

Exploring Competitive Competencies for ICT/Tech Startup Ecosystem Towards The Digital Economy in Thailand: An Empirical Competency Development Investigation

Kriengkrai Bhuvani¹, M.L.Kulthon Kasemsan¹, and Prasong Praneetpolgrang²

¹Rangsit University, Thailand, {kriengkrai.b54; kkasemsan}@rsu.ac.th

²Sripatum University, Thailand, prasong.pr@spu.ac.th

ABSTRACT

Tech startups are seen as a new economic growth engine in Thailand which will help the country step up and produce more sophisticated high valued products and services. However, the shortage of skilled labor with innovation in knowledge-based economy has trapped Thailand in inconvenient position and losing its competitive edge. Hence in this research, the study on the competitive competencies for the tech startups were addressed by conducting in-depth interview and focus group discussion with the key stakeholders responsible for the development on the tech startups ecosystem in Thailand. The study revealed the top 5 competitive competencies classified by 1) Innovation, 2) Business Acumen and Aspiration, 3) Analytical Thinking, 4) Interpersonal Effectiveness and 5) Leadership and Result Orientation are needed most for the tech startup workforce and recommended strategy for the tech startup ecosystem in Thailand. The results of this research will help prepare ICT workforce in a larger scope to drive Thailand to be competitive in the Digital Economy and the ASEAN Community.

Keywords: ICT Competency, ICT/Tech Startups, ICT/Tech Startups Ecosystem, Digital Economy, Knowledge-based Service Economy.

I INTRODUCTION

Startups are the future economy foundation of Thailand gaining interest by all stakeholders due to its easiness and low cost to start business. Particularly tech startups which will help drive the next wave of growth in Thailand's digital economy, technology and innovation are the key parts to build up business while it could be designed to be replicated and expanded without limitation. The tech startups business will create high value added to economy and could grow fast. Today, the tech startups in Thailand are growing and attracting attention in the region. In addition, the tech startups business will help solve the needs of market by creating products and services which could answer and deliver value matching to the requirements of users or customers. The tech startups has business model and business operation which could be replicated with low cost including being able to

expand quickly and widely. The tech startups business could help improve quality of life by delivering faster and better service which conventional business could not do (Thailand Tech Startup Association, 2016).

Regarding the economic contribution and potential of tech startups, the Thailand Development Research Institute (TDRI) and Software Industry Promotion Agency (SIPA) reported that in 2014 alone the industry was valued at THB 7.8 billion (US\$215 million), with 20 per cent growth predicted each year forward. With this, governments in many countries, particularly in Thailand, treats tech startups as the new country strategic move and has policy to build up the tech startups ecosystem, especially the tech startups services which will replace the old services by new services owned by the country and could expand to the other countries' market. Hence in order to increase opportunity for tech startups to be successful, the governments in those countries have issued supporting measurements such as revision on laws and regulations to facilitate ease of doing business, develop local talent pool, and attract foreign talents to come and develop tech startups businesses. These will create high valued businesses, build up high-quality workforce, and increase national revenue including stimulating the economy growth. The tech startups companies in the U.S. such as Apple, Facebook, Google and Uber are good examples which could help drive economy growth of the country. With the GEDI (Global Entrepreneurship Development Institute) study in 2016, the potential of tech startups in Thailand is at the world's average which is a little higher than the ASEAN's average, however, the tech startup ecosystem in the country still is not conducive to the development of tech startups which make the tech startups in Thailand not be able to show their full potential. Hence the numbers of quality tech startups with potential investment are still limited (Thailand Tech Startup Association, 2016).

The 3 key factors impacting the development of tech startup ecosystem which the Thai government should accelerate and resolve operational improvements are the followings (Thailand Tech Startup Association, 2016):

1. Revision on laws and regulations which are not conducive to investment and support new business models.
2. Promotion on policy support to accelerate growth with quality.
3. Provision on other supports for the tech startups such as education and human resource development. With this, the Ministry of Education curriculum needs to be structured in a way that it should not focus on creating entrepreneurs but on building support personnel who are experts with entrepreneurial mindsets.

Therefore, particularly, as the education and human resources are among the key factors to help develop the tech startups workforce across the economy to be equipped with required competencies, strategy and specific measurement are needed to develop the workforce to effectively deliver and promote their ICT services, products and advice. The strategy is required to boost perceptions of ICT careers, enhance the work readiness of ICT graduates and improve industry engagement in up-skilling and professional development in an industry characterized by rapidly changing skill sets to support the tech startups to drive the Digital Economy implementation in Thailand. Hence, the ICT human resource development to build workforce in the tech startups with the right competencies to be capable enough to develop and use ICT efficiently will be a key success factor to bring the nation towards the Digital Economy and the Knowledge-based Economy:

In this research, the objectives of the study are the followings:

1. To identify the competitive competencies for the tech startups in Thailand.
2. To propose strategy for competitive competencies for tech startups ecosystem towards the Digital Economy in Thailand.

II THEORETICAL BACKGROUND

A. Tech Startup

A tech startup (or startup for short) is defined as an emerging high-growth company that is using technology and innovation to tackle a large and most often global market. The tech startups have two important defining characteristics:

1. Potential for high growth. Professional investors recognize the high risk of failure in startups and therefore will only invest in opportunities capable of generating high returns to compensate for this risk.
2. Disruptive innovation. Startups are reshaping the way entire industries work by displacing established

competitors through use of technology and business model innovation (Kinner, 2005).

In Korea a high-tech startup is defined as a firm that invests more than 5% of total sales into R&D, or if sales due to a patent account for more than 50% of total sales, or if venture capital investors control more than 10% of stockholders' equity (Sohn, 2007).

Tech startups can be pure tech firms focusing in Software and hardware as their main service or product; tech startups can also be not-so-tech who aims straight at the heart of every industry and interest including food crawls, fashion, sport etc. Angel investor Mark Birch from New York City defines them as the "non-tech" tech startups. According to him, in tech startup ecosystems, "technology is required but it is certainly not the differentiator". Technology is used behind the scenes to support, prepare and spread out the surface show of products and services (Birch, 2012).

B. Tech Startups Ecosystem

In general, Tech Startup Ecosystem is a business ecosystem formed by communities of companies, startups in various stages regarding in technology fields and an aura of other actors/organizations interacting as a system to support the creation and development of startups companies or a small-scale system that enables startups to raise (Spruijt, 2015). Each community can function independently; however, all communities in the ecosystem are linked to each other through relationships, interactions and through the same development goal of the ecosystem. As startup ecosystems are defined by the interactions of networks and communities of people, startups and organizations, they can come in either practical or virtual types which are commonly known as startup ecosystems of countries, cities or online communities. Moreover, the main actors and purpose in a tech startup ecosystem are the tech startups and the development of them, and as technology is expanding its influence to every direction (Huong, 2015).

C. Defining Knowledge Based Economy and Digital Economy

The term Knowledge Based Economy (KBE) was first coined by OECD and defined as "economies which are directly based on the production, distribution and use of knowledge and information" (OECD, 1996). Choudaha (Choudaha, 2008) used the terms such as knowledge economy, service economy, new economy, and knowledge-based service economy interchangeably. The term refers to the nature of economy that involves service interaction, complex problem-solving and technology or information based transactions. Turban (Turban et. al. 2005) defined "What is Digital Economy" is the information and entertainment products that are digitized including

processes and services which are performed in this way as well. “Digital Economy” refers to a society that is enabled and supported in every aspect of modern life by digital technologies and markets connected via the internet. Put simply, the Digital Economy is the modern economy as it is naturally evolving and therefore does not represent an optional path for Thailand, or any economy for that matter, to remain regionally and globally competitive (AEC Advisor, 2015). Other names of Digital Economy are Internet Economy, Knowledge-based Economy, Network Economy, Web-based Economy and New economy. Thus, this paper will refer the term Knowledge Based Economy to the terms “Service Economy”, “Knowledge Based Service Economy” and “Digital Economy”.

D. Competency

A competency is the capability of applying or using knowledge, skills, abilities, behaviors, and personal characteristics to successfully perform critical work tasks, specific functions, or operate in a given role or position (Ennis 2008). The iceberg model for competencies (Spencer & Spencer, 1993) takes the help of an iceberg to explain the concept of competency. Similarly, a competency has some components which are visible like knowledge and skills but other behavioral components like attitude, traits, thinking styles, self-image, organizational fit etc. are hidden or beneath the surface as shown in Figure 1.



Figure 1. Competency Ice Berg Model (Spencer and Spencer, 1993).

E. ICT Competency Model for Digital Economy

In this research, the U.S. Department of Labor (DoL) IT Competency Model (US DoL, 2014) in Figure 2 (left) which includes three layers of soft skills and workplace ready competencies: Personal Effectiveness (Layer 1), Academic (Layer 2) and Work-place (Layer 3) which have been generally validated by DoL work across other industries. In layer 4, the model represent the knowledge in ICT in 8 areas while layer 5, layer 6 and layer 7 represent industry technical, occupation specific requirements and management competencies accordingly.

As per the competencies proposed by Choudaha (Choudaha, 2008), with knowledge set in vertical part

and skills and attitudes set in horizontal part, the Competency model for a service scientist/T-shaped professional in Figure 2 (right) should well correspond to the demands on competencies of knowledge-based service sector.

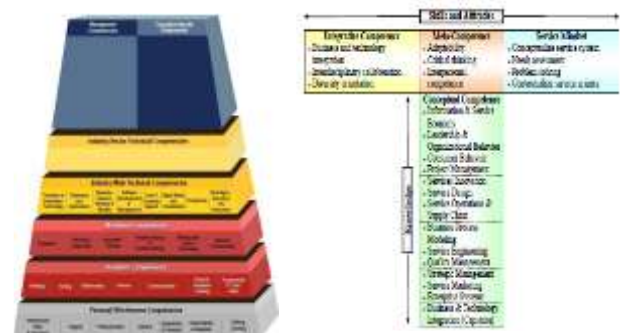


Figure 2. ICT Competency Model of U.S. Department of Labor (left) (US DoL, 2014) and Service Scientist Competency Model (right) (Choudaha, 2008)

In 2011, the Ministry of Education announced the Thailand Quality Framework (TQF) Computer standard as a foundation of education system in the country which covered in 5 majors including 1) Computer Science, 2) Computer Engineering, 3) Software Engineering, 4) IT (or ICT) and 5) Business Computing focusing in the areas of organization and ICT systems, technology for applications, technology and software process, ICT Infrastructure and Hardware and Computer Architect. The TQF Standard also defines competencies in 5 areas including Morals and Ethics, Knowledge, Cognitive Skills, Interpersonal Skills and Responsibilities and Numerical Analysis, Communications and Information Technology Skills which also aligned well with the competencies in each layer of the U.S. Department of Labor (DoL) IT Competency Model. The TQF standard also complies with the Association for Computing Machinery (ACM) and the Association for information Systems (AIS) and the Institute of Electrical and Electronics Engineer Computer Society (IEEE-CS) (TQF Computer, 2007). In this research, the US DoL IT Competency Model will be used as a foundation ICT Competency Model while the TQF Competency Model which is the core ICT knowledge along with ICT competency for Knowledge-based Service Economy and the Service Scientist Competency Model will be incorporated to construct the ICT HR Competency Development Model for Thailand towards Knowledge-based Service Economy as shown below in Figure 3.

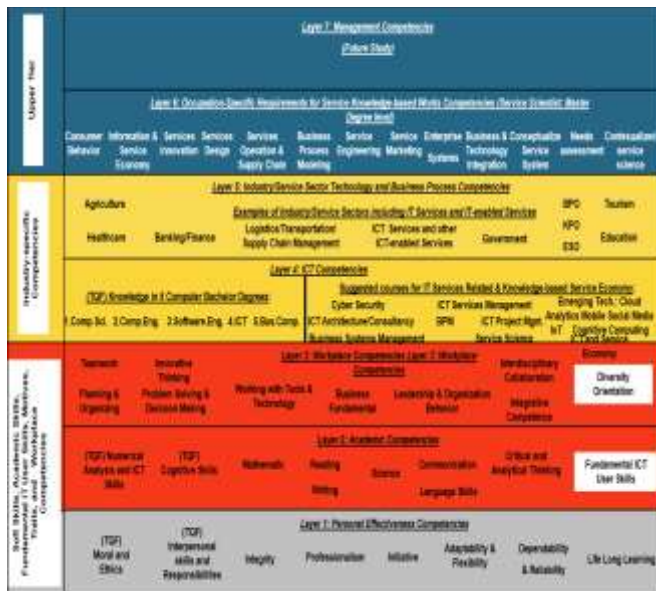


Figure 3. ICT HR Competency Development Model for Thailand towards Digital Economy/Knowledge-based Service Economy.

F. Identifying Startup Competencies

From the Documentary Research study (McCulloch, 2004) (Mogalakwe, 2006) on the 10 research papers of (Cooney, 2012) (Draycott, 2011) (Botha, 2015) (McCLELLAND, 2011) (Forster, 2013) (Morris, 2013) (Mitchellmore, 2012) (Hazlina, 2010) (Tatar, 2014) (Wu, 2009), the competencies for startups with frequency counting on each competency found in each paper is presented in Table 1.

With Documentary Research, the collective tech startup competencies were analyzed and obtained from the Table 1, the competencies with ranking with highest score on the importance could be shown in Table 2 with the highest-10-scores competency group which are Analytical Thinking, Self-Confidence and Self-Control while the lowest-6-scores competency group are Organization Awareness, Result Orientation, Verbal and Written Communication and Tolerance for Ambiguity and Risk accordingly.

With results from the ranked tech startup competencies from Table 2, all the competencies could be grouped as combination of Personal Effectiveness and Academic Competencies which could be represented in Layer 1 in the proposed tech startup competitive competency development model as shown in Figure 6 while the other parts of competency besides soft skills, academic skills, motive and traits are illustrated in Layer 2 to Layer 6 accordingly.

The proposed tech startup competitive competency development model in Figure 6 are used for the In-depth Interview with the key stakeholders in startups, government, business and academic sectors which will be later discussed in the research methodology sector.

Table 1. Collective Tech Startup Competencies.

Factor	1	2	3	4	5	6	7	8	9	10	Freq.
1. Analytical Thinking	/	/	/	/	/	/	/	/	/	/	10
2. Business Acumen	/	/	/	/	/	/	/	/	/	/	9
3. Client Service Orientation	/	/	/	/	/	/	/	/	/	/	4
4. Commitment to Learning	/	/	/	/	/	/	/	/	/	/	2
5. Communication	/	/	/	/	/	/	/	/	/	/	9
6. Conceptual Thinking	/	/	/	/	/	/	/	/	/	/	9
7. Order and Quality	/	/	/	/	/	/	/	/	/	/	4
8. Developing Others	/	/	/	/	/	/	/	/	/	/	4
9. Empathy	/	/	/	/	/	/	/	/	/	/	2
10. Expertise	/	/	/	/	/	/	/	/	/	/	9
11. Flexibility	/	/	/	/	/	/	/	/	/	/	3
12. Influence	/	/	/	/	/	/	/	/	/	/	4
13. Information Seeking	/	/	/	/	/	/	/	/	/	/	7
14. Initiative	/	/	/	/	/	/	/	/	/	/	3
15. Innovation	/	/	/	/	/	/	/	/	/	/	8
16. Organizational Awareness	/	/	/	/	/	/	/	/	/	/	6
17. Personal Motivation	/	/	/	/	/	/	/	/	/	/	7
18. Relationship Building	/	/	/	/	/	/	/	/	/	/	8
19. Results Orientation	/	/	/	/	/	/	/	/	/	/	6
20. Self-Confidence	/	/	/	/	/	/	/	/	/	/	10
21. Self-Control	/	/	/	/	/	/	/	/	/	/	10
22. Team Leadership	/	/	/	/	/	/	/	/	/	/	8
23. Verbal and Written Communication	/	/	/	/	/	/	/	/	/	/	6
24. Ambition	/	/	/	/	/	/	/	/	/	/	5
25. Ethical	/	/	/	/	/	/	/	/	/	/	2
26. Sale	/	/	/	/	/	/	/	/	/	/	7
27. Finance	/	/	/	/	/	/	/	/	/	/	7
28. Marketing	/	/	/	/	/	/	/	/	/	/	7
29. Tolerance for ambiguity and risk	/	/	/	/	/	/	/	/	/	/	6
30. Conscientiousness	/	/	/	/	/	/	/	/	/	/	4
31. Intellect	/	/	/	/	/	/	/	/	/	/	5
32. Creative	/	/	/	/	/	/	/	/	/	/	7
33. Passion	/	/	/	/	/	/	/	/	/	/	2

Table 2. Ranking of Tech Startup Competencies with Documentary Analysis.

Rank	Competencies	Score
1	Analytical Thinking	10
2	Self-Confidence	10
3	Self-Control	10
4	Business Acumen	9
5	Conceptual Thinking	9
6	Expertise	9
7	Communication	8
8	Innovation	8
9	Team Leadership	8
10	Creativity	8
11	Information Seeking	7
12	Personal Motivation	7
13	Relationship Building	7
14	Sale	7
15	Finance	7
16	Market	7
17	Organizational Awareness	6
18	Results Orientation	6
19	Verbal and Written Communication	6
20	Tolerance for ambiguity and risk	6

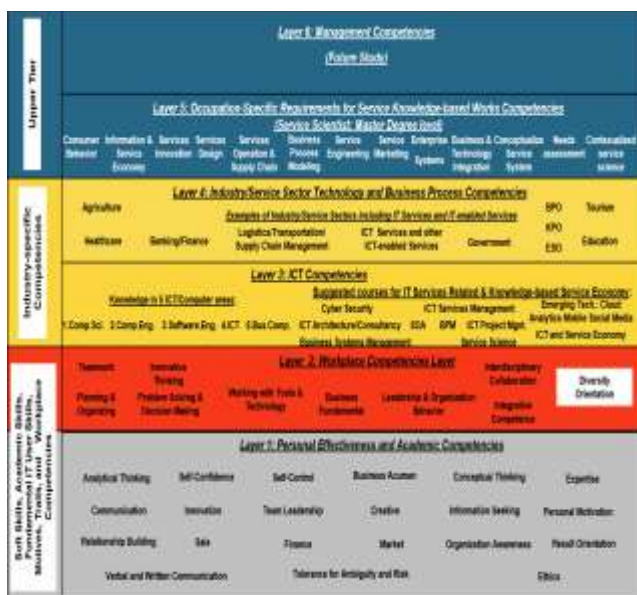


Figure 4. Proposed Tech Startup Competitive Competency Development Model.

III RESEARCH METHODOLOGY

In this research, the 3 stages of research processes consisting of: 1) Documentary Research, 2) In-depth Interview with the key stakeholders, 3) Focus group Discussion with the expert and key stakeholders in the startup ecosystem in Thailand were conducted.

As noted, from the information gained from the Documentary Research in stage 1) from table 1 and 2, and from figure 4, were used in the In-depth Interview in stage 2) with the 10 – 12 key stakeholders such as the advisor to Minister of ICT, owners of leading startup firms, executives of ICT associations, policy makers of Ministry of ICT, executives of Chamber of Commerce and SME associations and professors from academic sectors were interviewed to

verify the competencies needed for the tech startups in Thailand with the content analysis. The results from the in-depth interview were further interpreted by using the content analysis (Stemler, 2001), and then used in the Focus Group Discussion in stage 3) consisting of the 9 experts and key stakeholders responsible the development of startup sector in Thailand such as owners of the top ranked tech startups companies in Thailand, executives from Thailand Tech Startup Association, Executive Director of Software Park, executive from Thailand Professional Quality Institute, Executive Director of ICT Promotion Department of Ministry of ICT, academic professors with Knowledge Management expertise, executive of Software Industry Promotion Agency to verify the ICT Competency Development Model for ICT workforce in Thailand, specify the top 5 competitive competencies required for the tech startups in Thailand ecosystem with recommended strategy on the development of the tech startup workforce.

The two steps of research processes are as follows:

Step 1: Study and identify the competitive competencies for the tech startup in Thailand (Figure 5).

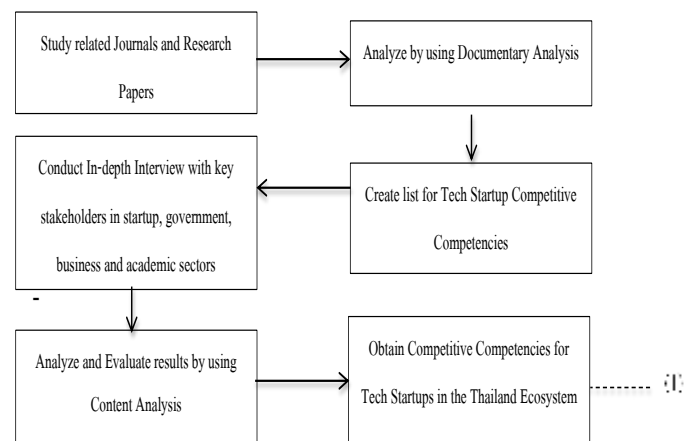


Figure 5. Step 1: In-depth Interview with Content Analysis to identify the competitive competencies for the tech startup in the Thailand Ecosystem.

Step 2: Propose strategy for competitive competencies for tech startup ecosystem towards the Digital Economy in Thailand (Figure 6).

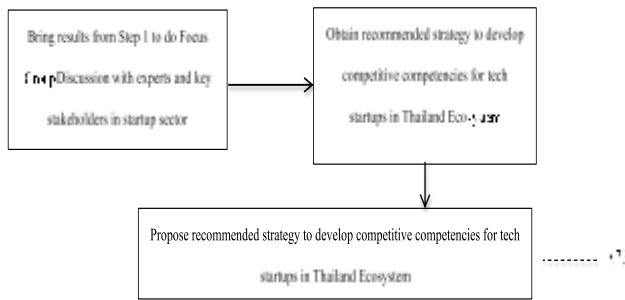


Figure 6. Focus Group Discussion to obtain proposed strategy for competitive competencies for tech startups in the Thailand ecosystem.

IV RESULTS

From the focus group discussion, the ranked tech startup competencies with Documentary Analysis from Table 2 were used to evaluate by the experts in the focus group as illustrated in Table 3 and re-order to be the top 5 recommended competitive competencies required by the tech start up in the Thailand ecosystem. The top 5 competitive competencies are, ranking from the ones which are mostly needed for the tech startups, 1) Creativity, Innovation, 2) Business Acumen, Conceptual Thinking and Personal Motivation, 3) Analytical Thinking, 4) Self Confidence, Expertise, Communication, Relationship Building, Market and Verbal and Written Communication and 5) Self-Control, Team Leadership, Result Orientation, Tolerance for Ambiguity and Risk (Table 4).

From the focus group discussion, with the results shown in Table 4, the Creativity and Innovation are mostly required for the tech startups in Thailand as the competencies could help the companies be able to create or innovate products or services, with application of technology and ICT, which could help the startups differentiate them from the competitors and from the existing products and services in the market. Regarding the second rank competitive competencies, Business Acumen including Finance and Sale, Conceptual Thinking which is the ability to see the overall picture of business while Personal Motivation are also important for the tech startups to be able to set up their company, grow, get strong, be stable and be sustainable.

Not only that, the lowest ranked competitive competencies are also important for the tech startups such as Ethics and Morality which could guide their businesses to run with integrity. Last but not least, due to the Thailand ecosystem, from the focus group discussion, the tech startups are also suggested to bring the Sufficiency Economy Theory to apply for their business operation as this could help them be able to run their business with stability and sustainability.

Table 3. Competitive competencies for tech startups in Thailand Ecosystem.

No.	Competencies	% of answers by experts in the focus group discussion
1	Analytical Thinking	60%
2	Self-Confidence	40%
3	Self-Control	20%
4	Business Acumen	80%
5	Conceptual Thinking	80%
6	Expertise	40%
7	Communication	40%
8	Innovation	100%
9	Team Leadership	20%
10	Creativity	100%
11	Information Seeking	
12	Personal Motivation	80%
13	Relationship Building	40%
14	Sale	
15	Finance	
16	Market	40%
17	Organizational Awareness	
18	Results Orientation	20%
19	Verbal and Written Communication	40%
20	Tolerance for ambiguity and risk	20%
21	Ethics & Morality	20%

Table 4. Top 5 recommended competitive competencies for tech startup in the Thailand ecosystem.

Rank	Competencies	Frequency
1	Creativity, Innovation	5
2	Business Acumen, Conceptual Thinking, Personal Motivation	4
3	Analytical Thinking	3
4	Self Confidence, Expertise, Communication, Relationship Building, Market, Verbal and Written Communication	2
5	Self-Control, Team Leadership, Result Orientation, Tolerance for Ambiguity and Risk, Ethics & Morality	1

In addition, with the suggestion from the focus group session, the top 5 competitive competencies could be designed as a standard curriculum or as a short course for the existing professionals who already have been in the business to get them equipped with required competencies.

As noted, the recommended tech startup competitive competency development model in the Thailand ecosystem towards Digital Economy could also be presented as depicted in Figure 7 which the priority of education or training could be implemented by starting with the competitive competencies in Layer 1 by ranked order while at the same time the competencies on knowledge and skills in the other layers from Layer 2 – 6 could also be trained separately or in parallel to

provide the best outcomes in the tech startup human resource development.



Figure 7. Recommended Tech Startup Competitive Competency Development Model and Strategy in the Thailand Ecosystem Towards Digital Economy.

V CONCLUSION

The tech startups are the potential economic growth engine for Thailand as it helps solve the needs from market by creating products and services which could answer and match to the requirements of users or customers. The tech startups has business model and business operation which could be replicated with low cost including being able to expand quickly and widely. However, the current country's start-ups and environment do not facilitate for entrepreneurship, hence Thailand needs to step up the measurement to promote the building up of the tech start up ecosystem. Among those recommended measurement are the revision on existing laws and regulations, the promotion on policy support to accelerate growth with quality and the supports for the tech startups such as education and human resource development to build workforce with required competencies to come up with innovations.

This research explores on the competitive competencies for the tech startups addressed by conducting in-depth interview and focus group discussion with the key stakeholders responsible for the development on the tech startup ecosystem in Thailand. In the study, the top 5 ranked competitive competencies which will best suit the current tech startup workforce human resource development are discussed with the proposed competency development model and training implementation. Due to the different nature of the Thailand's tech startup ecosystem from the ones studied in the other countries, in Thailand, the key strength of the workforce in the country are service oriented culture which the innovation creativity are required and well

complement with this nature while the competencies required in the other countries, particularly, in the western ones, the analytical thinking, self-confidence and self-control are considered important. The results of this research will help prepare ICT workforce in a larger scope to drive Thailand to be competitive in the Digital Economy and the ASEAN Community.

Future research could be on the Competency Knowledge Management Model for Tech Startup in various areas such as security, supply chain management, medical tourism, agriculture and education. Furthermore studies can also be made in the Competency Knowledge Management Model for Tech Startup of Thailand in comparison to ASEAN and the Policy on Competency for Tech Startup Competency Model for Tech Startup and Competency Knowledge Management Model for Tech Startup of Thailand in comparison to ASEAN, the Competency for Tech Startup Competency Model for Tech Startup Competency Knowledge Management Model for Tech Startup of other countries in ASEAN.

REFERENCES

- A Berelson, B. (1952). Content Analysis in Communication Research. Glencoe, Ill: Free Press.
- Birch, M. (2012) The Non-Tech Tech Startup. [Online] Available from: <http://birch.co/post/22367071851/the-non-tech-tech-startup>. [Accessed: 20th October 2015]
- Choudaha, R. (2008). Competency-based Curriculum For A Master's Program In Service Science, Management and Engineering (SSME): An Online Delphi Study. Morgridge College of Education, University of Denver, November 2008.
- Cooney, T. M. (2012). Entrepreneurship Skills for Growth-Orientated Businesses. Copenhagen: OECD.
- Draycott, M. (2011). Enterprise Education in Schools and the role of Competency Frameworks. Lincoln Business School, University of Lincoln.
- Ennis, R. (2008). Competency Models: A Review of the Literature and The Role of the Employment and Training Administration (ETA), U. S. Department of Labor January 29, 2008.
- ERIA. (2014). ASEAN SME Policy Index 2014: Towards Competitive And Innovative Asean SMEs, ERIA SME Research Working Group, Economic Research Institute for ASEAN and East Asia (ERIA), June, 2014.
- Forster, M., P. P. (2013). Personality: Blessing or Curse? The Entrepreneur's Path from Personal to Leadership Competencies. Organizacija, September 2013. Volume 46, pp. 221-231.
- Holsti, O.R. (1969). Content Analysis for the Social Sciences and Humanities. Reading, MA: Addison-Wesley.
- Huong Nguyen, H. (2015). Mapping Technology Startup Ecosystem In Vietnam. International Business, Business Administration, Turkey University of Applied Sciences, 2015.
- Kinner, C. (2005). Crossroads 2015: An action plan to develop a vibrant tech startup ecosystem in Australia. The StartupAUS April 2015.
- Krippendorff, K. (1980). Content Analysis: An Introduction to Its Methodology. Newbury Park, CA: Sage.
- M Botha, J. V. (2015). An integrated entrepreneurial performance model focusing on the importance and proficiency of competencies for start-up and established SMEs. S.Afr.J.Bus.Manage, pp. 55-65.
- McClelland, D. C. (2011). Small Business Entrepreneurs: Characteristics and Competencies. In D. C. McClelland, Characteristics of Successful Entrepreneurs (pp. 28-46).
- McCulloch, G. (2004). Documentary Research: In Education, History and the Social Sciences. 1st Edition. Routledge Publisher, 2004.

- Morris, M. H. (2013, June). A Competency-Based Perspective on Entrepreneurship. *Journal of Small Business Management*, pp. 352-369.
- Mitchelmore, S., Rowley, J., & Shiu, E. (2012). Entrepreneurial Competencies of Women Entrepreneurs Pursuing Business Growth. *Journal of Small Business and Enterprise Development*.
- Mogalakwe, M. (2006). The Use of Documentary Research Methods in Social Research. *African Sociological Review*. 10 (1): p. 221-230.
- Noor Hazlina Ahmad, H. A. (2010). Is Entrepreneurial Competency The Silver Bullet for SME Success in a Developing Nation. *International Business Management*, pp. 70-75.
- OECD (1996). The Knowledge-based Economy Organization For Economic Co-Operation And Development (OECD), Paris, France Head of Publications Service, OECD, 1996.
- OSMEP. (2011). Office of SME Promotion (OSMEP), the 3rd National SME Promotion Plan (2012 – 2016), (www.sme.go.th).
- Sato, Y. (2013). Development of Small and Medium Enterprises in the ASEAN Economies, BEYOND 2015: ASEAN-Japan Strategic Partnership for Democracy, Peace, and Prosperity in Southeast Asia (pp. 154–180). Japan Center for International Exchange (JCIE), 2013.
- Sohn, Dong-Won. (2007). Universities, Clusters, and Innovation Systems: The Case of Seoul, Korea. *World Development* Vol. 35, No. 6, pp. 991–1004, 2007, 2007 Elsevier Ltd.
- Spruijt, J. (2015). Schematic overview to understand the complexity of the innovation ecosystem [infographic]. [Online] Available from: <http://www.openinnovation.eu/27-07-2015/schematic-overview-to-understand-the-complexity-of-the-innovation-ecosysteminfographic/>. [Accessed: 20th October 2015].
- Stemler, S. (2001). An Overview of content analysis, analysis. *Practical Assessment, Research & Evaluation*, 7(17). Retrieved December 2, 2014 from <http://PAREonline.net/getvn.asp?v=7&n=17>.
- Stigler, J.W., Gonzales, P., Kawanaka, T., Knoll, S. & Serrano, A. (1999). The TIMSS Videotape Classroom Study: Methods and Findings from an Exploratory Research Project on Eighth-Grade Mathematics Instruction in Germany, Japan, and the United States. U.S. Department of Education National Center for Educational Statistics: NCES 99-074. Washington, D.C.: Government Printing Office.
- Tatar, G. A. (2014). How are entrepreneurial competence and dynamic capabilities of the Norwegian IT Start-ups related to performance. *Repsentrallen, Universitet i Oslo*.
- Thailand Startup Association. (2016). The Whitepaper for for Startup Thailand 2016.
- TQF Computer. (2009). Thailand Qualification Framework for Bachelor Degrees Computer. Office of the Higher Education Commission, 2009.
- Turban, E., Leidner, D., & McLean, E. (2005). *Information Technology for Management: Transforming Organizations in the Digital Economy*. 5th Edition, John Wiley & Sons, Inc. 2005.
- US ABC. (2014). Beyond AEC 2015: Policy Recommendations for ASEAN SME Competitiveness, ASEAN SME Working Group, https://www.usasean.org/system/files/downloads/sme_report_beyond_aec2015.pdf, The US-ASEAN Business Council, August 2014.
- US DoL. (2014). Information Technology Competency Model. CareerOneStop, U. S Department of Labor, Employment and Training Administration, Copyright © 2014 State of Minnesota, <http://www.careeronestop.org/competencymodel/pyramid.aspx?it=Y>, 2014.
- Weber, R. P. (1990). *Basic Content Analysis*, 2nd ed. Newbury Park, CA.
- Wheelock, A., Haney, W., & Bebell, D. (2000). What can student drawings tell us about high-stakes testing in Massachusetts? *TCRecord.org*. Available: <http://www.tcrecord.org/Content.asp?ContentID=10634>.
- WU, W.-W. (2009, June). A competency-based model for the success of an entrepreneurial start-up. *WSEAS TRANSACTIONS on BUSINESS and ECONOMICS* Issue 6, Volume 6, 279.