The composite reliability value should exceed 0.7 or higher (or 0.6 for exploratory research) according to Bagozzi and Yi (1988) and Hair Jr. *et al.* (2016). The value for NES and INS was 0.920 and 0.928, respectively. On the other hand, Cronbach's alpha describes the degree to which a measure is error-free. The Cronbach's alpha value for NES and INS was 0.890 and 0.902, respectively which was above the value of 0.7 suggested by Vellis and Dancer (1991) and Oliva *et al.* (1992) which means that all the constructs were considered to be sufficiently error-free.

To confirm the convergent validity on the construct level, the size of factor loading, Average Variance Extracted (AVE) and Construct Reliability (CR) should be considered in relation to the sets of items in the construct. As for AVE, it is defined as the grand mean value of the squared loadings of the indicator associated with the construct (Hair Jr *et al.*, 2016). An AVE value equal or <0.50 indicates that, on average, more errors remain in the items than the variance explained by the construct. In this study, an AVE value of 0.5 and above was deemed acceptable as recommended by Bagozzi and Yi (1988) Oliva *et al.* (1992) and Hair Jr *et al.*, 2016). The AVE value for NES and INS was 0.697 and 0.722, respectively which means that convergent validity was confirmed for all the variables.

Discriminant validity is used to distinguish a construct from other constructs and can be assessed by comparing the square root of the AVE for two constructs and their correlations (Fornell and Larcker, 1981; Abramson *et al.*, 1978). Further, correlations between the factors should not exceed 0.85 (Kline, 2010). To confirm the results, the square root of the AVE value of any specific construct must be greater than all the other values in the same column or row of the correlation matrix (Fornell and Larcker, 1981; Hair Jr *et al.*, 2016). In this study, the discriminant validity for all the different constructs was confirmed.

Multicollin earity analysis was also performed to check each set of exogenous latent variables in the inner model for potential collinearity and to determine whether any variables should be deleted or merged into one or whether a higher-order latent variable should be developed (Wong, 2013). To measure the tolerance level between constructs, the Variance Inflation Factor (VIF) scale was used, to assure the absence of high correlation. An acceptable VIF value is above 0.20<5.00 according to Wong (2013). All the constructs were at the acceptable tolerance level of between 1.147 and 4.151. Hence, multicollinearity is confirmed for the entire model.

Evaluation of the structural model: The Second Main Stage of SEM analysis is the structural equation model. A representation of the structural model can be made by specifying the relationship between the constructs if the measurement model is validated. The structural model is used to provide clear details about the links between the variables. It also displays good details of the relationship between the independent (exogenous) variables and dependent (endogenous) variables (Hair *et al.* 2006; Ho 2006). In this study, the structural model was used to examine the research hypotheses, using PLS analysis, technique and bootstrap with 79 replications. The following discusses the development of the structural model employed to test the research hypotheses.

To assess the predictive power of the model, the coefficient of determination (R^2) and the predictive elevance (Q^2) are used to explain the variance in the target endogenous variable. The rule of thumb is used to assess the values levels, as recommended by (Hair Jr *et al.* 2016) which for predictive power (R^2) is weak between 0.2 and 0.5, moderate between 0.5 and 0.75 and strong above 0.75. Furthermore, predictive relevance (Q^2) is small between 0.02 and 0.15, the medium between 0.15 and 0.35 and large above 0.35 In this study, for the endogenous latent construct INS, the coefficient of determination (R^2) was 0.847 and the predictive relevance (Q^2) was 0.775. These results confirm that the exogenous construct NES has a strong predictive power and a large predictive relevance for the construct INS.

A construct's effective size (f^2) is defined as a measure of the impact of a specific predictor construct on an endogenous construct which can measure the change in the R^2 value when a specified exogenous construct is omitted from the model (Hair Jr *et al.*, 2016). The rule of thumb for the f^2 value is that it is small at 0.02, medium at 0.15 and large at 0.35. In this study, the value of the effective size is 0.166 for the NES construct.

Parameter estimates together with coefficient values were used for hypotheses testing purposes, through applying bootstrapping with 500 replications (Wetzels *et al.*, 2009). To calculate the coefficients values, the variance estimate was divided by its Standard Error (SE). If the Critical value (CR) or $z>1.96$ for a regression weight (standardised estimates) the parameter is statistically significant at the 0.05 level. The

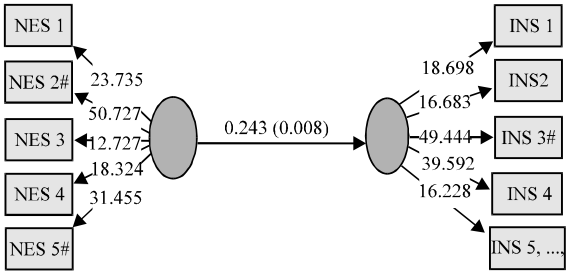

Fig. 2: The structural model for testing the direct effect of NES variable

significance level or probability estimate value (p-value) the significance of the path coefficient (t-statistic) and the path coefficient are the important values used in the assessment of the construct relations in a model. The rule of thumb for the p-value can be at the 1,5 or 10% level but the popular level in psychological studies is 5% (Hair Jr *et al*. 2016). Furthermore, p-value was significant at 5% level, t-statistic>1.96 was significant at two-tailed and t-statistic>0.98 was significant at the one-tailed test. In this study, for the NES construct, the path coefficient value was 0.243, the SE value was 0.098, the t-statistic value was 2.488 and the p-value was 0.013. These results indicate that the path between NES and INS is statistically significant and has a positive effect. Therefore, hypothesis H_1 was supported. Figure 2 displays the structural model for testing the direct effect of NES on INS.

The moderating effect of ICT tools: In this study, the moderating effect of ICT tools on the effect of NES (as the independent variable) on INS (as the dependent variable) was examined. To confirm the existence of a moderating effect of a third variable on the relationship between the independent variable and dependent variable, the relationship should change with the changing value of the moderating variable (Aiken *et al*., 1991).

This study performed the following steps to analyse this effect, data was split into two sets, one for the "Basic ICT tools" group and one for the "Advanced ICT tools" group, by using SPSS, the two data sets were loaded into SMART-PLS, the abstract final model was tested for the "Basic ICT tools" group and the bootstrapping report was stored to get the path coefficient values, the abstract final model was tested for the "Advanced ICT tools" group and the bootstrapping report was stored to get the path coefficient values using the "Stats tools package -X2 differences", the t-statistic and p-value were calculated by using the path coefficient and SD values for both groups (Robinson *et al*., 2013). The rule of thumb was that any p = 0.05 and any t-statistic>1.96 meant that the path coefficient was different between groups and there was a significant moderation effect.

The results showed that the effect of ICT tools interaction with NES on INS was statistically significant at the 0.05 evel where the t-value = 3.408 and the p = 0.001. This indicated that ICT tools moderated the relationship between NES and INS. Thus, hypothesis H_2 was supported.

CONCLUSION

Business incubators are one of the key elements in the economic development policies that help to increase the creation of new firms which in turn contributes to job creation and minimising unemployment in many countries.

The use of ICT tools in any organisation is very important as they increase competitiveness, save a lot of time and money and improve the effectiveness of decision-making.

This study aimed to explore the moderating effect of ICT tools on the relationship between networking services and incubator success in a new framework to identify the attributes of good business incubators and to test the framework on incubators currently active in Palestine as a special case.

Networking services are one of the most important value-added services offered by incubators to incubatees as these services allow incubatees to identify innovation parties and transform them into innovation partners.

In the literature, there are many models and case studies that have used networking services to measure incubator success and performance but in developing countries and especially in Arab countries, only a few research studies have been conducted on this topic. Therefore, this research makes a good contribution to knowledge in this area by providing practical evidence on the relationship between networking services and incubator success in a developing country such as Palestine. This study found that networking services appears to be an important success factor that can help incubators to facilitate networking services between incubatees themselves and also between incubatees and other important parties.

RECOMMENDATIONS

Furthermore, another important contribution of this study is that it investigated whether ICT tools act as a moderator of incubator success. It seems from the literature review that ICT tools have not been used as a

moderator in any incubator success models. However, this study found that ICT tools do moderate the relationship between networking services and incubator success. The adoption of ICT tools by a business incubator could, therefore, improve international competitiveness and enhance product qualities by enhancing all activities and services for the incubated companies, also, help these companies in providing more comprehensive customer services.

Finally, it is hoped that the results of this study will provide useful guidance to incubator managers and other stakeholders on how to ensure the implementation of successful incubation programmes in Palestine and in other similar developing countries in the future.

REFERENCES

AL-Mubaraki, M.H. and M. Busler, 2014. Incubator successes: Lessons learned from successful incubators towards the twenty-first century. World J. Sci. Technol. Sustainable Dev., 11: 44-52.

Abramson, L.Y., M.E. Seligman and J.D. Teasdale, 1978. Learned helplessness in humans: Critique and reformulation. J. Abnormal Psychol., 87: 49-74.

Aiken, L.S., S.G. West and R.R. Reno, 1991. Multiple Regression: Testing and Interpreting Interactions. Sage Publication, London, UK., Pages: 213.

Al-Kasasbeh, M.M., M.I. Alhalalmeh and S.M.A. Lehyeh, 2017. Business incubators and its effect on success of incubated firms in Jordan. Intl. Bus. Manage., 11: 189-193.

Al-Mubaraki, H.M. and M. Busler, 2010. Business incubators: Findings from a worldwide survey and guidance for the GCC states. Global Bus. Rev., 11: 1-20.

Al-Mubaraki, H.M., A.H. Muhammad and M. Busler, 2015. Categories of incubator success: A case study of three New York incubator programmes. World J. Sci. Technol. Sustainable Dev., 12: 2-12.

Al-Mubaraki, H.M., M. Aruna and M. Busler, 2013. Entrepreneurship, innovation, incubator and economic development: A case study. World Acad. Sci. Eng. Technol., 7: 1082-1087.

Almakenzi, S., A. Bramantoro and W. Rashideh, 2015. A survivability model for saudi ICT start-ups. Intl. J. Comput. Sci. Inf. Technol., 7: 145-159.

Alon, I. and M.M. Godinho, 2016. Business incubators in a developing economy: Evidence from Brazil's Northeast region. Sci. Public Policy, 44: 13-25.

Alshukri, E.A.M., 2012. Palestinian experience in business incubators and their role in the development of new works for young people. Youth Development Association, Palestine.

Alzaghal, Q. and M. Mukhtar, 2017. Factors affecting the success of incubators and the moderating role of information and communication technologies. Intl. J. Adv. Sci. Eng. Inf. Technol., 7: 538-545.

Annonymous, 2009. ICT-enabled business incubation program: Strengthening innovation at the grassroots. Infodevelopers Pvt. Ltd., Patan, Nepal.

Annonymous, 2015. The tech terms computer dictionary. USA. https://techterms.com/.

Bagozzi, R.P. and Y. Yi, 1988. On the evaluation of structural equation models. J. Acad. Market. Sci., 16: 74-94.

Blok, V., S. Thijssen and S. Pascucci, 2017. Understanding management practices in business incubators: Empirical evidence of the factors impacting the incubation process. Intl. J. Innovation Technol. Manage., 14: 1-23.

Cantu, C., 2015. A service incubator business model: External networking orientation. IMP. J., 9: 267-285.

Churchill Jr, G.A. and D. Iacobucci, 2010. Marketing Research: Methodological Foundations. 10th Edn., Cengage South-Western, Ohio, USA., ISBN:9781439081297, Pages: 604.

Dee, N., D.E. Gill, T.F. Livesey and T.H.W. Minshall, 2011. Incubation for growth: A review of the impact of business incubation on new ventures with high growth potential. MSc Thesis, University of Cambridge, Cambridge, England.

Elmansori, E., 2014. Business incubators in the Arab World: Comparative study of Jordan and UAE business incubators. World J. Sci. Technol. Sustainable Dev., 11: 282-293.

Eshun, J.P., 2009. Business incubation as strategy. Bus. Strategy Ser., 10: 156-166.

Fornell, C. and D.F. Larcker, 1981. Evaluating structural equation models with unobservable variables and measurement error. J. Market. Res., 18: 39-50.

Gable, G.G., 1994. Integrating case study and survey research methods: An example in information systems. Eur. J. Inf. Syst., 3: 112-126.

Gozali, L., M. Masrom and T.Y.M.Z. Haron, 2015. Critical success factors of successful E-business incubators framework in Indonesian Public Universities. Proceedings of the 2nd International Conference on Human Capital and Knowledge Management (HCKM'15), February 11-13, 2015, University of Technology Malaysia, Johor Bahru, Malaysia, pp: 1-10.

Grimaldi, R. and A. Grandi, 2005. Business incubators and new venture creation: An assessment of incubating models. Technovation, 25: 111-121.

Hair Jr, J.F., G.T.M. Hult, C. Ringle and M. Sarstedt, 2016. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). Sage, Thousand Oaks, California, USA., ISBN:9781483377445, Pages: 363.

Hair, J.F., 2006. Multivariate Data Analysis. 6th Edn., Pearson/Prentice Hall, New Jersey, USA., ISBN:9780132281393, Pages: 899.

Hair, J.F., C.M. Ringle and M. Sarstedt, 2011. PLS-SEM: Indeed a silver bullet. J. Marketing Theor. Practice, 19: 139-152.

Ho, R., 2006. Handbook of Univariate and Multivariate Data Analysis and Interpretation with SPSS. CRC Press, Boca Raton, ISBN: 9781584886020, Pages: 424.

Hong, J. and J. Lu, 2016. Assessing the effectiveness of business incubators in fostering SMEs: Evidence from China. Intl. J. Entrepreneurship Innovation Manage., 20: 45-60.

Johannisson, B., 2000. Networking and Entrepreneurial Growth. In: The Blackwell Handbook of Entrepreneurship, Sexton, D.L. and H. Landstrom (Eds.). Wiley-Blackwell, Oxford, UK., pp: 368-386.

Kline, R.B., 2010. Principles and Practice of Structural Equation Modeling. 3rd Edn., Guilford Press, New York, USA., ISBN:9781606238783, Pages: 427.

Lee, M.H. and M.C. Lio, 2017. Can information and communication technology promote venture creation? A cross-country study using an instrument variable approach. Inf. Dev., Vol. 1,

Lose, T. and R.K. Tengeh, 2015. The sustainability and challenges of business incubators in the Western Cape Province, South Africa. Sustainability, 7: 14344-14357.

Mubaraki, H.A. and H. Schrodl, 2012. Incubating success towards Gulf Cooperation Council (GCC). Intl. J. Innovation Knowl. Manage. Middle East North Afr., 1: 31-56.

O'neal, T., 2005. Evolving a successful university-based incubator: Lessons learned from the UCF technology incubator. Eng. Manage. J., 17: 11-25.

Oliva, T.A., R.L. Oliver and I.C. MacMillan, 1992. A catastrophe model for developing service satisfaction strategies. J. Market., 56: 83-95.

Pettersen, I.B., J. Aarstad, O.S. Hovig and A.E. Tobiassen, 2015. Business incubation and the network resources of start-ups. J. Innovation Entrepreneurship, 5: 1-7.

Robinson, C.D., S. Tomek and R.E. Schumacker, 2013. Tests of moderation effects: Difference in simple slopes versus the interaction term. Multiple Linear Regression Viewpoints, 39: 16-24.

Saunders, R.K., P. Lewis and A. Thornhill, 2009. Research Methods for Business Students. Prentice Hall, Cape Town, South Africa, ISBN:9780273716860, Pages: 614.

Smilor, R.W., 1987. Managing the incubator system: Critical success factors to accelerate new company development. IEEE. Trans. Eng. Manage., 3: 146-155.

Sungur, O., 2015. Business incubators, networking and firm survival: Evidence from Turkey. Intl. J. Bus Soc. Sci., 6: 136-149.

Tabachnick, B.G. and L.S. Fidell, 2007. Multivariate analysis of variance and covariance. Using Multivariate Stat., 3: 402-407.

Theodorakopoulos, N., N.K. Kakabadse and C. McGowan, 2014. What matters in business incubation? A literature review and a suggestion for situated theorising. J. Small Bus. Enterp. Dev., 21: 602-622.

Vellis, R.F.D. and L.S. Dancer, 1991. Scale development: theory and applications. J. Educ. Meas., 31: 79-82.

Veronice, V., 2015a. Analysis level of utilization information and communication technology with the competency level of extension workers. Intl. J. Adv. Sci. Eng. Inf. Technol., 5: 226-229.

Veronice, V., Y. Yelfiarita and D. Darnetti, 2015b. Analysis of characteristics extension workers to utilization of information and communication technology. Intl. J. Adv. Sci. Eng. Inf. Technol., 5: 303-305.

Wetzels, M., G. Odekerken-Schroder and C. van Oppen, 2009. Using PLS path modeling for assessing hierarchial construct models: Guidelines and impirical illustration. Manage. Inform. Syst. Q., 33: 177-195.

Wong, K.K.K., 2013. Partial Least Squares Structural Equation Modeling (PLS-SEM) techniques using SmartPLS. Marketing Bull., 24: 1-32.

Zikmund, W.G., B.J. Babin, J.C. Carr and M. Griffin, 2013. Business Research Methods. Cengage Learning, Boston, Massachusetts, USA.,.