IDENTIFYING CRITICAL SUCCESS FACTORS FOR UNIVERSITY BUSINESS INCUBATORS IN SAUDI ARABIA

Kamran Ahmed Siddiqui 1, Mohammad Emad Al-Shaikh 2, Ishtiaq Ahmed Bajwa 3, Abdulaziz Al-Subaie 4

1,2,3,4 College of Business Administration, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia

E-mails: 1 KASiddiqui@iau.edu.sa; 2 IABajwa@iau.edu.sa; 3 MEAlshaikh@iau.edu.sa; 4 abdulaziz208@hotmail.com

Received 18 July 2020; accepted 15 December 2020; published 15 January 2021

Abstract. Business incubators are a major tool in entrepreneurial eco-system of any country and forms the backbone of economic development initiatives. One of the greatest adaptations of business incubators came through universities especially public sector universities. This is due to the university's understood responsibility of supporting science and society development and ultimately providing all the new businesses' requirements in science and technology. Saudi Arabia has taken robust measures to develop and improve the local entrepreneurial eco-system by establishing and nurturing business incubators, especially university business incubators. In a small frame of time, Saudi business incubators have produced many innovate solutions for the technology, economic and social challenges. Due to multifaceted functionality and lack of standard evaluation criteria the business incubator performance became very important topic in Saudi Arabia. The purpose of this research is to develop critical success criteria for business incubators in Saudi Arabia. Survey methodology was employed to collect the data. Data were analyzed in many ways. Firstly, based on the survey results, list of success criteria for business incubators performance was presented. Secondly, descriptive analysis shows that top three critical factors include (a) coaching and mentoring hours, (b) number of services and supports offered; and (c) access to funds in terms of total attractive investment. While the least important factors considered were (a) affiliation with the university, (b) time limit to tenancy, and (c) numbers of IPOs launched. Thirdly, factor analysis summarizes all the critical success factors for university business incubators and culminates into five big factors, including (a) support services; (b) network support; (c) financial support; (d) economic development; (e) alumni success. Finally, cluster analysis shows there are two major cluster groups in the data: (a) ‘employees’ of the incubators and (b) ‘incubatees’. This research provides guidelines and critical success criteria for business incubators operating in Saudi Arabia or elsewhere.

Keywords: Business Incubators; Accelerators; University Business Incubators; Saudi Arabia; Success Factors

Reference to this paper should be made as follows: Siddiqui, K.A., Emad Al-Shaikh, M., Bajwa, I.A., Al-Subaie, A. 2021. Identifying critical success factors for university business incubators in Saudi Arabia. Entrepreneurship and Sustainability Issues, 8(3), 267-279. http://doi.org/10.9770/jesi.2021.8.3(15)

JEL Classifications: L26

1. Introduction

Over the past two decades, Saudi Arabia has been actively engaged in educational expansion and investment. As a result of this direction from the Government, many graduated students from different fields and specializations have graduated. However, it is implausible that the Government will provide the required jobs for all those graduated students. Moreover, the private sector in Saudi Arabia is not developed enough to address this gap
between the Government and the huge number of graduated students. As a solution to this problem, the Government has developed a new initiative to establish a business incubator as part of universities throughout the Kingdom. The incubators have been increased very rapidly after launching the 2030 Vision by the Government of Saudi Arabia. There are over 35 business incubators working under the universities as non-profit organizations. Different names are assigned to these incubators, such as ‘business incubators’, ‘accelerators’ ‘accelerated business centers’, and ‘business hub center’.

2. Theoretical background

There are many definitions of business incubators (BI) in the literature. The most prominent definition comes from the National Business Incubation Association (NBIA). It defines business incubators as a catalyst tool for either regional or national economic development that has been formulated to enhance the growth rate of the new companies by providing all the required support and services or overcontrol new businesses by managing them through incubation and networking (NBIA, 2021). Other researchers have also provided useful definitions for BI as following. The business incubator is the organization that provides the logistic requirements to the business project in the early stages, such as place and the required recommendations and guidelines; a suitable space and all required assistance in the early stages for the targeted firm; the required support for the firm in the early stages (Mian, 2014). The support may include office service, coaching, and communication (Hansen et al. 2000); governance to the firm in the early stages and provides the required guidance and recommendations (Manan & Yunos 2001); support the new project and link it to the appropriate network, along with the offering of the required advice and recommendation, especially in the first few years of the business start-up (Mian, 1997).

Business incubators have evolved over a period of time and can easily be classified into four generations based on the commonalities among services offered. The first generation of the business incubator, which has been stated from 1970 till mid-1990 “traditional incubator.” The main objectives of these incubators were to enhance the national economy by improving entrepreneurship and small firm. The Government normally controls this type of incubator. Additionally, the universities and private sector contribute by providing the space, and the major revenue is by the rent of space. These incubators were based on economies of scale and offer office space and shared resources. Important characteristics were (a) reactive support, (b) landlord-tenant relationships, and inclination towards real estate management (Allahar, & Brathwaite, 2016). The second generation of the incubator which started from 1990 till 2000. This type of incubator is also named as an incubator without walls or a new economy incubator. Technology development is the main target of this incubator without the interest of job creation. The revenue of this incubator is from the equity of companies via IPO. This generation was based on accelerating the learning curve and used to provide coaching and training support in addition to first-generation services. Prominent characteristics of the generation were (a) advisory services and (b) proactive support (Allahar, & Brathwaite, 2016). The third-generation incubators were started in early 2000. These incubators were based on access to external resources, knowledge, and legitimacy and used to offer access to technological, professional, and financial networks (Bruneel et al., 2012). Prominent characteristics of the generation include (a) access to funding; (b) co-venturing; (c) business accelerators; (d) coaching; (e) mentoring; and (f) technology labs/parks (Allahar, & Brathwaite, 2016). The emergence of business accelerators during the third generation of business incubators can be seen as a catalyst for the growth of business incubators. Business accelerators are a series of programs that give developing companies access to mentorship, investors, and other support services that help them become stable, self-sufficient businesses. Start-ups that use the services of business accelerators are typically those having moved beyond the earliest stages of getting established. Typically, business incubators target local start-ups and provide office space to reduce rent, while accelerators offer fixed-term cohort-based programs. Mentoring, education, technical assistance, and seed funding are some of the common characteristics (Ganamotse et al., 2017). The fourth generation of business incubators is still evolving and based on the concept of business incubators accreditations and internationalization (Khalid et al. 2014). Prominent characteristics of the generation include (a) international business incubators; (b) accredited business incubators; and (c)
international co-incubation (Allahar, & Brathwaite, 2016). One thing is consistent among all generations and among all definitions of business incubators, i.e., business incubators are companies that help new ideas, novice entrepreneurs, and/or new start-up companies to develop by providing services such as management, training or office space, more precisely they provide support to early-stage start-ups (Bruneel et al., 2012; Khalid et al., 2014).

One of the greatest adaptations of business incubators and accelerators came through universities. Although teaching entrepreneurship is not directly linked with business incubators and accelerators as part of their curricula (Siddiqui, & Alaraifi, 2019) but graduates' risk aversion and work effort are positively influenced by the university business incubator and entrepreneurship education programs (Guerrero et al., 2020). Now universities understand their responsibility of supporting science and society development and ultimately providing all the requirements for the new business in science and technology to play their most important roles as university business incubator (Nicholls-Nixon et al., 2020). Literature provide further support to the application and implementation of UBIs throughout the globe i.e., University business incubator (UBI) works as hub to market; university; research and technology (Pellegrini, & Johnson-Sheehan, 2020); UBIs are considered as an effective tool used to compensate the weakness in the traditional business incubators (Grimaldi, & Grandi, 2001); UBIs also provide the required support to university professors, students, alumni to start businesses as entrepreneurs (Gozali et al, 2018); UBI’s role is not only to provide the required support to the accelerate the growth for the new businesses in the market but also provide the required training for the university students and marketing university’s innovation (Nicholls-Nixon et al., 2018); UBIs are considered as the most crucial element of entrepreneurial ecosystem (Nicholls-Nixon et al., 2020); UBI can utilize all available resources and the faculty experiences to support the new firm during the start-up period in the market (Lendner, & Dowling, 2007); UBI establishes effective networks and creates value for the incubatees to survive in the market. It also provides a chance of getting fund and support to incubatees (Cooper et al., 2012); UBI has to consider the differences of cross-border and cross-cultural organizations in order to get acceptance of incubator concept, especially in developing centuries (Dahms, & Kingkaew, 2016); UBI is a tool used to enhance national economic growth. Normally, UBIs are targeting the technology firms in early stages (Somsuk, & Laosirihongthong, 2014); UBI provide the required offices, tools, and the consultation service for the new firm; works as mediator between the university and the industrial market and creates the required link to support the university research (Wonglimpiyarat, 2016); UBI provides varieties of facilities and image to tie with university image and it provide incubatees the ability to survive in the market (Grimaldi, & Grandi, 2001). On the other hand, literature also provide significant critique to the UBIs. For example, UBI’s support activities for entrepreneurs is dependent on UBI’s manager’s experience (Redondo, & Camarero, 2017); UBIs need to consider the organizational and cultural differences in different countries in order to get acceptance of incubator concept, especially for developing centuries (Dahms, & Kingkaew, 2016); UBIs are under great pressures to evaluate the UBI performance and the rationalization of UBI’s fund (Nicholls-Nixon, & Valliere, 2019). Even research on UBIs also came under scrutiny. For example, most of earlier research have ignored to study society funding to the entrepreneur through UBIs (Redondo, & Camarero, 2019); most of the earlier research on UBI activities failed to link the UBI’s activities to the different generations of business incubators and their offerings despite the fact that UBI works as mediator between the university and the industrial market and create the required link to support the university research (Wonglimpiyarat, 2016).

A very thin amount of literature is available on the critical success factors for UBIs. Firstly, a seminal work on UBI’s success factors (Mian, 1994, 1996a, 1996b 1997), reviewed and upgraded success factors (Verma, 2004), and Saudi model for technology incubators (Binsawad et al., 2019); six-factor model including age and quality of facilities, credits and rewards, entry criteria, exit criteria, funding support, good system and infrastructure (Gozali et al., 2018); four-factor model including human resources, financial resources, technological resources and organizational resources (Mavi et al. 2019) and most recently used success
criteria for the ranking university business incubators (UBI Global, 2020). All models have their merits and
demerits. Mian’s model (1994) is very old and belongs to first generation of business incubators but does not link
to subsequent generations and needs updating. Verma’s model (2004) is also old and belongs to the second
generation of UBI (Verma, 2004). Some of the research on university business incubators and their performance
were excluded from this research as they were based on students’ entrepreneurial intentions; not based on actual
incubator experience; for example (Yamockul, Pichyangkura, & Chandrachai, 2019) or having methodological
issues (Mavi, et al 2019; Gozali et al, 2018). Binsawad et al. (2019) is a Saudi Technology business incubator
model is based on personal perspective, not organizational criteria, and cannot be used for UBI performance
evaluations and it does not include the attributes of the fourth generation of UBI (Binsawad et al. 2019). UBI
Global model (2020) for UBI ranking is more appropriate but lacks features of earlier generations of UBI (UBI
Global, 2020). It became the criteria to rank the university incubators in the world. Every year the UBI provides a
report started the top business all over the world based on three categories. The first categories are the top
changers. The second categories are the recognize the most promising incubator and the last category is the
ranking for university incubator over the world. Every year these is around 70 counties involve in the incubator
rang with total number of 300 incubators. These samples contain the most important and popular sector in the
business. UBI framework to rank the incubator contain of three importins categories, the values of ecosystem,
value for client and attractiveness. These three categories spared to seven indictor which use to measure the
incubator performance. The seven indictors are economy enhancement, access to funds, incubator offer, talent
retention, competence development, post-incubation performance and access to the network (UBI Global, 2020).

During the last two decades there has been an increasing effort by the Saudi authorities to improve the
entrepreneurial ecosystem in the country establishing the business incubators and accelerators (Al-Mubaraki &
Busler, 2010). Saudi vision 2030 has selected entrepreneurship as future roadmap for economic development and
employment creation (Saudi Arabia, Vision 2030; www.vision2030.gov.sa/en). In addition, Government has
established the Small and Medium Enterprise Authority (SMEA; www.monshaat.gov.sa/en), as part of the Vision
2030 and this authority has helped to establish new business incubators and support and evaluation the
performance of existing business incubators. The Kingdom of Saudi Arabia began to support its entrepreneurial
ecosystem in the last decade, with different governmental initiatives and the involvement of the private sector.
Such initiatives include the Saudi Business Incubator Network initiative (Salem, 2014). Another business
incubator that has been established nationally to promote technology and innovation is BADIR technology
business incubator (Khorsheed et al., 2014). This indicates that the Saudi government agencies responsible for
shaping entrepreneurship policies must acknowledge the need to integrate business incubators into economic
policy reforms (Salem, 2014). Table 1 provides a list of national business incubators and accelerators in Saudi
Arabia. University business incubators have recently been introduced in Saudi Arabia (Siddiqui, Siddiqui, &
Alaraifi, 2018) and almost all universities have launched university business incubators (UBI) as not-for-profit
organizations.

| No | Business Incubator | City   | No | Business Incubator | City   |
|----|-------------------|--------|----|-------------------|--------|
| 1  | BADIR - King Abdullah City of Science and Technology (KACST) | Riyadh | 12 | FLAT6LABS | Jeddah |
| 2  | Misk 500 - MISK Foundation | Riyadh | 13 | InspireU | Riyadh |
| 3  | 9/10th - King Abdullah University of Science and Technology (KAUST) | Riyadh | 14 | Tamakkun BA | Riyadh |
| 4  | E3qlha - First women's business incubator | Riyadh | 15 | Entertainment BA | Riyadh |
| 5  | Bab Rizq - Abdullatif Jameel Motors | Riyadh | 16 | I-be Hub | Riyadh |
| 6  | Jeddah Valley | Jeddah | 17 | Inspire | Riyadh |
| 7  | Dharan techno valley | Dharan | 18 | Startups House | Riyadh |
| 8  | Riyadh Taqnia venture | Riyadh | 19 | Oqal | Riyadh |
| 9  | Riyadh Valley | Riyadh | 20 | Raz | Riyadh |
| 10 | Saudi Credit and Savings bank | Riyadh | 21 | Riyadh | Riyadh |
| 11 | Saudi Venture Capital | Riyadh |
Table 2 provides list of UBIs and parent universities in Saudi Arabia. In Saudi Arabia, not many UBIs are performing at par and there are no centralized acceptable criteria available for UBI’s success. One of the obvious reasons is the fact that some of UBIs in Saudi Arabia are still in infancy stages and restricted to provide only first-generation services. Hence their progress in terms of alumni success or financial performance cannot be measured. This requires an urgent task to develop the criteria for UBI success in Saudi Arabia.

Table 2 List of University Business Incubators participated in this study

| No | University Business Incubator and Parent University                                      | City       |
|----|--------------------------------------------------------------------------------------------|------------|
| 1  | Innovation and entrepreneurship center - Business incubator and accelerator, Al-Baha university | Al-Bahah   |
| 2  | Najahat – Business incubator, King Faisal University                                       | Al-Hasa    |
| 3  | IAU Entrepreneurship center - Business incubator and accelerator, Imam Abdurrahman Bin Faisal University | Dammam    |
| 4  | Entrepreneurship institute - King Fahad for University of Petroleum and (KFUPM)           | Dammam     |
| 5  | Hail university start-up accelerator - Business incubator and accelerator, Hail university | Hail       |
| 6  | Jinnov8 – Business incubator and accelerator, Jazan University                            | Jazan      |
| 7  | Business Innovation and Entrepreneurship - Business incubator and accelerator, Effat university | Jeddah   |
| 8  | Sahabat Alimam – Business incubator, Imam Mohammed bin Saud Islamic University            | Madinah    |
| 9  | Bab-Al-Madinah – Business incubator & accelerator, Islamic University of Madinah           | Madinah    |
| 10 | Wadi Makkah – Business incubator and accelerator, Umm Al-Qura University                 | Makkah     |
| 11 | Centre of creativity and entrepreneurship – Business incubator & accelerator, King Abdulaziz University | Riyadh   |
| 12 | Innovation and economic development –King Abdullah University of Science of Technology (KAUST) | Riyadh   |
| 13 | Hikma incubator, King Abdullah University of Science of Technology (KAUST)                | Riyadh     |
| 14 | King Salman Institute for Entrepreneurship - Business incubator and accelerator, King Saud University | Riyadh   |
| 15 | Innovation and entrepreneurship center - Business incubator and accelerator, University of Taif | Taif      |

3. Research objective and methodology

The objective of this research is to identify critical success factors for UBIs in Saudi Arabia. Population of this research is considered to be all stakeholders all-inclusive. Respondents selected for this research includes graduates / alumni of UBIs successfully running their start-ups; senior employees of business incubators; incubates associated with different business incubators regardless of their stage; field business experts involved in teaching, consulting or other support activities for business incubators in Saudi Arabia. Although judgmental sampling technique was employed to collect the data, but all efforts were made to make the sample as true representative sample and include all possible groups of respondents. Questionnaire was developed using multi-stage method. Firstly, individual items were drawn from the literature review including Verma (2004), Mian (1996) and most recent UBI Global (2020). Table 3 presents a comparative account of different models used to provide success criteria for Business Incubators.

Four models including Mian (1994), Verma (2004), Binsawad et al (2019), and UBI Global (2020) were presented through semi-structured interviews to experts from the field. Participants were recruited through networking events, LinkedIn profiles, and snowballing techniques. A total of five experts from different institutions were interviewed, representing one from Monshaat (small and medium enterprise regulatory authority), two from the largest business incubators in Saudi Arabia and two from leading business schools responsible for university business incubators. All participants are well-known and were over the age of 35 and have reasonable experience in the field.

After interviews with all stakeholders three important decisions were made; (1) items from Binsawad et al (2019) inventory were dropped for further research for many reasons; (a) items were based on personal perspective not organizational perspectives; (b) criteria used for evaluation of UBIs was focused on academic research and cannot be used for UBI performance evaluations; (c) items do not include the attributes of fourth generation of UBIs; (d) items could not be validated during the research and cannot be generalizable for field research. (2) Although, UBI Global (2020) model is the most recent and updated model for critical success factor business incubators but may
not be a suitable option to measure critical success factor for Saudi UBIs due to reasons mentioned above. (3)
There is a need to develop critical success factors for Saudi UBIs spreading over all generations of UBIs and meeting the needs of UBIs in different stages of their evolution. Table 4 presents the nine dimensions having 28 items selected for further research stages dully validated by six experts from the field.

| Table 3 Comparison of different models used to provide success criteria for Business Incubators |
|---------------------------------------------------------------|
| **Mian (1994)** | **Verma (2004)** | **Binsawad et al (2019)** | **UBI Global (2020)** |
| A. Shared office services | Shared Physical Services | Management Support | Economy Enhancement |
| 1. Photocopier | a. Security | IT Support | a. Jobs created & sustained (#) |
| 2. Telephone | b. Computers | Reward | b. Sales revenue ($*) |
| 3. Facsimile (Fax) | c. Conference room | Self-Efficacy | c. Graduates (#) |
| 4. Conference room | d. Custodial services | Interpersonal Trust | d. Self-generated revenue ($*) |
| 5. Security | e. Photocopier | Enjoyment in Sharing | Talent Retention |
| 6. Receptionist | f. Furniture and equipment | Knowledge-Donation | a. Client start-ups accepted (#) |
| 7. Custodial maintenance | g. Library | Knowledge-Collection | b. Graduate retention (#, %) |
| 8. Personal computer | h. Telephone equipment | Diffusion of Innovation | competence Development |
| 9. Shipping/receiving | Shared Business Support | Complexity | a. Services offered (#) |
| 10. Mail sorting | a. Photocopy | Compatibility | b. Coaching & mentoring hours (#) |
| 11. Word processing clerical | b. Receptionist | Relative Advantage | Access to Funds |
| 12. Cafeteria/lunchroom | c. Typing | Creativity Intrinsic | a. Total investment attracted ($*) |
| B. Business assistance & | d. Clerical | Expertise | b. Average investment attracted ($*) |
| 1. Govt. grants and loans | e. Filing | Creative Thinking Skills | c. Seed funding attraction (#, %) |
| 2. Business plan | f. Mail Services | | |
| 3. Legal/govt. regulations | g. Word Processing | | |
| 4. Tax assistance | h. Off-hours answering services | | |
| 5. Accessing outside capital | i. Audio-visual equipment | | |
| 6. Marketing | j. Shipping & Receiving | | |
| 7. Accounting | Financial Consulting | | |
| 8. Personnel recruiting | a. Business Taxes | | |
| 9. Business connections outside | b. Risk management | | |
| 10. Business connections | c. Govt. Grants & Loans | | |
| 11. Rent breaks | d. Govt. Contract preparation | | |
| | e. Equity & Debt Arrangements | | |
| | f. Export Development | | |
| Management Assistance | | | |
| a. Business Plan Preparation | | | |
| b. Employee Relations | | | |
| c. Advertising & Marketing | | | |
| d. Health & benefit packages | | | |
| Professional Business | | | |
| a. Legal Counselling | | | |
| b. Patent Assistance | | | |
| c. Accounting / Bookkeeping | | | |
| d. Computer & Information | | | |
| e. Venture Capitalist | | | |

After successful validation of all items, questionnaire was developed and demographic data including age, gender, experience, and education. Respondent’s status was also added, including the manager, employee, trainer, faculty, incubatee. The questionnaire in its final shape was pre-tested on a smaller number of respondents. Successful completion of test run questionnaire was deployed online using data collection facility (UDQUEST) to collect the data. Respondents were contacted through emails and social media channels including WhatsApp, LinkedIn, Facebook, and Instagram etc. A total of 75 responses were found complete in all respects (N=75) and a sample size of 75 business incubator experts and alumni was believed to be adequate for the current study (Siddiqui,
2013). Data was analysed including descriptive analyses, factor analyses, and cluster analyses using SPSS and MS Excel software.

| Serial No. | Dimensions                          | Number of items | Validated by Experts |
|------------|-------------------------------------|-----------------|----------------------|
| 1          | Access to Funds                     | 3               | √  √  √  √  √        |
|            | • Average investment attracted      |                 |                      |
|            | • Seed funding attraction           |                 |                      |
|            | • Total attractive investment       |                 |                      |
| 2          | Access to Network                   | 2               | √  √  √  √  √        |
|            | • Number of events conducted        |                 |                      |
|            | • Number of partners                |                 |                      |
| 3          | Competence Development              | 2               | √  √  √  √  √        |
|            | • Coaching and mentoring hours      |                 |                      |
|            | • Number of services and supports   |                 |                      |
| 4          | Economy Enhancement                 | 4               | √  √  √  √  √        |
|            | • Total revenue for projects        |                 |                      |
|            | • Number of graduates               |                 |                      |
|            | • Number of IPOs                    |                 |                      |
|            | • Number of jobs created            |                 |                      |
| 5          | Engaged Alumni                      | 6               | √  √  √  √  √        |
|            | • Alumni engagement per support     |                 |                      |
|            | • Number of attractiveness Program  |                 |                      |
|            | • Number of high growth rate enterprises |   |                      |
|            | • Number of sponsorships attracted  |                 |                      |
|            | • Rate of survival project in the first year | |                      |
|            | • Rate of survival projects over five years | |                      |
| 6          | Entry Criteria                      | 4               | √  √  √  √  √        |
|            | • Time limit to tenancy             |                 |                      |
|            | • Affiliated with university        |                 |                      |
|            | • Be able to pay operating expenses |                 |                      |
|            | • Number of advance technology projects |              |                      |
| 7          | Incubator Governance                | 2               | √  √  √  √  √        |
|            | • Experienced incubator manger      |                 |                      |
|            | • University link                   |                 |                      |
| 8          | Shared Service                      | 3               | √  √  √  √  √        |
|            | • Importance of business service    |                 |                      |
|            | • Importance of management assistance|                  |                      |
|            | • Importance of professional business|                  |                      |
| 9          | Talent retention                    | 2               | √  √  √  √  √        |
|            | • Continuous improvement for the graduates |             |                      |
|            | • Effective start-up for the graduate |                  |                      |
|            | Total                               | 28              | √  √  √  √  √        |

4. Results and discussion

The data was analysed in three stages; a) descriptive analysis; b) exploratory factor analysis, c) cluster analysis multiple regression was used to investigate the effects of consumer’s personality on the usage patterns of mobile phone services.

Table 5 shows descriptive analysis for UBI’s critical success factors. Result of descriptive analysis shows top three critical factors include (1) competence development: coaching and mentoring hours (M=3.87); (2) access to
funds: total attractive investment (M = 3.84) and (3) competence development: number of services and support (M = 3.81). These findings are true reflection of incubatees looking for mentorship and coaching, access to funds and general services offered by the UBIs. Interestingly these findings belong to different generations of services offered by UBIs for example coaching and mentoring hours and access to funds belong to second generation of UBIs while number of services and support has been classified as part of first-generation criteria. On the other hand, three least important critical factors include (1) entry criteria: affiliated with university (M = 3.25); (2) entry criteria: time limit to tenancy (M = 3.24) and (3) economy enhancement: number of IPOs (M = 3.21).

Table 5 shows exploratory factor analysis (EFA), which can be used to summarize the UBIs critical success factors and ultimately can be used in the performance evaluation of UBIs. EFA was performed using the principal component analysis as extraction method and varimax rotation method with Kaiser normalization, was used to determine the factor structure of 28 items related to UBI critical success factors. Analyses resulted in a five-factor solution, consists of a total of 28 items. These items were analysed using qualifying criteria. The factor loading criteria were applied which required that; (a) a factor must have at least 2 salient item loadings greater than 0.3, (b) individual items must have at least one factor loading greater than 0.3 and (c) any item loading on more than one factor when the final solution is obtained will be placed only in the factor on which it loads most highly. Overall scores were created by summing item scores and creating one dimensional factor score, one for each
factor and dividing by the number of items in that factor, making overall scores relative and comparable. Participant’s potential overall scores on each factor ranged from 1 to 5. The first factor is ‘support services’, which aims to provide all requirements for the incubator until incubatee become self-sufficient and successful in the market. The second factor is the ‘network and communication services’ which mainly measuring the effectiveness business incubator to get involved in the targeted field’s environment and establishing an effective communication with the surrounding market which give the incubator the ability to successfully maintain the supply chain for the project. The third factor is ‘financial support’ which evaluate the ability of the business incubator to provide the required seed fund for the incubatee’s project and the return of investment for the projects. The fourth-critical factor is the ‘economic development’ which relates the contribution of the business incubator’s projects in national economic development in term of job creation and the number of successful projects in the market. The last important factor is the ‘alumni network quality & successfulness, which measure

| Items                                                                 | Factors |
|----------------------------------------------------------------------|---------|
|                                                                      | Support | Network | Financial | Economic | Alumni |
|                                                                      | Services| Support | support   | development | success |
| Shared Service; Importance of management assistance                  | .632    |         |           |           |        |
| Entry Criteria: Time limit to tenancy                                | .623    |         |           |           |        |
| Entry Criteria: Number of advance technology projects                | .608    |         |           |           |        |
| Shared Service: Importance of professional business                 | .600    |         |           |           |        |
| Entry Criteria: Affiliated with university                           | .584    |         |           |           |        |
| Engaged Alumni: Rate of survival projects over five years           | .570    |         |           |           |        |
| Incubator Governance: University link (long run relation with entrepreneur) | .555    |         |           |           |        |
| Talent retention: Effective start-up for the graduate and getting accepted | .545    |         |           |           |        |
| Economy Enhancement: Number of successful IPOs with proof           | .537    |         |           |           |        |
| Entry Criteria: Be able to pay operating expenses                   | .489    |         |           |           |        |
| Access to Network: Number of partners (business development)        | .752    |         |           |           |        |
| Access to Network: Number of events conducted by incubators and involve in. | .707    |         |           |           |        |
| Engaged Alumni: Alumni engagement peer support                      | .677    |         |           |           |        |
| Engaged Alumni: Rate of survival project in the first year          | .626    |         |           |           |        |
| Engaged Alumni: Number of sponsorship attraction by incubators      | .523    |         |           |           |        |
| Talent Retention: Suitable improvement for the graduate             | .514    |         |           |           |        |
| Incubator Governance: An experienced incubator manager              | .465    |         |           |           |        |
| Competence Development: Coaching and mentoring hours                | .677    |         |           |           |        |
| Economy Enhancement: Total revenue for projects                     | .638    |         |           |           |        |
| Access to Funds: Average investment attracted (funding- average)    | .634    |         |           |           |        |
| Access to Funds: Total attractive investment                         | .544    |         |           |           |        |
| Economy Enhancement: Number of jobs created by the incubator        | .797    |         |           |           |        |
| Competence Development: Number of service and support               | .581    |         |           |           |        |
| Economy Enhancement: Number of graduates of the incubators          | .530    |         |           |           |        |
| Access to Funds: Seed funding attraction (funding- probability)      | .347    |         |           |           |        |
| Shared Service: Importance of business service                      | .721    |         |           |           |        |
| Engaged Alumni: High growth enterprises rate for post-graduation    | .463    |         |           |           |        |
| Engaged Alumni: Number of attractiveness Program                    | .431    |         |           |           |        |

Table 7 shows two major cluster groups which have been formulated from the samples. The first cluster is the ‘employee’ of the incubator, which has more than ten years in the incubator process. The second group is the
‘incubatee’, which considered as business incubator’s customers and normally spend a short period of time in the business incubator before the graduation. The employee group has chosen for the criticality of most of success factors in the survey. This vote due to the highly experience on the field and the knowledge of business incubator operation and the effective key performances factor which can be used to evaluate the efficiency of business incubator. In other hand, the incubatee group has chosen for neutral for most of the success factors which can be justify be looking to the experience of the incubator in the field. Moreover, the incubatee group does not involve in the day-to-day operation for business incubator. Additionally, both groups have their own interests, the employee group target to produce an effective product “graduator” which success in the market and incubator group looking for a knowledge and the fund to success in the project.

Table 7 Critical Success Factor for UBI in Saudi Arabia - Cluster Analysis [N=75]

| Final Cluster Centres | Clusters | ANOVA |
|-----------------------|----------|-------|
|                       | Incubates| Employees|
|                       |          |       |
| Cluster 1             |          |       |
| Status                | 4        | 3     | 4.891 | 1 | 0.997 | 73 | 4.905 | 0.03 |
| Access to Network: Number of partners (business development) | 2  | 4 | 44.379 | 1 | 1.429 | 73 | 31.064 | 0.00 |
| Economy Enhancement: Number of successful IPOs with proof | 2  | 4 | 37.38 | 1 | 1.425 | 73 | 26.236 | 0.00 |
| Engaged Alumni: Rate of survival projects over five years | 2  | 4 | 49.902 | 1 | 0.943 | 73 | 52.914 | 0.00 |
| Entry Criteria: Affiliated with university | 2  | 4 | 56.255 | 1 | 1.259 | 73 | 44.671 | 0.00 |
| Entry Criteria: Time limit to tenancy | 2  | 4 | 23.91 | 1 | 1.175 | 73 | 20.35 | 0.00 |
| Shared Service: Importance of professional business | 2  | 4 | 53.302 | 1 | 0.633 | 73 | 84.141 | 0.00 |
| Talent retention: Effective start-up for the graduate and getting accepted | 2  | 4 | 52.859 | 1 | 0.874 | 73 | 60.474 | 0.00 |
| Access to Funds: Total attractive investment | 3  | 4 | 32.505 | 1 | 1.008 | 73 | 32.252 | 0.00 |
| Competence Development: Number of service and support | 3  | 4 | 20.594 | 1 | 0.997 | 73 | 20.653 | 0.00 |
| Economy Enhancement: Number of graduates of the incubators | 3  | 4 | 20.349 | 1 | 1.085 | 73 | 18.757 | 0.00 |
| Engaged Alumni: Alumni engagement peer support | 3  | 4 | 27.65 | 1 | 1.137 | 73 | 24.314 | 0.00 |
| Engaged Alumni: High growth enterprises rate for post-graduation | 3  | 4 | 18.765 | 1 | 1.213 | 73 | 15.475 | 0.00 |
| Engaged Alumni: Number of sponsorship attraction by incubators | 3  | 4 | 20.502 | 1 | 1.236 | 73 | 16.585 | 0.00 |
| Engaged Alumni: Rate of survival project in the first year | 3  | 4 | 21.181 | 1 | 1.172 | 73 | 18.071 | 0.00 |
| Entry Criteria: Be able to pay operating expenses | 3  | 4 | 21.463 | 1 | 1.332 | 73 | 16.118 | 0.00 |
| Entry Criteria: Number of advance technology projects | 3  | 4 | 23.547 | 1 | 1.084 | 73 | 21.726 | 0.00 |
| Incubator Governance: An experienced incubator manger | 3  | 4 | 22.253 | 1 | 1.01 | 73 | 22.028 | 0.00 |
| Incubator Governance: University link (long run relation with entrepreneur) | 3  | 4 | 24.576 | 1 | 1.027 | 73 | 23.93 | 0.00 |
| Shared Service: Importance of management assistance | 3  | 4 | 22.993 | 1 | 1.304 | 73 | 17.632 | 0.00 |
| Talent Retention: Suitable improvement for the graduate | 3  | 4 | 24.009 | 1 | 1.157 | 73 | 20.749 | 0.00 |
| Competence Development: Coaching and mentoring hours | 3  | 4 | 10.982 | 1 | 0.9 | 73 | 12.205 | 0.001 |

Conclusions

The project has been set to customize an internal criterion which can be used to evaluate UBI’s performance in Saudi Arabia or elsewhere. Three international standard modules have been explored and customize for Saudi Arabia environment. A target sample has selected by using judgmental sampling technic. The total received response is 200 responses. The results show, most of the response agreed on the criticality of the costumes models. Five main factors have been identifying through the factor analysis, economic support, network & communication, financial support, contribution in economic development and graduator quality & successfulness. Two clusters groups have been identifying from the survey results. This group is incubator group and employee.
Each opinion reflects the interest of each group in terms of how this group is looking to the incubator process. The incubator more looking for fund and knowledge to effectively start their project in the market. In the other hand the incubator employee which more knowledgeable about the incubator process and procedure.

Business incubator has been started around ten years back in Saudi Arabia universities. It is recommended to lunch a comprehensive awareness for universities student in order to enhance their knowledge and build up the passion in them to start the bath in the local market. Moreover, most of business incubators are facing a difficulty of getting fund and the government bureaucratic requirements.

This research will generate many tangible outputs serving different stakeholders for example, it will provide baseline data and measuring the performance of UBIs in Saudi Arabia. Similarly this research will also be used to enhance other business, technology, and bio-technology incubators in Saudi Arabia. It provides output in the form research paper and /or conference paper and augment the existing literature on the subject area. It generates a critical success factor for UBIs, which will help policymakers enhance their UBI policies and rationalize their budgets for different UBIs having different levels of success criteria. Finally, and probably more exciting and rewarding output from this research is in the form of UBI consulting services to enhance the performance of UBIs in Saudi Arabia or elsewhere.

References

9/10th start-up Accelerator Showcase, (December 5, 2020) https://innovation.kaust.edu.sa/event/910ths-startup-accelerator-showcase/
Allahar, H., & Brathwaite, C. (2016). Business incubation as an instrument of innovation: the experience of South America and the Caribbean. International Journal of Innovation, 4(2), 71-85. http://doi.org/10.5585/iji.v4i2.107
Al-Mubaraki, H. M., & Busler, M. (2010). Business incubators models of the USA and UK: A SWOT analysis. World Journal of Entrepreneurship, Management and Sustainable Development. 6(4), 335-347
Binsawad, M., Sohaib, O., & Hawryszkiewycz, I. (2019). Factors impacting technology business incubator performance. International Journal of Innovation Management, 23(01). http://doi.org/10.1142/S1363919619500075
Bruneel, J., Ratinho, T., Clarysse, B., & Groen, A. (2012). The Evolution of Business Incubators: Comparing demand and supply of business incubation services across different incubator generations. Technovation, 32(2), 110-121. http://doi.org/10.1016/j.technovation.2011.11.003
Cooper, C. E., Hamel, S. A., & Connaughton, S. L. (2012). Motivations and obstacles to networking in a university business incubator. The Journal of Technology Transfer, 37(4), 433-453. http://doi.org/10.1007/s10961-010-9189-0
Dahms, S., & Kingkaew, S. (2016). University business incubators: An institutional demand side perspective on value adding features. Entrepreneurial Business and Economics Review, 4(3), 41-56. http://doi.org/10.15678/EBER.2016.040304
Flat6labs Jeddah Companies, (December 5, 2020) www.flat6labsjeddah.com/en/
Ganamotse, G. N., Samuelsson, M., Abankwah, R. M., Anthony, T., & Mphela, T. (2017). The emerging properties of business accelerators: The case of Botswana, Namibia and Uganda global business labs. Journal of Entrepreneurship and Innovation in Emerging Economies, 3(1), 16-40. http://doi.org/10.1177/2393957516684469
Gozali, L., Masrom, M., Zagloel, T. Y. M., Haron, H. N., Dahlan, D., Daywin, F. J., ... & Syamas, E. H. S. (2018). Critical success and moderating factors effect in Indonesian public universities’ business incubators. International Journal of Technology, 9(5), 1049-1060. http://doi.org/10.14716/ijtech.v9i5.1363
Grimaldi, R., & Grandi, A. (2001). The contribution of university business incubators to new knowledge-based ventures: Evidence from Italy. Industry and higher education, 15(4), 239-250. http://doi.org/10.5367/00000001.101295731
Guerrero, M., Urbano, D., & Gajón, E. (2020). Entrepreneurial university ecosystems and graduates' career patterns: do entrepreneurship education programmes and university business incubators matter?. Journal of Management Development. 39(5), 753-775 https://doi.org/10.1108/JMD-10-2019-0439
Hansen, M. T. N. Nohria, & J. A. Berger (June 2000). The State of the Incubator Marketplace. Harvard Business School, Boston, MA
Indiran, L., Khalifah, Z., Ismail, K., & Ramanathan, S. (2017). Business incubation in Malaysia: An overview of multimedia super corridor, small and medium enterprises, and incubators in Malaysia. In Handbook of research on small and medium enterprises in developing countries (pp. 322-344). IGI Global.
Khalid, F. A., Gilbert, D., & Huq, A. (2014). The way forward for business incubation process in ICT incubators in Malaysia. International Journal of Business and Society, 15(3), 395.
Khorsheed, M. S., Alhargan, A., & Qasim, S. M. (2012). A Three-Tier service model for national ICT incubator in Saudi Arabia. In Proceedings of IEEE International Conference on Management and Service Science (pp. 1-6).
Mian, S. A., & Dowling, M. (2007). The organisational structure of university business incubators and their impact on the success of start-ups: an international study. International Journal of Entrepreneurship and Innovation Management, 7(6), 541-555. http://doi.org/10.1504/IJEIM.2007.014596

Malan, J. (2002). Benchmarking of Business Incubators. Centre for Strategy and Evaluation Services, Kent, UK.

Mian, S. A. B. A. and M. G. B. M. Yunus (Jan 2001). Technology Business Incubators-A Smart Partnership. International Workshop on Technology Business Incubators in India, Bangalore, India. 1-20.

Mavi, R. K., Gheibdoust, H., Khanfar, A. A., & Mavi, N. K. (2019). Ranking factors influencing strategic management of university business incubators with ANP. Management Decision, 57(12), 3492-3510. http://doi.org/10.1108/MD-06-2018-0688

Mian, S. A., (2014). Business incubation and incubator mechanisms. In Handbook of Research on Entrepreneurship. Edward Elgar Publishing. http://doi.org/10.1014/9781783269778.0001

Mian, S. A., (1994). US university-sponsored technology incubators: an overview of management, policies and performance. Technovation, 14(8), 515-528. http://doi.org/10.1016/0166-4972(94)90151-1

Mian, S. A., (1996a). Assessing value-added contributions of university technology business incubators to tenant firms. Research Policy, 25(3), 325–335. http://doi.org/10.1016/0048-7333(95)00828-4

Mian, S. A., (1996b). The university business incubator: a strategy for developing new research/technology-based firms. The Journal of High Technology Management Research, 7(2), 191-208. http://doi.org/10.1016/S1047-8310(96)90004-8

Mian, S. A., (1997). Assessing and managing the university technology business incubator: an integrative framework. Journal of Business Venturing, 12(4), 251–285. http://doi.org/10.1016/S0883-9026(96)00063-8

National Business Incubation Association (2021). Principles and practices of successful business incubators. Retrieved January 15, 2021 from http://www.nbia.org/best_practices.html

Nicholls-Nixon, C. L., & Valliere, D. (2019). A Framework for Exploring Heterogeneity in University Business Incubators. Entrepreneurship Research Journal. 10(3) http://doi.org/10.1515/erj-2018-0190

Nicholls-Nixon, C. L., Valliere, D., Gedeon, S. A., & Wise, S. (2020). Entrepreneurial ecosystems and the lifecycle of university business incubators: An integrative case study. International Entrepreneurship and Management Journal, 1-29. http://doi.org/10.1007/s11365-019-00627-4

Nicholls-Nixon, C., Valliere, D., & Hassannezhad, Z. (2018). A typology of university business incubators: Implications for research and practice. In International Conference on Innovation and Entrepreneurship (pp. 535-XXII). Academic Conferences International Limited

Pellegrini, M., & Johnson-Sheehan, R. (2020). The Evolution of University Business Incubators: Transnational Hubs for Entrepreneurship. Journal of Business and Technical Communication, 20(10),1-34 https://doi.org/10.1177/1050666X20979983

Redondo, M., & Camarero, C. (2017). Dominant logics and the manager’s role in university business incubators. Journal of Business & Industrial Marketing. 32(2), 282-294. http://doi.org/10.1108/JBIM-01-2016-0018

Redondo, M., & Camarero, C. (2019). Social Capital in University Business Incubators: dimensions, antecedents and outcomes. International Entrepreneurship and Management Journal, 15(2), 599-624. http://doi.org/10.1007/s11365-018-0494-7

Salem, M. I. (2014). The role of business incubators in the economic development of Saudi Arabia. International Business & Economics Research Journal (IBER), 13(4), 853-860. http://doi.org/10.19030/iber.v13i4.8694

Saudi Arabia’s Vision 2030. (2020, March 13) retrieved from http://vision2030.gov.sa/en/ntp

Saudi National Transformation Program (2018-2020). (December 4, 2018) http://vision2030.gov.sa/sites/default/files/NTP

Seam, M. Hakett and David, M. Dilts (2004). A systematic Review of Business Incubation Research, Journal of Technology Transfer.

Seam, M. Hatt and David, M. Dilts (2004). A systematic Review of Business Incubation Research, Journal of Technology Transfer.

Shalaby, N. (2008). Business and Technology Incubation Initiatives in Saudi Arabia. Chamber of Commerce and Industry Eastern Province.

Siddiqui, K. (2013). Heuristics for sample size determination in multivariate statistical techniques. World Applied Sciences Journal, 27(2), 285-287. http://doi.org/10.5829/idosi.wasj.2013.27.02.889

Siddiqui, K. À., Siddiqui, A., & Alaraifi, A. (2018). Managing University Business Incubators in Saudi Arabia. In ICIE 2018 6th International Conference on Innovation and Entrepreneurship: ICIE 2018 (p. 418). Academic Conferences and publishing limited.

Siddiqui, K., & Alaraifi, A. (2019). What they don’t teach at entrepreneurship institutions? An assessment of 220 entrepreneurship undergraduate programs. Journal of Entrepreneurship Education, 22(6), 1-16.

Somusuk, N., & Laosiniphongthong, T. (2014). A fuzzy AHP to prioritize enabling factors for strategic management of university business incubators: Resource-based view. Technological forecasting and social change, 85, 198-210. http://doi.org/10.1016/j.techfore.2013.08.007

Tavoletti, E. (2013). Business incubators: effective infrastructures or waste of public money? Looking for a theoretical framework, guidelines and criteria. Journal of the Knowledge Economy, 4(4), 423-443. https://doi.org/10.1007/s13132-012-0090-y

UBI Global (2020) https://ubi-global.com/ [Accessed on 16-Oct-2020 at 2:00 pm]

Verma, S. (2004). Success Factors for business Incubators: An Empirical Study of Canadian Business Incubator. Dissertation, Sprott School of Business, Carleton University, Ottawa, Ontario

Wonglimpiyarat, J. (2016). The innovation incubator, university business incubator and technology transfer strategy: The case of Thailand. Technology in Society, 46, 18-27. http://doi.org/10.1016/j.techfore.2016.04.002

Yamockul, S., Pichyangkura, R., & Chandrachai, A. (2019). University Business Incubators Best Practice: Factors Affecting Thailand UBI Performance. Academy of Entrepreneurship Journal, 25(1), 1-14.
Dr. Kamran SIDDIQUI is an Associate Professor of Marketing and Entrepreneurship at College of Business Administration, Imam Abdulrahman Bin Faisal University, Saudi Arabia. Research interests: entrepreneurship, business incubators and accelerators, entrepreneurial marketing, venture capital.

ORCID ID: 0000-0002-5724-0991

Dr. Mohammad EMAD AL-SHAIKH is an Assistant Professor of Entrepreneurship at College of Business Administration, Imam Abdulrahman Bin Faisal University, Saudi Arabia. He is also head of the IAU entrepreneurship unit and business incubator. Research interests: entrepreneurship, business incubators and accelerators, and entrepreneurial marketing.

ORCID ID: 0000-0003-4545-3938

Dr. Ishtiaq Ahmed BAJWA is an Assistant Professor of Finance at College of Business Administration, Imam Abdulrahman Bin Faisal University, Saudi Arabia. Research interests: entrepreneurial finance, venture capital, and fin-tech.

ORCID ID: 0000-0001-5296-0028

Abdulaziz AL-SUBAIE is a graduate student at the College of Business Administration, Imam Abdulrahman Bin Faisal University, Saudi Arabia.

ORCID ID: 0000-0002-7938-1189

Make your research more visible, join the Twitter account of ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES: @Entrepr69728810

Copyright © 2021 by author(s) and VsI Entrepreneurship and Sustainability Center
This work is licensed under the Creative Commons Attribution International License (CC BY).
http://creativecommons.org/licenses/by/4.0/

Open Access