A FRAMEWORK TOWARD SUCCESSFUL BUSINESS INCUBATOR FOR INDONESIAN PUBLIC UNIVERSITIES : A PILOT REVIEW

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Abstract
The purpose of this paper is to evaluate a small sample data on pilot survey for developing framework of successful business incubator for Indonesian Public Universities. This pilot survey assess the content of validity, reliability, subsequently the data normality through expert validation. The evaluation of this pilot survey showed that the instrument reliable and the data for preliminary study exhibit reasonable normality. This pilot survey evaluate the instrument of many factors and dimensions of Indonesian Business Incubator Manager and Association responses most of which have not been explored yet.

Keywords – Pilot Survey, Qualitative Method, Quantitative Method, Expert Validation, Reliability Test, Business Incubator, Indonesian Public University

1. Introduction

It has been argued elsewhere that new venture formation and small companies with high growth potential, represent the greatest opportunity for the creation of jobs in economies across the globe (Bolton, 1971; Birch, 1987; Davis et al., 1996; Kelley et al., 2012). The process of new venture formation also provides an answer to the question "What purpose does an incubator serve?" Two main drivers for incubation have emerged: (1) incubation is a way of addressing market failures, which limit the ability of small high-tech start-ups to overcome uncertainty (Hansen et al., 2000); and (2) it helps overcome obstacles associated with the early stages of firm development (Dee et al., 2011; McAdam and McAdam, 2008).

Since the first recognized incubator was established in Batavia, New York in 1959, the offer has grown from the provision of a shared workspace to a nurturing environment (McAdam and Marlow, 2008; Rothschild and Darr, 2005), providing access to business services (Lee and Osteryoung, 2004), business management and operational support (Scillitoe and Chakrabarti, 2010; Nouira et al., 2005), and networking opportunities with seasoned entrepreneurs (Hoang and Antoncic, 2003), venture capitalists and mentors (Lalkaka and Bishop, 1996; Siegel et al., 2007).

In addition, taking into account conditions specific to a country or university (e.g., geographic localization, university management, funding, awareness, researcher motivation) is essential to understand how to optimize internal university support infrastructure. Investigations into the

background of inventors and their roles in commercialization could provide insights that cannot be extracted from quantitative patent data analyses. For example, in order to understand why almost 10 % of the inventions remain in the hands of the inventors, more in-depth analysis of inventor behavior is needed. This should be coupled with studies of the role of university leadership and innovation intermediaries in the management of Intellectual Property Right at universities. (Dahlborg et. al, 2016).

Given the importance of technology transfer performance for driving growth and innovation in a knowledge economy, our approach offers a way to evaluate actual technology transfer performance of universities, taking into consideration the potential for technology transfer. (Vinig & Lips, 2015). Technology entrepreneurship has come of age as a discipline of study and no longer debating how it should be defined, and whether it is important, but should focus upon how best to investigate, analyses and share how technology entrepreneurship can be encouraged across the myriad of international regions and universities that seek to do so. (Simon Mosey et. al, 2016)

Networks are complex: take many forms; are fluid, flexible, and dynamic, constantly changing and evolving to suit individual and organizational needs and requirements; networks also consist of latent and active relationships to others. So, their study is compounded by many factors. Consequently, it is important to use different research approaches to consider networks as each approach is differentially suited to the analysis of particular kinds of problems, enabling a fuller and more complete understanding of the whole (Sarah L. Jack, 2010).

The university business incubator (UBI) is an innovative system designed to assist entrepreneurs, particularly entrepreneurs in technology, in the development of new firms. By providing a variety of services and support to startup and emerging companies, the incubator seeks to link talent, technology, capital, and know-how effectively to leverage their talent, to accelerate the development of new companies, and thus to speed the commercialization of technology (Smilor, Gibson, and Dietrich 1990). The present study suggests that there are critical success factors for effective operation of business incubators.

Indeed, the review by Sir Tim Wilson into higher education-industry collaboration initiated by the government identified as one of its criteria: An enterprising and entrepreneurial culture amongst university students and staff, where success in enterprise and entrepreneurship is celebrated, rewarded and promoted (Wilson, 2012, p. 14). Lee, Kim, and Chun (1999) investigated the critical success factors to operate UTBI effectively. Their classified critical factors include the following: (1) goal/strategy; (2) operational policy; (3) infrastructure of UTBIs; (4) incubating services; and (5) physical/human resources, internal/external networking, and so forth. From a policy point of view, the model differs from the traditional top-down approach, which calls for new ideas on how public agencies can support such initiatives most effectively. (Anne Bøllingtoft , John P. Ulhøi*, 2005)

Lack of managerial skills is one of the main barriers to a venture’s success in different industries, all the more so in small businesses, where the owners have to be involved in all areas of activity. In accordance with our findings that managerial skills are so crucial for venture success, the main objective of advisory incubators should be to promote managerial competencies. (Lerner et. al, 2000)

All business assistance programs, including business incubators, are targeted at helping entrepreneurial ventures start up, survive, and succeed. To that end, the two parties engage in coproduction to compensate for the firm's gaps in knowledge, competencies and resources. (Mark P. Rice*, 2002). Technical support services involving shared laboratory and research facilities tend to work best in the tier 1 cities where TBIs have become more specialized in a particular industrial sector and where there has been a constant flow of incoming and outgoing firms. In this respect Chinese TBIs are following the path of incubator development in western countries where it has been found that building knowledge networks and realizing opportunities that meet the needs of resident firms is leading to increased incubator specialization (Dee et al. 2011). This development path also implies that TBIs become more selective in the ventures that they accept. The more limited impact of TBI services on the graduation of incubated firms in the tier 2 and tier 3 cities indicates that the TBIs in these less favorable economies face more difficult challenges if they are to help the early development of new technology-based firms (Xiao & North, 2016).

Startups of new firms are not restricted to high-technology activities only. On the contrary, it is the diversity of new firms with economic activities along the whole chain of value-added that finally contributes to the restructuring of a regional or local economic tissue. Therefore it becomes quite obvious that public support has its legitimation where private capital does not dare to invest. Obviously *seed money* is one of these fields of market failure, because private venture capital all too often concentrates only on glamorous high-tech start-ups with expectations for rapid firm growth and consequently high return on investment. (Thierstein & Willhelm, 2001). In fact, the fund manager's understanding of what a funding application should look like in terms of information and how it should sound when verbally presented underpins the meaning attached toinvestment readiness status. However, the process to construct a business proposition which meets the preferences of fund managers and so encourages them to go further than executive summary is a complex process (McAdam & Marlow, 2011).

To this end, the paper presents the result of pilot test with regard the framework of successful business incubator for Indonesian public universities. The contribution of this paper is to present experiences of pilot study: practices and tools are proposed for pilot preparation, Validation and Reliability testing. (Laukarinen et al, 2011).

2. Literature Review

The theories and models explored and used throughout the study are discussed in the previous research section (Gozali et al., 2015a and 2015b). Business Incubator model in Figure 1 developed by Campbell et al. (1985) suggests four areas where incubators-incubation creates value: the diagnosis of business needs, the selection and monitored application of business services, the provision of financing, and the provision of access to the incubator network. Implicitly, with this framework, Campbell et al. (1985) have normatively defined the incubation process. This is useful because it suggests in detail, and for the first time, how different components of, and activities within, the incubator are applied to facilitate the transformation of a business proposal into a viable business. Weaknesses in the framework center on the failure to account for failed ventures (the

framework assumes that all incubator tenants succeed) and the ascription of the framework to private incubators only.

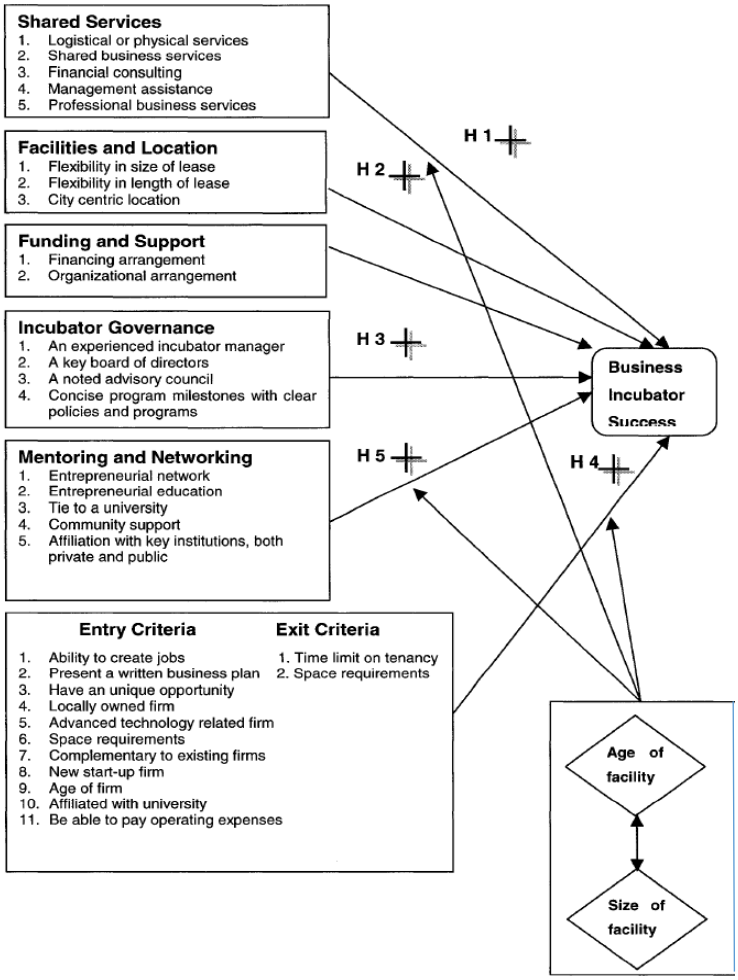

Figure 1 A Priori Framework of Incubator Success Factors (Verma, 2004)

A pilot test is considered to be like "a dress rehearsal" in which a small scale trial of the study is conducted prior to the full-scale study (Gay, Mills and Airasian, 2006). Hence, in this study a pilot test was carried out in order to achieve some objectives. Firstly, the pilot survey was done to test the validity and reliability of the instrument of the study. Secondly, it aimed at obtaining an insight into the real conditions of the actual study. Thus, this would enable the researcher to anticipate and adjust to potential problems during the full-scale research. Among the major concern of pilot test is the instrument validity and reliability. Validity of the measuring instrument is the extent to which the instrument is measuring what it is supposed to measure and not something else. Reliability of a measure on the other hand, indicates the extent to which an instrument is error free and thus, consistent and stable across time and also across the various items in the scale (Sekaran and Bougie, 2010).

A pilot survey represents a cornerstone of a good research design. In fact, a pilot survey is an essential initial step in a research and this applies to all types of research studies. The term of pilot study, however, is defined as "a small scale test of the methods and procedures to be used on a

large scale …" (Porta 2008). On the other hand, there is little published guidance with respect to the sample size required for pilot studies. The study of Billingham *et al*. (2013) mentioned that even though all studies should have a sample size justification, some kinds of studies do not need to have a sample size calculation. Their studies, however, concluded that a formal sample size calculation for pilot studies may not be appropriate. Generally, 10–20% of the main sample size is a reasonable number for conducting a pilot study (Baker 1994).

Mainly, the importance of the pilot survey lies in improving the quality and the efficiency of the main study. A one thing the researchers should pay attention that a pilot survey is not a hypothesis testing study. Leon *et al*. (2011), however, mentioned that the main purpose of conducting a pilot survey is examining the feasibility of the intended approach the researchers will use in the main study. Generally, a pilot survey can be used as a small version of a full-scale study or trial run in preparation for a main study (Polit *et al*. 2001). It can also be used to check out a particular research instrument.

Data represents the lifeblood of a research. It helps us to understand the real world well through connecting the theory to practice. Therefore, the researchers should handle with data carefully and honestly, especially, when collecting, analyzing and interpretation. However, the present work believes that addressing a pilot survey is an interesting and important topic amongst the researchers. Furthermore, many researchers disregard conducting a pilot survey since it includes quantitative methodological issues (i.e., Back-Translation, Missing Data, Normality, and Reliability) which need long time to look at deeply, especially, for the researchers who are not well-established in research methods. However, there are different ways to collect data (e.g., questionnaire, interviews, observations, diaries and journals). Questionnaire is one of the most widely used data gathering instruments in many fields including Business, Management, Market Research, Psychology and Sociology (Hazzy, 2015).

3. Method

The present research addressed in this work the importance of the pilot survey for research and the most recommended practices of the most important quantitative and qualitative methodological issues the researchers had better take into account when conducting the pilot study. However, the present work will also address in this section the importance of pilot studies for business sectors (e.g., business companies, banking sector, research centers and other) through addressing the most of its implementations and practices. On the other hand, talking about the implementations and practices of pilot studies in business sectors is really a wide topic since there are many different business sectors use such kind of studies. Therefore, the present research will address the most aspects of the implementations and practices of pilot studies in business sectors since such implementations and practices will consider as the common denominator amongst many different kinds of business sectors including marketing, and financial business sectors. (Hazzy, 2015)

The research instrument was administered to the volunteers, replicating the main study as near as possible. Face-to-face interviews were conducted after completion of the task to test for problem questions, respondent comprehension and time taken to complete the task. The results led to a revised research instrument, which was tested on a further two graduate entrepreneurs, making a total of ten subjects involved in the pilot study (Culkin, 2013)

Within the context of this study the literature on the performance of incubators in developed and developing countries will be reviewed and the fact that the measures for assessing business incubator effectiveness as business development mechanism should be adopted to country needs illustrated.

3.1.Research Location

This research conducted in Indonesia. The 17 public universities business incubator in Indonesia are: University of Indonesia, Institute Technology of Bandung, Bogor Agricultural Institute, Diponegoro University, Brawijaya University, Institute Technology Sepuluh November, Airlangga University, Padjajaran University, Andalas University, Sebelas Maret University, Udayana University, Sam Ratulangi University, Universitas Sumatera Utara, Riau University, Gorontalo University, Jambi University, and State University of Yogyakarta.

3.2.Research Sample

The sample used for this study consisted of incubator managers in Indonesia Public University, involved in the day to day operations of the incubator and graduated tenant company. The sample was so proposed, as the respondents would have the necessary insights and experiences of managing incubators and in managing the relations within the incubator with tenant firms.

3.3.Pilot Test

According to Cooper and Schindler (2014) a pilot test will be conducted to detect weakness in the design and instrumentation and to provide proxy data for selection of a probability sample. Furthermore the pilot test will be done in order to ascertain how much time it took for respondents to answer the questions to examine the reliability of instrument. The researcher will take the respondents' feedback into account and will modify the questionnaire.

According to Connelly (2008), extant literature suggests that a pilot survey sample should be 10% of the sample projected for the larger parent study. However, Hertzog (2008) cautions that this is not a simple or straight forward issue to resolve because these types of studies are influenced by many factors. Nevertheless, Isaac and Michael (1995) suggested 10 – 30 participants; Hill (1998) suggested 10 to 30 participants for pilots in survey research; Julious (2005) in the medical field, and van Belle (2002) suggested 12; Treece and Treece (1982) suggested 10% of the project sample size.

The sample size for pilot survey for this research comprised 17 business incubator managers, former business incubator manager Public Universities and Head of Business Incubator Association in Indonesian.

3.4.Validity

Validity is the extent to which a test measure what actually wish to measure (Copper and Schindler, 2014). The validity of the self-report questionnaire will be obtained using context and constructs validities. The content validity of a measuring instrument is the extent to which it provides adequate coverage of the investigate questions guided the research. If the instrument contains representative sample of the universe of the subject matter of interest, that the content validity is good (Cooper

and Schindler, 2014). The content validity ensures that the measure includes adequate and representative set of items that tap the concept (Sekaran, 2003).

Content validity ensures that the measure include adequate and representative set of items that tap the concept (Sekaran, 2003). The content validity of the questionnaire will be established by a panel of experts. The panel experts consist of 10 professors from reputable university in the world, for 51 corrections or amendments have been done to the research instruments. To assess the content adequacy of the questionnaires, the questionnaires will give a brief description of the research objectives, and the scales components to the experts and requested them to read the scales and give their comments on the clarity, readability and redundancy within the scales. The second method used to test the content validity of the questionnaire is by conducting a pilot test before collecting the research data. The feedback provided by the respondents in the pilot test will be used to modify the questionnaires.

3.5.Reliability

Reliability refers to the accuracy and precision of a measurement procedure (Thorndike, Cunningham, Thorndike, & Hagen, 1991). Reliability may be viewed as an instrument's relative lack of error. In addition, reliability is a function of properties of the underlying construct being measured, the test itself, the groups being assessed, the testing environment, and the purpose of assessment.

One of the most popular reliability statistics in use today is Cronbach's alpha (Cronbach, 1951). Cronbach's alpha determines the internal consistency or average correlation of items in a survey instrument to gauge its reliability. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the 'underlying construct'. Construct is the hypothetical variable that is being measured (Hatcher, 1994).

Alpha coefficient ranges in value from 0 to 1 and may be used to describe the reliability of factors extracted from dichotomous (that is, questions with two possible answers) and/or multi-point formatted questionnaires or scales (i.e., rating scale: 1 = poor, 5 = excellent). The higher the score, the more reliable the generated scale is. Nunnaly (1978) has indicated 0.7 to be an acceptable reliability coefficient but lower thresholds are sometimes used in the literature.

Acceptable levels of reliability depend on the purpose of the instrument. Acceptable reliability of instruments developed for research purposes can be as low as 0.60. This is an acceptable reliability level of a diagnostic instrument used for making decisions about individuals (Shay, 2008).

Within this context, there are deep discussions with respect to the acceptable value of Cronbach's alpha amongst researchers. However, Griffee (2012) mentioned that a typical guideline is that 0.3 at the threshold, 0.5 or higher is adequate, and 0.7 or higher is high. George & Mallery (2003) provide more detailed categories of reliability values as rules of thumb (i.e., >0.9 "Excellent", >0.8 "Good", >0.7 "Acceptable", >0.6 "Questionable", >0.5 "Poor", while <0.5 "Unacceptable") (as cited in Khalid *et al*. 2012). From another standpoint, there are works in the literatures recommends using specific values of reliability according to the nature of the study since the reliability relies on a large extent on the use that is to be made of the results. For example, while Reid (1990) recommends that the reliability of 0.7 would be fair for survey instruments, some literatures

recommend that the reliability should be about 0.9 or higher for important decisions (Cronbach 1990).

Furthermore, since the sample size affect Cronbach's alpha, the researchers should consider that issue, especially, when conducting pilot studies. However, according to the experience, the present work strongly emphasizes following the next steps to report pilot survey well especially in the research which uses questionnaire or survey as a main tool for collecting data. (1) Conduct a pilot survey first taking into account the issues discussed above including checking the reliability by Cronbach's alpha, and put the initial results aside. (2) Conduct the main study taking into account checking the reliability again, and report the results. (3) Compare between those results (the initial and main ones), especially, with respect to the reliability. (4) Delete the items, which have common problems of reliability.

4. Finding and Discussion

In the previous study (Gozali, 2015b) in literature review and preliminary study, the result indicates that the success factors for successful e-business incubator in Indonesian public universities are consisting of eight independent variables, three moderating variables, and one dependent variable. The eight (9) success factors are shared services and facilities, incubator governance, entry and exit criteria, mentoring and networking, funding and support, governance support and protection, university regulation, and system infrastructure. The three (3) moderating variables consist of age of facility, credibility of the facility, credit and rewards. Meanwhile, the dependent variable is incubator success.

4.1. Content Validity

This pilot ensure the measure consists of an adequate and representative set of items that tap a particular concept. Content validity entails consulting with 10 professors to pass judgement on the suitability of the items selected to measure the construct (Hair et al, 2007, Sekaran & Bougie, 2010). They suggested revising the format and grammar as well. One of the experts suggested dividing the questionnaire into two main sections, one about whether they provide the services, and the other about how important the services are. Two of the experts suggested providing the exact number of tenants which were assisted, which went out of business, and which started business operations. One of the experts suggested keeping the respondents anonymous, and changing option number 3 to "moderately agree". Two of the experts suggested utilizing variables, data categories, and several data calculation methods. One of the experts suggested adding a row for "none of the above" option. One of the experts suggested using incentives to motivate the respondents to fill in the questionnaire.

The discussion with the experts resulted in the fact that most of them suggested shortening the questionnaire because the factors and dimensions were too many, complicated and redundant. They suggested revising the format and grammar as well. One of the experts suggested dividing the questionnaire into two main sections, one about whether they provide the services, and the other about how important the services are. Two of the experts suggested providing the exact number of tenants which were assisted, which went out of business, and which started business operations. One of the experts suggested keeping the respondents anonymous, and changing option number 3 to "moderately agree". Two of the experts suggested utilising variables, data categories, and several data calculation methods. One of the experts suggested adding a row for "none of the

above" option. One of the experts suggested using incentives to motivate the respondents to fill in the questionnaire.

4.2. Reliability Test

The reliability test result for this pilot survey describe all of the factors and dimension and moderating variable are in the accepted range of Cronbach's Alpha requirement. ~~The~~ Table I describe about the result of reliability test for each factors of successful business incubator in Indonesian Public Universities as below.

Table 1
Summary of Reliability Results

No	Factors	Cronbach's Alpha
1	Physical or logistical facilities	0.801
2	Shared Business Services and Equipment	0.887
3	Financial Accounting and Consultation	0.950
4	Marketing Assistance	0.973
5	Professional Business Services and Business Etiquette	0.885
6	Management and Human Resources Assistance	0.928
7	Information Technology and E-Commerce Assistance	0.774
8	Incubator Governance	0.803
9	Entry Criteria	0.885
10	Exit Criteria	0.757
11	Mentoring Networking	0.834
12	Government Support and Protection	0.906
13	Funding and Support	0.848
14	University Regulation	0.848
15	System Infrastructure	0.760
16	Factors of Success of Business Incubator	0.798
17	Performance of Business Incubator	0.929
18	Moderating Factors of Successful Business Incubator	0.821

Table I shows the summary of the reliability results. It could be seen from the table that the result of pilot test indicates that Cronbach's alpha values for the constructs under investigation are all above 0.70. Consequently, given the established benchmark of 0.70 all the constructs are reliable and therefore, there was no need to delete any item (Nunnaly, 1978)

Table 2
Demography of respondents

No.	Item	Description	Frequency (N)	Percentage (%)	Skewness/ Std Errof	Kurtosis/ Std Error	Normal/ not
1.	Gender	Male	14	82.4	0.226	-1,103	Normal
		Female	3	17.6	-	-	- *)
2.	Age	30-39 years old	5	29.4	- 0.624	0,320	Normal

No.	Item	Description	Frequency (N)	Percentage (%)	Skewness/ Std Errof	Kurtosis/ Std Error	Normal/ not
		40-49 years old	3	17.6	1.190	0	Normal
		50-59 years old	6	35.3	-0.132	-0.975	Normal
		>60 years old	3	17.6	0	1.225	Normal
3.	Designation	Business Incubator Manager	14	82.4	0.500	1.191	Normal
		Business Incubator Association	2	11.8	-	-	-
		Others	1	5.9	-	-	-
4	Level of Education						
		Master Degree	8	47.1	-1.306	0.778	Normal
		PhD Degree	9	52.9	0.820	1.400	Normal

In figure 2, all the factors sum up from the most important findings of the literature review, on critical value-added components of the business incubators, from the perspective of business incubator successful factors for Indonesian Public Universities. The red color are the factors finding from the literature review and preliminary study which different from previous model of Verma.

5. Conclusion

In literature study, Some factors such as: Strategic alliances, universities support infrastructure, innovation or technology transfer, network, assistance, commercialization, collaboration, government policy, management skill, experience, seed money or funding have been defined as a successful factors for University Technology Business Incubator.

We have observed three significant differences from the previous business incubator model of Verma, the Government Support and Protection, University Regulation, System Infrastructure. These 3 factors are remarkable, since these weren't observed as top value-added components in previous incubator literature.

In this research with the significant result of the data processing such as good reliability and validity calculation, Good normality data, and Good Cronbach Alpha result. So for the future study, we will continue this model as a framework for business incubator successful factor of Indonesian Public Universities with new additional targeted sample and structural equation modelling analysis.

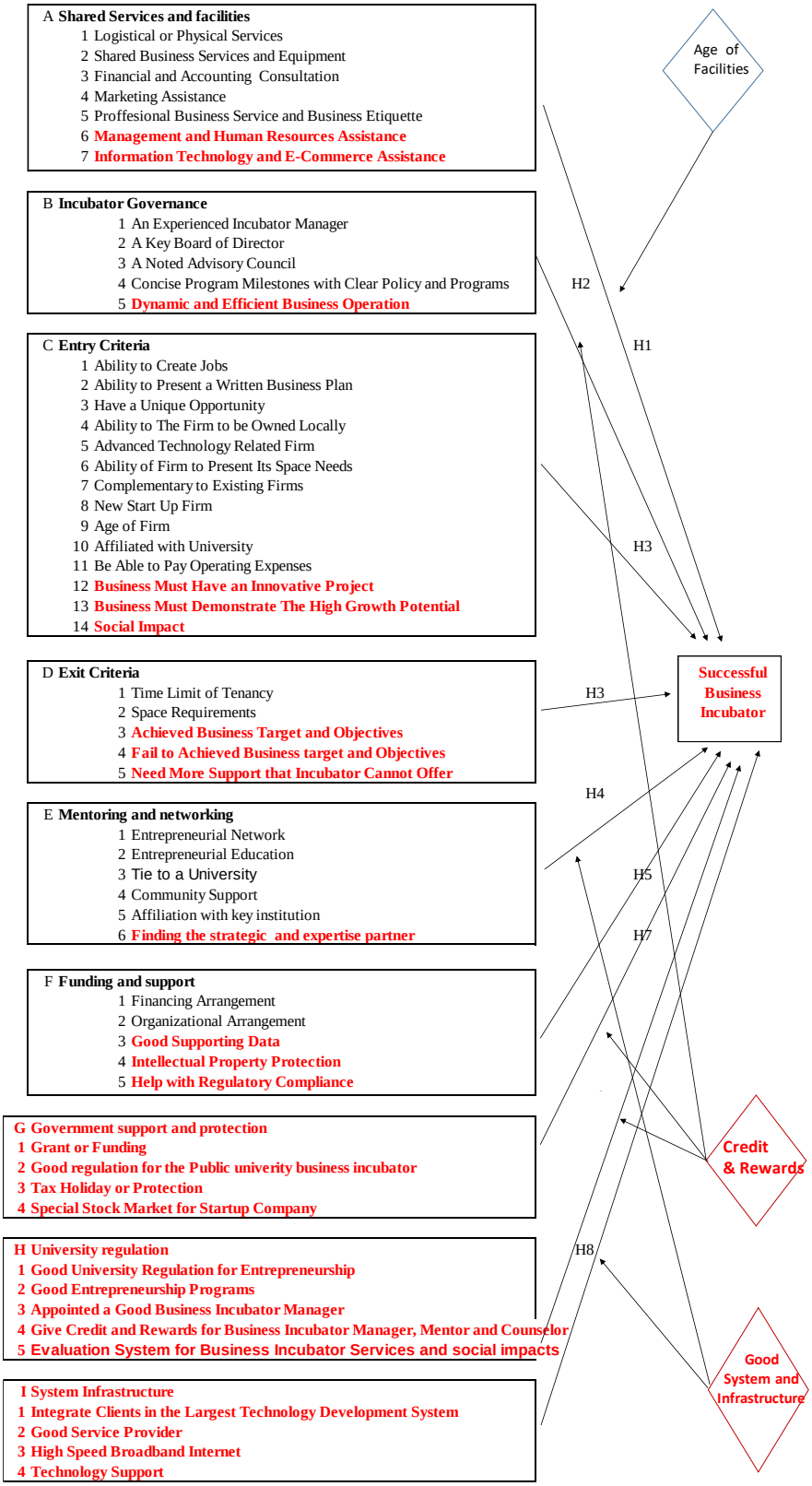

Figure 2: A Framework toward Successful Business Incubator of Indonesian Public Universities (Gozali et al., 2016)

As noted earlier in the paper that the aim of this study is pre-tests the validity and reliability of the instrument of an ongoing research in preparation for the large scale study. Hence, the conclusion of this study is tied to its objective which is mainly statistical in nature at this stage. The managerial implication of the variables under investigation would be fully uncovered after the main study is carried out. The study explore, evaluate, validate and share a small sample data on pilot survey for developing framework of successful business incubator for Indonesian Public Universities. Content with expert validation were conducted which subsequently led to the rewording of several items. Furthermore, the inter-item reliability test revealed that all the items were reliable with Cronbach Alpha well above the benchmark of 0.70; thereby no item was deleted. Finally, normality test using skewness and kurtosis shows that the data as a whole is reasonably normal more especially with skewness values not significantly different from zero.

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References

Albert, P., Bernasconi, M. and Gaynor, L. (2002), Incubators: The Emergence of a New Industry. A Comparison of the Players and their Strategies: France – Germany – UK – USA, Ceram Sophia Antipolis.

Baker, T. L. 1994. *Doing social research.* 2nd ed. New York: McGraw- Hill Inc. 499 p.

Birch, D.L. (1987), Job Creation in America: How Our Smallest Companies Put the Most People to Work, The Free Press, New York, NY.

Billingham, S.; Whitehead, A. L.; Julious, S. A. 2013. An audit of sample sizes for pilot and feasibility trials being undertaken in the United Kingdom registered in the United Kingdom Clinical Research Network database, *BMC Medical Research Methodology* 13(104): 1–6.

Bolton, J.E. (1971), Small Firms: Report of the Commission of Inquiry on Small Firms, Cmnd 4811, HMSO, London.

Bøllingtoft, A., & Ulhøi, J. P. (2005). The networked business incubator—leveraging entrepreneurial agency?. *Journal of business venturing*, *20*(2), 265-290.

Campbell, C.; Kendrick, R. & Samuelson, D. (1985). Stalking the Latent Entrepreneur. Economic Development Review, Vol. 3, No. 2, pp. 43-48.

Cooper, D.R and Schindler P.S, (2014), Business Research Methods, 12th ed. Mc Graw Hill International Edision. Mc Graw-Hill Irwin, - The Mc Graw-Hill/Irwin series

Connelly, L. M. (2008). Pilot studies. Medsurg Nursing, 17(6), 411-2

Culkin, N. (2013). Beyond being a student: An exploration of student and graduate start-ups (SGSUs) operating from university incubators. *Journal of Small Business and Enterprise Development*, *20*(3), 634–649. doi:10.1108/JSBED-05-2013-0072

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika. 16, 297-334

Cronbach, L. J. 1990. *Essentials of psychological testing.* 5th ed. NY: Harper and Row. 726 p.
CSES (2002), Benchmarking of Business Incubators, Final Report to the European Commission Enterprise Directorate, Brussels.
Davis, S.J., Haltiwanger, J.C. and Schuh, S. (1996), "Small business and job creation: dissecting the myth and reassessing the facts", *Small Business Economics*, Vol. 8, pp. 297-315.

Dee, N.J., Livesey, F., Gill, D. and Minshall, T. (2011), "Incubation for growth: a review of the impact of business incubation on new ventures with high growth potential", Research Summary, September, National Endowment for Science, Technology and the Arts, London.
Dahlborg, C., Lewensohn, D., Danell, R., & Sundberg, C. J. (2016), To invent and let others innovate: a framework of academic patent transfer modes. *The Journal of Technology Transfer*, 1-26.
Hazzi, O., & Maldaon, I. (2015). A pilot study: Vital methodological issues. Business: Theory and Practice, 16(1), 53-62.
Khalid, S.; Irshad, M. Z.; Mahmood, B. 2012. Job satisfaction among academic staff: a comparative analysis between public and private sector universities of Punjab, Pakistan, *International Journal of Business and Management* 7(1): 126–136.
Gay, L. R., Mills, G. E. & Airasian, P. (2006). *Educational research: Competencies for analysis and applications (8th ed.)*. Uppersaddle River, New Jersey: Pearson Education International, Inc.
George, D.; Mallery, P. 2003. *SPSS for Windows step by step: a simple guide and reference*. *11.0 update*. 4th ed. Boston: Allyn & Bacon. 400 p.
Gozali, L., Maslin Masrom, Habibah @ Norehan Haron, Teuku Yuri M Zagloel (2015a) Research Comparison among Business Incubator Research Sample and Analysis in The Worlds, *International Conference Engineering Tarumanagara University* 2015 , October 22-23, 2015, Jakarta, Indonesia
Gozali, L., Maslin Masrom, Habibah Norehan Haron, Teuku Yuri M. Zagloel (2015b), A Framework of Successful E-Business Incubator for Indonesian Public Universities, *The Asian Journal of Technology Management* Vol. 8 No. 2 (2015): 118-132, Indonesia
Gozali, L., Masrom, M., Zagloel, T. Y. M., & Haron, H. N. (2016). A Framework of Successful Business Incubators for Indonesian Public Universities. *International Journal of Technology*, *7*(6), 1086-1096.
Griffee, D. T. 2012. *An introduction to second language research methods: design and data.* 1st ed. CA: TESL-EJ Publications. 213 p.
Haber, S., & Reichel, A. (2007). The cumulative nature of the entrepreneurial process: The contribution of human capital, planning and environment resources to small venture performance. *Journal of Business Venturing*, *22*(1), 119-145.
Hansen, M.T., Chesbrough, H.W., Nohria, N. and Sull, D. (2000), "Networked incubators: hothouses of the economy", *Harvard Business Review*, Vol. 78 No. 5, pp. 74-84.
Hatcher, L. (1994). A step-by-step approach to using the SAS(R) system for factor analysis and structural equation modeling. Cary, NC: SAS Institute.
Hertzog, M.A. (2008). Considerations in determining sample size for pilot studies. Research in Nursing & Health, 31,180-191.
Hill, R. (1998). What sample size is "enough" in internet survey research? Interpersonal Computing and Technology: *An Electronic Journal for the 21st Century*, 6(3-4).

Hoang, H. and Antoncic, B. (2003), "Network based research in entrepreneurship: a critical review", *Journal of Business Venturing*, Vol. 18 No. 2, pp. 165-187.
Isaac, S., & Michael, W. B. (1995). Handbook in research and evaluation. San Diego, CA: Educational and Industrial Testing Services
Jack, S. L. (2010). Approaches to studying networks: Implications and outcomes. *Journal of Business Venturing*, *25*(1), 120-137.
Julious, S. A. (2005). Sample size of 12 per group rule of thumb for a pilot study. Pharmaceutical Statistics, 4, 287-291.
Kelley, D.J., Singer, S. and Herrington, M.D. (2012), "The 2011 Global Entrepreneurship Monitor Report", available at: www.gemconsortium.org/docs/2201/gem-2011-global-report (accessed 25 January 2012).
Laukkarinen, T., Suhonen, J., Hämäläinen, T. D., & Hännikäinen, M. (2011, November). Pilot studies of wireless sensor networks: Practical experiences. In*Design and Architectures for Signal and Image Processing (DASIP), 2011 Conference on* (pp. 1-8). IEEE.
Lee, J. J., J. S. Kim, and H. K. Chun (1999). "A Study on the Management and Financial Independence of University Technology Business Incubators (UTBIs) in Information and Telecommunication Industry," *Korean Small Business Review* 21(2), 185–206.
Lee, S. and Osteryoung, J. (2004), "A comparison of critical success factors for effective operations of university business incubators in the United States and Korea", *Journal of Small Business Management*, Vol. 42 No. 4, pp. 418-427.
Leon, A. C.; Davis, L. L.; Kraemer, H. C. 2011. The role and interpretation of pilot studies in clinical research, *Journal of Psychiatric Research* 45(5): 626–629.
Lerner, M., & Haber, S. (2001). Performance factors of small tourism ventures: The interface of tourism, entrepreneurship and the environment. *Journal of business venturing*, *16*(1), 77-100.
McAdam, M. and McAdam, R. (2008), "High tech start-ups in university science park incubators: the relationship between the start-up's lifecycle progression and use of the incubator's resources", *Technovation*, Vol. 28 No. 5, pp. 277-290.
McAdam, M. and Marlow, S. (2008), "A preliminary investigation into networking activities within the university incubator*", International Journal of Entrepreneurial Behaviour & Research*, Vol. 14 No. 4, pp. 219-241.
McAdam, M., & Marlow, S. (2011). Sense and sensibility: The role of business incubator client advisors in assisting high-technology entrepreneurs to make sense of investment readiness status. *Entrepreneurship & Regional Development*, *23*(7-8), 449-468.
Mosey, S., Guerrero, M., & Greenman. (2016), A. Technology entrepreneurship research opportunities: insights from across Europe. *The Journal of Technology Transfer*, 1-9.
NBIA National Business Incubator Association (2016). https://www.inbia.org/resources/business-incubation-faq. View July 2016
Nunnaly, J. (1978). Psychometric theory. New York: McGraw-Hill.
Lalkaka, R. and Bishop, J. (1996), Business Incubators in Economic Development – An Initial Assessment in Industrialising Countries, United Nations Development Programme, New York, NY.
Nouira, S., Klofsten, M. and Dahlstrand, A. (2005), "The logic of the entrepreneur: implications of the entrepreneur's perception of early-stage financing", *International Journal of Entrepreneurship and Innovation*, Vol. 6 No. 2, pp. 85-96.

Polit, D. F.; Beck, C. T.; Hungler, B. P. 2001. *Essentials of nursing research: methods, appraisal, and utilization.* 5th ed. Philadelphia: Lippincott Williams and Wilkins. 544 p.
Porta, M. 2008. *A dictionary of epidemiology.* 5th ed. Oxford: Oxford University Press. 320 p.
Rae, D., Martin, L., Antcliff, V., & Hannon, P. (2012). Enterprise and entrepreneurship in English higher education: 2010 and beyond. *Journal of Small Business and Enterprise Development*, *19*(3), 38
Reid, J. 1990. The dirty laundry of ESL survey research, *TESOL Quarterly* 24(2): 323–338.
Rice, M. P. (2002). Co-production of business assistance in business incubators: an exploratory study. *Journal of business venturing*, *17*(2), 163-187.
Rothschild, L. and Darr, A. (2005), "Technological incubators and the social construction of innovation networks: an Israeli case study", *Technovation*, Vol. 25 No. 1, pp. 59-69.
Scillitoe, J.L. and Chakrabarti, A.K. (2010), "The role of incubator interactions in assisting new ventures", *Technovation*, Vol. 30 No. 3, pp. 155-167.
Sekaran, U. & Bougie, R. (2010). *Research methods for business: A skill building approach (5th ed.)*. Chichester: John Willey & Sons Ltd
Shay, Mary. (2008). An Investigation of the Attitudes, Beliefs, and Values of Elementary School Teachers Toward Race and Schooling. Greeley CO: University of Northern Colorado.
Siegel, D.S., Wright, M. and Lockett, A. (2007), "The rise of entrepreneurial activity at universities: organizational and societal implications", *Industrial and Corporate Change*, Vol. 16, pp. 489-584.
Smilor, R. W., D. V. Gibson, and G. B. Dietrich (1990). "University Spin-Out Companies: Technology Startups from UT–Austin*," Journal of Business Venturing* 5, 63–76.
Thierstein, A., & Willhelm, B. (2001). Incubator, technology, and innovation centres in Switzerland: features and policy implications. *Entrepreneurship & Regional Development*, *13*(4), 315-331.
Thorndike, R. M., Cunningham, G. K., Thorndike, R. L., & Hagen E. P. (1991). Measurement and evaluation in psychology and education. New York: Macmillan Publishing Company.
Treece, E. W., & Treece, J. W. (1982). Elements of research in nursing (3rd ed.). St. Louis, MO: Mosby.
Van Belle, G. (2002). Statistical rules of thumb. New York: John Wiley.
Verman, Sameer. (2004) Success Factors for Business Incubators: an Empirical Study of Canadian Business Incubators. Eric Sprott School of Business, Carleton University, Ottawa, Ontario
Vinig, T., & Lips, D. (2015). Measuring the performance of university technology transfer using meta data approach: the case of Dutch universities. *The Journal of Technology Transfer*, *40*(6), 1034-1049.
Wilson, T. (2012), "Review of HE-business collaboration", available at: www.wilsonreview.co.uk/review/
Xiao, L., & North, D. (2016). The graduation performance of technology business incubators in China's three tier cities: the role of incubator funding, technical support, and entrepreneurial mentoring. *The Journal of Technology Transfer*, 1-20.