

‘ENTREPRENEURIAL LEARNING’ – THE ROLE OF UNIVERSITY LED BUSINESS INCUBATORS AND MENTORS IN EQUIPPING GRADUATES WITH THE NECESSARY SKILLS SET FOR INDUSTRY 4.0

Ho Yew Foo¹
Jason James Turner²

¹ Taylor’s Business School, Taylor’s University, Malaysia, (E-mail: hoyewfoo@sd.taylors.edu.my)

² Taylor’s Business School, Taylor’s University, Malaysia, (E-mail: jasonjames.turner@taylors.edu.my)

Accepted date: 26-12-2018

Published date: 07-05-2019

To cite this document: Ho, Y. F. & Turner, J. J. (2019). ‘Entrepreneurial Learning’– The Role of University Led Business Incubators and Mentors in Equipping Graduates with The Necessary Skills Set for Industry 4.0. *International Journal of Education, Psychology and Counseling*, 4(30), 283-298.

Abstract: *The 4th Industrial Revolution (4IR) has received significant academic and practitioner attention recently as a result of developments in automation and digitalisation of the home and work environments. Although these developments provide positive benefits to the world economy, they also have the potential to have both a positive and negative impact on human capital. It is within this context that this research, through a review of the current practices of business incubators and university-led business incubators, investigates the opportunities for entrepreneurial graduates in this disruptive environment and the role of education providers in equipping graduates with the necessary skills set to be entrepreneurial. As a partial response to a disruptive economy, the Malaysia Education Ministry produced a blueprint for Higher Education (2015-2025) where one of the key initiatives is to produce all-rounded and balanced entrepreneurial graduates. However, can this initiative be fully realised in universities and colleges when there is an ongoing debate on whether entrepreneurial skills can be taught (Drucker, 1985ab, Hills, 1988, Jensen, 2008, McClelland, 1999, Vesper and Gartner, 1997) and whether the teaching of such skills is more appropriate for a few individuals rather than embedded into the mainstream curriculum. Using a critical review of the literature, this paper aims to examine the nature and type of entrepreneurial learning which is most suitable for students while at university, providing insights for future research through the development of a theoretical model which examines the impact specifically of learner’s facilitators and business incubators on entrepreneurial education and development.*

Keywords: *Entrepreneurial Learning; Mentoring, Business Incubator, Enterprise Education*

Introduction

Since the early 18th century, the world has experienced four distinct industrial phases or revolutions. The first revolution was characterised by advancements in steam and water

powered machinery (Van Hooijdonk, 2017; Morgan, 2016), with the second industrial revolution synonymous with mass production and the development of electrical machinery (Van Hooijdonk, 2017; Fujimori, *et al.*, 2016; Morgan, 2016). Such revolutions arguably had a significant and radical impact on society, by contrast, the third industrial revolution was a relatively quiet revolution, seeing the increased application of electronics and computerisation characterised the third phase. What all three revolutions had in common was the disruption to the jobs market, with the third industrial revolution being subtler in its impact but nevertheless created job displacement, opportunities and unemployment. The third industrial revolution also set the tone for the fourth industrial revolution (4IR), with increased use and usage of the Internet and interconnectivity of digital platforms (Sharman, 2018).

The concept of the 4IR was first introduced by Klaus Schwab during the World Economic Forum (Peters, 2017), and is considered an era of digital disruption which covers how data is being managed through to how systems could be connected over cyber-networks (Marr, 2016; McCabe, 2016). During discussion of this revolution, the notion of Industry 4.0 or smart manufacturing emerged with automation and optimisation of the production line (MITI, 2018; Lasi, Fettke, Kemper, Feld, & Hoffmann, 2014). The Boston Consulting Group identified that Industry 4.0 would be characterised by more than the antecedents of the 4IR and would include the convergence and application of nine key pillars of technologies, namely: autonomous robots, big data analytics, internet of things (IoT), system integration, simulation, additive manufacturing (3D printing), cloud computing, augmented reality (AR) and cybersecurity (Sharman, 2018; MITI, 2018; Lasi, Fettke, Kemper, Feld, & Hoffmann, 2014). Industry 4.0 and the 4IR founded on such technologies will clearly lead to further job displacement. However, what makes the 4IR different from previous revolutions is the rate of change, all revolutions bring a degree of uncertainty (Morgan, 2016; Saurin, Ratcliffe and Puybaraud, 2008), but the rate of change in the 4IR could produce increased uncertainty and raise questions surrounding the future of the employment market, the skills required of graduates and the graduate skills gap.

Statement of the Problem

The 4IR has prompted discussion with regards its implications for business and employment. It is viewed as cautiously beneficial because of its potential to reduce time and costs associated to production and create opportunities for those seeking employment or changes in their career. However, there is a degree of concern about the talents and skills set readiness of future employees to adapt to such changes in the market and the possible unemployment for those who cannot adapt (Summers, 2014; MacCarthy, 2014). Arguably the 4IR could replace rather than displace the human workforce, with the job market seeing significant disruption as automation eventually substitutes labour across most industries (Schwab, 2016; Brynjolfsson & McAfee, 2014). Alternatively, there could be significant job creation in certain sectors, particularly in regard to technology and digitally based applications, surrounding the design, development and testing of these new initiatives (MacCarthy, 2014). There is also the potential for new product development and increased entrepreneurial activity as a result of increased use and application of technology, where there will be increased demand for a new and technological-driven skilled labour force. In the study of entrepreneurial intention of business graduates in Malaysia, Mamun (2017) also highlighted that promoting entrepreneurship is one of the ways to address the employability issue. Although there has been discussion of the latter topic in the literature, it has often been neglected in favour of debate around preparing graduates for careers in the new creative industries, with the need for curriculums to adapt to include design thinking and user experience for example (Knemeyer, 2015). This research will investigate the role that universities, business incubators and learner's facilitators play in

preparing graduates for the 4IR. The research will consolidate literature in the area of business start-ups and entrepreneurship and take research forward in the need to address the potential of increased entrepreneurial activity as a result of the 4IR and how prepared universities are to develop graduates and their entrepreneurial skills set.

Research Objectives

Using a critical review of the literature, the purpose of this paper is to develop a theoretical model attempting to meet the following research objectives:

- 1) To examine the nature and type of entrepreneurial learning which is most suitable for students while at university
- 2) To provide insights on the relationship between enterprise education, business incubation and entrepreneurial learning
- 3) To investigate the impact specifically of mentors and business incubators on entrepreneurial education and development

This study will contribute to the literature concerning higher education and business incubation by highlighting the importance of collaboration between business and educational stakeholders to equip students and prospective entrepreneurs. The focus of this paper is to provide insights for future research which examines the impact specifically of learner's facilitators and business incubators on entrepreneurial education and development. It is anticipated that through the testing of this model, it will further enhance the collaboration between education providers and business incubators in nurturing entrepreneurial learning. Furthermore, the theoretical model proposed in this paper could improve understanding of the importance of the mentor-mentee relationship, and the impact learner's facilitators play a role in both education and incubation settings.

Literature Review

Education Providers and Preparing the Graduates for Employment

Given the disruptions in the employment market brought about by the 4IR, the onus is on educational institutions to prepare and produce suitably qualified graduates who can not only adapt but thrive in a technologically centric job market which focuses on the task and not necessarily the specific job. Universities, colleges and even secondary schools need to engender skills into future graduates which are not easily replicated (National Center for O*NET Development for USDOL, 2017) which implies the need to embed both hard and soft employability skills into the various curriculum. The soft skills to which we refer are usually associated to, but not exclusively include, the antecedents of confidence, self-reflection, self-motivation and self-management (Beard, Schwieger and Surendran, 2007; Clarke, 2016; Jameson *et al.*, 2016; Rao, 2014; Rao, 2013; Sail and Alavi, 2010). The hard skills, by contrast are those which are more readily embedded, to varying degrees, across institutional curriculums, and include teamwork, project management, leadership, creative thinking and problem solving with communication considered to be both a hard and soft skill (Turner and Mulholland, 2017; Department for Business Innovation and Skills, 2015; Fiala, Gertler and Carney, 2014; Draycott and Rae, 2011; Jones and Iredale, 2010).

Embedding these hard and soft skills into the curriculum is the challenge facing all educational institutions in order that they skill, reskill and upskill human capital, ensuring graduates stay relevant to business (Zimmerman, 2018; Baygin, Yetis, Karakose, & Akin, 2016). How best to go about addressing this task is however the cause of much academic and practitioner debate. The common theme in the literature appears to be related to two specific stakeholders, the first,

industry, what does industry want from graduates and how can education engage with industry in order to deliver appropriate and relevant training to students. The second, teachers, and how to get 'buy in' from them to adopt a mindset which can enhance the student skills set, combining theory and practice with digital technologies courseware (Zimmerman, 2018). Addressing these two issues could better prepare students to be more job ready in terms of their skills set to work for an employer or themselves.

Changing the mindset of education providers is key to addressing the issue of preparing the graduates for the future employment market. Not only does there need to be a change in the subjects taught at universities, colleges and schools, there also need to be a radical change to the teaching approaches and how certain skills and tasks are perceived by students. In a job market where traditional opportunities, based around certain tasks are likely to decline, it is beholden on educational establishments to encourage students to embrace alternatives such as business start-ups (Jones and Iredale, 2014). However, educational establishments are apt to encourage students and pupils to pursue university enrolment as the main career path (Roth and Thum, 2010) and to work for someone else rather than for themselves (Wamba and Hikkerova, 2014; Edwards and Muir, 2012). Given the growing number of business start-ups and growth in enterprising activities (Anderson, 2015; Burn-Callander, 2014), perhaps this is not the best approach and therefore educational establishments should do more to encourage students and pupils to consider an entrepreneurial path. However, can entrepreneurship be taught within an educational environment? In order to be considered entrepreneurial, an individual need to be creative and innovative (Schumpeter, 2008), can such characteristics be taught? If we are to accept the proposition of Drucker (1985ab) and later by Vesper and Gartner (1997), entrepreneurship can be learned and therefore taught, with entrepreneurs able to be motivated (Jensen, 2008). However according to McClelland (1999), many individuals do not have the skills set and are not properly motivated to be entrepreneurial, underlined by the fact that there are more individuals working for others than themselves and therefore supports the argument that entrepreneurship can be difficult to teach (Hills, 1988), because it is problematic to educate students to be risk takers and creative.

We therefore have the scenario that there are potential opportunities for entrepreneurial graduates but there is debate over whether entrepreneurship can be taught and arguably there is a lack of suitable infrastructure in education providers to provide entrepreneurial education, only pockets of good practice. As a response to the 4IR, the Malaysia Education Ministry produced a blueprint for Higher Education (2015-2015) to revolutionise the way knowledge is propagated to learners. One of the initiatives was to produce holistic, entrepreneurial and balanced graduates (The StarOnline, 2018). The Ministry intends to implement measures to equip learners and teachers with entrepreneurial skills and support student-owned businesses through industry collaboration, business incubators and green lane policies (Ministry of Education Malaysia, 2016; Ganapathy, 2016). The extent to which universities are prepared to realise this ambition is however patchy, with perceptions of business incubators and start-ups support vary depending upon the institution, the entrepreneurial ecosystem in place and the engagement of the teacher and mentors.

Proposition 1. Education Providers Should Embed Both Hard and Soft Skills in Tertiary Education Curriculum in Order to Nurture Graduates to Be Entrepreneurial

Business Incubators Defined

The idea of business incubation has evolved over the years to encompass more than just a physical space, with many practitioners and researchers describing them as an 'organisation'

that assist and accelerate new ventures or entrepreneurs into growing their business (Carvalho & Galina, 2015; Ratinho, Harms, & Groen, 2013). Business Incubators (BIs) arguably go beyond providing office premises or infrastructures to include business support services such as coaching, professional services, and networking connections in exchange for a membership or monthly fees (Entrepreneur Media Inc., n.d.; InBIA, 2017; UKBI, 2016). Some BIs have a measurement of success with graduation policies over a typical period of 3 years or rolling basis, upon achieving the agreed milestones or growth metrics (InBIA, 2017).

BIs have been well-established in other countries but are relatively new in Malaysia, operating both privately or jointly with existing universities. They have been observed to incorporate the networked model (i.e. a model where internal networking is available among incubatees and an extension to external networks accessibility) to assist start-ups and businesses in leveraging on one another for business development (Bruneel, Ratinho, Clarysse, & Groen, 2012). This has contributed to opportunities for aspiring entrepreneurs to gain the necessary knowledge and skills prior to embarking on their new venture. This model is the latest in a relatively long line of initiatives which began with the real estate model which was arguably the first generation of BIs where physical spaces and relevant facilities were provided to aspiring entrepreneurs (Bruneel et al., 2012; McAdam & McAdam, 2008). This was followed by the second generation of BIs where business and technical services were offered as well as training and mentoring hubs (Scillitoe & Chakrabarti, 2010; Siegel, Wright, & Lockett, 2007). The current model, or third generation of BIs focuses on external professional networks and social networking development among tenant firms (Bennett, Yábar, & Saura, 2017; Bruneel et al., 2012; Redondo & Camarero, 2018; Scillitoe & Chakrabarti, 2010).

Because aspiring entrepreneurs are looking for the right opportunity to commercialise their idea/concept, BIs are meant to address any deficiencies with their idea and provide scaffolding to their business concept. The responsibilities of BIs should therefore not be limited to basic infrastructures or financial assistance, and rather extended to professional services, knowledge sharing and social networking capabilities in creating successful start-ups (Ebberts, 2014; Mas-Verdú et al., 2015; Zibarzani, Zaidi, & Rozan, 2018). To support such initiatives, some studies have highlighted relevant intellectual capital as measures to evaluate BIs, arguing the necessary presence of structural capital, human capital and relational capital (Calza et al., 2014; Indiran, Khalifah, & Ismail, 2017, Liu & Li, 2011). Having all three forms of capital would arguably address the needs of BIs by having both tangible and intangible components which new ventures are potentially looking for. The first form of capital, structural capital, in BIs comprises the way it is operated such as the BIs specialisation (e.g. technological or non-technological incubation) and the entry and graded policies of the incubation path (Calza et al., 2014). The second form of capital, human capital refers to coaching and training in the development of new start-ups or new businesses with the third form of capital, relational capital (also refers to social capital) touching on the networks received internally and externally among the incubatees (Redondo & Camarero, 2018; Bennett et al., 2017; Calza et al., 2014; Scillitoe & Chakrabarti, 2010; Siegel et al., 2007).

With all these intellectual capitals in place, the success rate of such incubation could lie in the effectiveness of these incubatees in integrating and leveraging those services within incubators (Calza, Dezi, Schiavone, & Simoni, 2014; Liu & Li, 2011). The measurement for incubatees' success in business incubation could be categorised into financial and non-financial perspectives. Traditionally, financial measures could range from sales turnover, probability and growth of the tenant firms or incubatees over the tenure of incubation (Harper-Anderson, Lewis, & Molnar, 2011; Voisey, Gornall, Jones, & Thomas, 2006). The non-financial or 'soft'

measures involve improvement in incubatees' business skills, professionalism, productivity, knowledge, broader business networks and publicity (Harper-Anderson et al., 2011; Scillitoe & Chakrabarti, 2010; Voisey et al., 2006) which links back to the earlier discussion of hard and soft skills which could be addressed by education providers.

Business Incubators and University Incubators

There are arguments in the literature around the type of services provided and the role of outbound business incubators and university incubators to their tenant firms (Kolympiris & Klein, 2017; Rubin, Aas, & Stead, 2015; Ratinho, Harms, & Groen, 2013; Culkin, 2013). The tenants or incubatees, are exposed to professional services, training, social networking in addition to the basic infrastructure (i.e. desk, computers or internet). All these extended services are subjected to the type of incubators they are tied to. Outbound BIs seem to be the one-stop solution in providing the resource support throughout the entrepreneurial journey, yet there is an argument that basic issues such as business planning, financial management and hiring were not fully resolved within the BI's support (Ratinho, Harms, & Groen, 2013). This scenario could fall into the jurisdiction of the BIs' operators competencies in managing it or the type of incubatees residing within BIs. Hence, managers of BIs play a significant role in the integration of the potential incubatees with the incubation paths within the BIs (Calza, Dezi, Schiavone, & Simoni, 2014; Redondo & Camarero, 2017). BIs must be supported by qualified managers and support staff and customise services according to incubatees' requirements as these are potential success predictors for BIs (Carvalho & Galina, 2015; Khalid, Gilbert, & Huq, 2014; Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno, 2015).

With the popularity of BIs, the emergence of university-led business incubation centres (UBICs) has become more prominent, converting academic research into commercialisation and contributing to innovation (Kolympiris & Klein, 2017). Having the idea to value-add to the education ecosystem, these university incubators compete with commercialised BIs in providing pre-entrepreneurial support to prospective entrepreneurial students and graduates. These UBICs could be the first contact in converting academic research into commercial innovations and provide similar services to BIs for example, broadband, computers, business advice and mentoring (Culkin, 2013; Kolympiris & Klein, 2017). Universities play an important role as the source of knowledge, while incubators complement universities in assisting incubatees to turn such knowledge into commercialisation (Rubin, Aas, & Stead, 2015). However, the social networking within UBICs must not be lacking, as this area still remains crucial for entrepreneurs to seek opportunities from industry actors (Culkin, 2013). Hence, UBICs must put more resources and focus into filling this gap as compared to outbound BIs who are arguably doing better in this area.

To further assess the effectiveness of BIs and UBICs, it is argued that hybrid managers within incubators (with both academic and commercial background), were considered better in fostering entrepreneurs compared to academic dominant managers or commercial dominant managers (Redondo & Camarero, 2017). The enabling factors for UBICs through the lens of Resource-Based View (RBV), has proven human capital resources (talented managers in particular) is becoming the most valued followed by financial, organisational and technological resources (Somsuk & Laosirihongthong, 2014; Somsuk, Wonglimpiyarat, & Laosirihongthong, 2012). Though this seems like a known fact, it is often overlooked as UBICs are normally hosted by academics while outbound BIs engage with industry practitioners. In short, it is still a challenge to strike a balance among UBICs and outbound BIs when it comes to hiring hybrid managers or being one.

It is also suggested the interaction between incubatees, graduated incubatees and incubator management are essential in technology and market knowledge transfer (Rubin et al., 2015). In order words, there is evidence to indicate that entrepreneurial learning could be enhanced under such collaboration. Previous studies on the intensity of business assistance and continuous monitoring by incubators have indeed shown a positive impact in producing high performance and profitable incubatees (Khalid, Gilbert, & Huq, 2014; Khalid, Jabar, Kayani, & Gilbert, 2017). With the advancement of technologies, BIs have been included as a contributor to economic development. This is because BIs reduce unemployment by helping new ventures creation and achieving business targets (Jamil et al., 2016). Similarly, such phenomenon is critical in promoting entrepreneurial learning and culture within BIs and can be related to an entrepreneurial ecosystem for students. The ecosystem is multifaceted which includes BIs as one of the components besides entrepreneurship courses, grants and accelerator programmes (Wright, Siegel, & Mustar, 2017). Hence, BIs or UBICs are indeed a crucial component within the entrepreneurial ecosystem in instilling entrepreneurial orientation and nurturing learners through professional programmes or training.

Proposition 2. Bis/Ubics Promotes Entrepreneurial Learning by Translating Knowledge into Practice to Increase the Survival Rate Among Tenant Firms

Learning Facilitators - Being Teachers, Mentors or Coaches

Entrepreneurialism and entrepreneurship are arguably a subset of being enterprising. As alluded to earlier, there is debate as to whether entrepreneurship can be taught, but enterprise education is a more accepted vehicle for learning with classroom study combined with practical role-playing capable of transforming students into enterprising entrepreneurs (Zatyka, 2013). However, research has revealed that simply embedding enterprise-led real-life business challenges and business engagement, although capable of developing hard skills, soft skills, project management, communication and confidence, does not necessarily make students entrepreneurial (Turner & Mulholland, 2017). The reasons for this are because they are integrated into the modules and assessments of academic programmes and not necessarily perceived as a distinct entrepreneurial programme or activity. A further reason is that staff may not embrace business-led and entrepreneurial activities.

Entrepreneurship learning has been linked to adult learning theories (Rajasinghe & Mansour, 2018). The school of thoughts argue that the traditional content model is targeted at students learning theoretical knowledge while the process model is more suitable for entrepreneurship learning (Garvey, R., 2011 and Knowles et al., 2015 as cited in Rajasinghe and Mansour, 2018). In this model, each learner is given steps to achieve their end goal by acquiring the skills set and knowledge. This idea has contributed to the emergence of coaching or mentoring in entrepreneurial process. However, there is no common definition or job scope for being a coach or a mentor despite these individuals playing an important role in passing real world knowledge and experience, with the use of their expertise in achieving learners' goals (Newman, 2015).

There are various types of learning facilitators when it comes to nurturing entrepreneurial learning. These facilitators could be a teacher, mentor or coach to the learners because they have a common role in developing students or mentees to achieve their respective goals. A teacher will help their students to learn through cognitive skills and develop personal capabilities (Brefi Group, 2018). In the context of entrepreneurial learning, teachers could act as 'coaches' in developing conceptual understanding of their respective students through various teaching methods (Bechard & Gregoire, 2005, Wahid, Ibrahim, & Hashim, 2017). In higher education, lecturers or teachers play a role in delivering knowledge through the supply

teaching model. The model emphasises content delivery from one person to multiple learners (Aluthgama-Baduge & Mulholland, 2018). This mode of delivery is categorised as education ‘to’ entrepreneurship and it could be argued that this does not necessarily make the learners become entrepreneurial. Taking an example of writing a business plan, this mode of delivery could help in providing a holistic view on what to cover in the writing skills of the plan but not the experience of starting a new business (Gibb, 2007; Mulholland & Turner, 2018).

As coaches, they assist in guiding the individual to achieve certain needs or goals, while providing non-judgmental feedback to improve an individual’s performance (Brefi Group, 2018; Business Dictionary, 2018a). In relation to entrepreneurship, engaging with an experienced coach would be beneficial to create insights and effective entrepreneurial development (UCL Human Resources, n.d.). In contrast, mentoring is sometimes described as a long-term relationship when compared to coaching, helping to shape the individual values and beliefs (Brefi Group, 2018). In addition to that, a mentor would be a senior or more experienced person being assigned to support and guide a mentee in either career or skills development (Business Dictionary, 2018b; UCL Human Resources, n.d.). Both mentoring and coaching might seem to be slightly different however their objective is still the provision of guidance and assistance to the mentees into accomplishing an end goal and hence the interchangeable nature of the terms mentor and coach.

These coaches and mentors participate in a relationship that supports creativity, provide feedback and motivate learners towards a common goal. This relationship supports entrepreneurial learning as it promotes interaction between industry coaches or mentors and learners via contextual learning (Rae, 2005). Coaching is a one-to-one hybrid teaching model (the demand-competence model) which comprises what the learners wish to learn and the interaction between both parties in co-creating knowledge (Bechard & Gregoire, 2005; Rajasinghe & Mansour, 2018). It could involve a practical experience sharing and putting that into practice. In order to be successful, it has to be a joint-effort process to accomplish the learners’ objectives through this personalised guidance (Rajasinghe & Mansour, 2018). Through coaching services, learners’ management skills can improve and assist those learners to apply the knowledge and skills into practice (Somsuk & Laosirihongthong, 2014). However, it is not without its difficulties as if the matching process is not correct, or the enthusiasm of either party is inhibited in any way through the process, the capacity for learning is somewhat diminished.

In different phases of the entrepreneurial journey, continuous learning is important for organisational growth. Previous studies have provided evidence that mentoring programmes could give new ventures the necessary guidance in the early stage of entrepreneurship (Gimmon, 2014; Sullivan, 2000). Research also discovered that enrolment in such a programme has provided considerable improvement in entrepreneurs’ self-efficacy. The role of the mentor is beneficial at various stages of the mentoring relationship starting from idea initiation through to the development of the intended products or services (Memon, Rozan, Ismail, Uddin, & Daud, 2015). This is further supported by other research indicating the legitimacy of the mentoring relationship at identifying opportunities and business continuity (McKevitt & Marshall, 2015) consistently, not at any one particular stage of the journey.

Reciprocal Relationships

But it is not just the role of the mentor, as part of the reciprocal relationship, the learning goal orientation (LGO) of the mentee plays an important part on how the mentee perceives the mentoring outcome. The mentee could be anticipating either reassurance motivation, guidance

motivation or stimulated motivation (St-Jean, Radu-Lefebvre, & Mathieu, 2018) and therefore it is important to manage expectations with the mentor/mentee matching process required to be constantly monitored and reviewed to meet the objectives and effectiveness of the relationship. The collaboration with the mentors has significantly contributed to better practical learning and entrepreneurs do agree that the importance of access to appropriate mentors will be beneficial for entrepreneurial success (Overall & Wise, 2016). Entrepreneurial learning could be further enhanced when emphasis is placed upon the mentor-protege matching process (McKevitt & Marshall, 2015; Sullivan, 2000). It is like a jigsaw puzzle where matching the right candidates with suitable mentors can intensify the progress of the programme.

The learning not only has to be appropriate, it has to be authentic in order to close the gap among these entrepreneurs from education ‘to’ entrepreneurship to putting entrepreneurship into practice (Miles et al., 2017). Authentic learning is learning through experienced entrepreneurs, coaching and mentoring (Herrington, 2000). This coaching and mentorship model are commonly embedded within the accelerators learning programmes to assist start-ups in developing entrepreneurial competencies and are typically three to four months long. As part of the business development process, such programme covers a selection of nascent entrepreneurs, seed funding, mentors and coaches assignment (Miles et al., 2017). With a structured programme that comprises proper guidance and goal-setting by coaches and mentors, it will value-add and enhance the effectiveness of entrepreneurial learning.

Proposition 3. Entrepreneurial Learning Is Significantly Enhanced with The Help of An Appropriately Matched and Authentic Coaching and Mentoring Programme

Theoretical Model for Future Studies

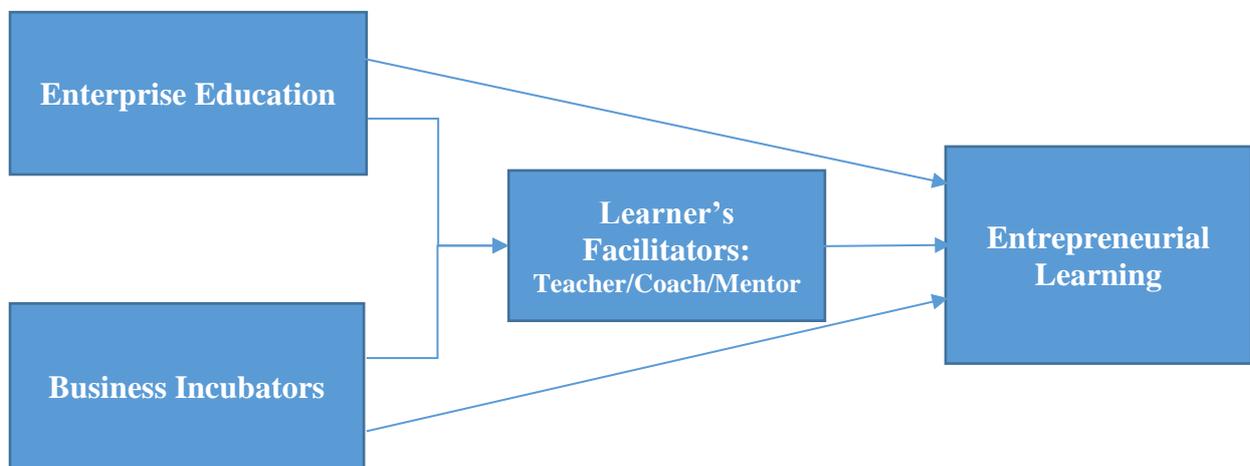


Figure 1: Facilitated Model for Entrepreneurial Learning

Derived from the themes to emerge from the literature, the proposed entrepreneurial learning model in Figure 1 provides a theoretical framework in an area where there is an identified gap in the literature, focusing on enterprise education, BIs, UBICs and the role of experts’ facilitation (including teachers, mentors or coaches). As the framework looks in to the intrinsic and extrinsic values of entrepreneurial learning, this should address some of the gaps in the literature on the role of universities in presenting a credible alternative to students who do not wish to work for someone else and in assessing the performance of a typical graduate entrepreneur over the period of incubation (Culkin, 2013).

First, there is an opportunity to view entrepreneurial learning from two sources of knowledge transfer. Universities being the primary source of knowledge is developed from the syllabus which include enterprise education to instill entrepreneurial orientation. The required knowledge embedded within the syllabus provides a foundation for learners to understand the entrepreneurial journey. This is the start of entrepreneurial learning.

Second, the teachers (or lecturers) play an important role as an academic mentor or coach to guide learners into the world of entrepreneurship. Though most of the delivery mode is content based, one must not forget that writing a business plan and working in business projects - involves participation and guidance from the teachers and lecturers. These learners gain positive insights into business activities through the feedback from these academics. This is also an important component of the model as the facilitation provided over the incubation period in universities arguably has positive influence on entrepreneurial learning.

Third, another source of knowledge could be developed from BIs themselves. In most reviews of the subject, BIs have evolved over the years from a real-estate model to a business network model. Under such circumstances, business graduates could receive more value-added benefits and real-life experiences for being an incubatee. The question on how it contributes to entrepreneurial learning, could be answered through collaborative learning within the co-working environment among other incubatees. Interaction through internal and external networks are arguably an essential part of entrepreneurial learning.

Fourth, research is needed to investigate the relationship between entrepreneurial learning and business incubation through the facilitation programmes such as mentoring or coaching. Being a member of the business incubation does not necessary lead them to their business goal. However, the argument is that business objectives could be enhanced through the guidance and assistance from the experienced mentors or coaches. This will fit well into the model where coaching or mentoring has a direct impact on the process of entrepreneurial learning.

Lastly, the model summarises the importance of both education providers and BIs in transferring the relevant knowledge 'to' and 'for' entrepreneurship to the learners. There are potentially new insights and useful managerial implications emerging under this area of research. It will lead us to answer some important questions like (1) 'does entrepreneurial development go beyond the remit of universities?', (2) 'is starting up a business and preparation to do business better to be a joint-effort between universities and incubators?', (3) 'does incubation work better after learners are equipped with the knowledge of entrepreneurship?', and (4) 'are facilitators a necessity in both UBICs and BIs to promote learning and building an entrepreneurial skill set?'

Conclusion

The scope of this research covered both public and private universities with particular emphasis on those universities who have access to internal business incubators, with the suggested theoretical framework helpful to all education providers in Malaysia. The paper has theoretically revealed a more generic role of education providers and BIs in preparing learners for entrepreneurship. It has highlighted 3 key areas in BIs that will affect the journey of entrepreneurial learning, namely the structural capital (the operational part), human capital (expertise and managers) and social capital (business networks) and revealed the importance of mentors or coaches in fostering entrepreneurial learning. The insights gained through the critical review of the various literature has suggested a facilitated model for entrepreneurial

learning that will continue the discussion into how pupils and students could become entrepreneurial and take advantage of a disruptive economy. To not only consolidate existing literature in the area but to take research forward, it is proposed to test the theoretical framework both quantitatively and/or qualitatively to gain greater insights into the relationship between university incubators and academic entrepreneurs (Kolympiris & Klein, 2017). Furthermore, the proposed framework may give opportunities to enhance the study by Bisk (2002) for hypothesis development in differentiating mentoring or coaching programmes between nascent entrepreneurs and those who are already in business for a short while, as part of the assessment of needs and expectations on the guidance required. The proposed theoretical framework and respective propositions could be further studied in different contexts including public and private academic institutions, business co-working communities or business incubators to address the education and entrepreneurship studies research gaps.

References

- Aluthgama-Baduge, C. J., & Mulholland, G. (2018). Are the dominant teaching theories in higher education adequate to underpin teaching practices in enterprise and entrepreneurship context? In J. J. Turner & G. Mulholland (Eds.), *Enterprise Education in UK Higher Education: Challenges for Theory and Practice*. London: Routledge.
- Anderson, E. (2015), “Britain hits record number of start-ups as more aspiring entrepreneurs take the plunge”, [online]. *The Telegraph*, Available from: www.telegraph.co.uk/finance/businessclub/11692123/Britain-hits-record-number-of-startups-as-more-aspiring-entrepreneurs-take-the-plunge.html [Accessed 1 September 2016].
- Baygin, M., Yetis, H., Karakose, M., & Akin, E. (2016). An effect analysis of industry 4.0 to higher education. In *2016 15th International Conference on Information Technology Based Higher Education and Training (ITHET)*. <https://doi.org/10.1109/ITHET.2016.7760744>
- Beard, D., Schwieger, D. and Surendran, K. (2007). Incorporating soft skills into accounting and MIS curricula. In *Proceedings of the 2007 ACM SIGMIS CPR conference on 2007 computer personnel doctoral consortium and research conference: The global information technology workforce*. ACM: 179-185.
- Bennett, D., Yábar, D. P.-B., & Saura, J. R. (2017). University Incubators May Be Socially Valuable, but How Effective Are They? A Case Study on Business Incubators at Universities. In M. Peris-Ortiz, J. A. Gómez, J. M. Merigó-Lindahl, & C. Rueda-Armengot (Eds.), *Entrepreneurial Universities Exploring the Academic and Innovative Dimensions of Entrepreneurship in Higher Education* (Vol. 32, pp. 165–177). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-47949-1_11
- Bechard, J., & Gregoire, D. (2005). Understanding Teaching Models in Entrepreneurship for Higher Education. *The Dynamics of Learning Entrepreneurship in a Cross-Cultural University Context*, *Entrepreneurship Education*, (2), 104–134. Retrieved from http://expertise.hec.ca/chaire_entrepreneuriat/wp-content/uploads/2005-19-utmentrepreneurship.pdf
- Bisk, L. (2002). Formal entrepreneurial mentoring: the efficacy of third-party managed programs. *Career Development International*, 7(5), 262–270. <https://doi.org/10.1108/13620430210440082>
- Brefi Group. (2018). Coaching and mentoring – the difference. Retrieved August 10, 2018, from https://www.brefigroup.co.uk/coaching_and_mentoring.html
- 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*.
<https://doi.org/10.1016/j.technovation.2011.11.003>
- Brynjolfsson, E. and McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company, New York.
- Burn-Callander, R. (2014), “More young entrepreneurs launch start-ups in wake of recession”, [online]. *The Telegraph*, Available from: www.telegraph.co.uk/finance/yourbusiness/11133048/More-young-entrepreneurs-launch-start-ups-in-wake-of-recession.html [Accessed 1 September 2016].
- Business Dictionary. (2018a). Coaching. Retrieved August 10, 2018, from <http://www.businessdictionary.com/definition/mentoring.html>
- Business Dictionary. (2018b). Mentoring. Retrieved August 10, 2018, from <http://www.businessdictionary.com/definition/coaching.html>
- Calza, F., Dezi, L., Schiavone, F., & Simoni, M. (2014). The intellectual capital of business incubators. *Journal of Intellectual Capital*, 15(4), 597–610. <https://doi.org/10.1108/JIC-07-2014-0086>
- Carvalho, L. M. C., & Galina, S. V. (2015). The role of business incubators for start-ups development in Brazil and Portugal. *World Journal of Entrepreneurship, Management and Sustainable Development*, 11(4), 256–267. <https://doi.org/10.1108/WJEMSD-05-2015-0023>
- Clarke, M. (2016). Addressing the soft skills crisis. *Strategic HR Review*. 15(3): 137-139.
- 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. <https://doi.org/10.1108/JSBED-05-2013-0072>
- Department for Business Innovation and Skills (2015), “Entrepreneurship skills: literature and policy review”, [online]. *BIS Research Paper*, No.236, pp.1-50.
- Draycott, M. C. and Rae, D. (2011), “Enterprise education in schools and the role of competency frameworks”, *International Journal of Entrepreneurial Behaviour & Research*, Vol.17 No.2, pp.127-145.
- Drucker, P.F. (1985a), “The Practice of Innovation”, *Innovation and Entrepreneurship Practice and Principles*, Harper & Row, New York.
- Drucker, P.F. (1985b), “Entrepreneurial Strategies”, *Innovation and Entrepreneurship Practice and Principles*, Harper & Row, New York.
- Ebbers, J. J. (2014). Networking Behavior and Contracting Relationships Among Entrepreneurs in Business Incubators. *Entrepreneurship Theory and Practice*, 38(5), 1159–1181. <https://doi.org/10.1111/etap.12032>
- Edwards, L.J. and Muir, E.J. (2012), “Evaluating enterprise education: why do it?” *Education + Training*, Vol.54 No.4, pp.278-290.
- Entrepreneur Media Inc. (n.d.). Business Incubator. Retrieved August 9, 2018, from <https://www.entrepreneur.com/encyclopedia/business-incubator>
- Fiala, N., Gertler, P. and Carney, D. (2014), “The role of hard and soft skills in entrepreneurial success: Experimental evidence from Uganda”, *AEA RCT Registry*, November 07.
- Fujimori, Y., Brynjolfsson, E., Pissarides, C., George, D., and Poulsen, T. L. (2016). *A World Without Work?* (H. Kuniya, Intervieweur) World Economic Forum Meeting.
- Ganapathy, M. (2016). Transformation of Malaysia’s Higher Education System: Malaysia Education Blueprint (2015-2025). Retrieved July 15, 2018, from <http://eprints.usm.my/34170/1/004.pdf>
- Gibb, A. (2007). Enterprise in Education. Educating Tomorrow’s Entrepreneurs. *Pentti Mankinen*.

- Gimmon, E. (2014). Mentoring as a practical training in higher education of entrepreneurship. *Education + Training*, 56(8/9), 814–825. <https://doi.org/10.1108/ET-02-2014-0006>
- Harper-Anderson, E., Lewis, D. a., & Molnar, L. a. (2011). Incubating Success. Incubation Best Practices That Lead to Successful New Ventures. US Department of Commerce Economic Development Administration. <https://doi.org/10.13140/RG.2.1.2732.6881>
- Herrington, J. (2000). An Instructional Design Framework for Authentic Learning Environments. *Educational Technology Research and Development*, 48(3), 23–48. <https://doi.org/10.1007/BF02319856>
- Hills, G.E. (1988), “Variations in university entrepreneurship education: an empirical study of an evolving field”, *Journal of Business Venturing*, Vol.3 No.1, pp.109-122.
- InBIA. (2017). Operational Definitions: Entrepreneurship Centers (Incubators, Accelerators, Coworking Spaces and Other Entrepreneurial Support Organizations). Retrieved August 9, 2018, from https://inbia.org/wp-content/uploads/2016/09/Terms_4.pdf?x62369
- Indiran, L., Khalifah, Z., & Ismail, K. (2017). A model for intellectual capital of business incubators. *Advanced Science Letters*, 23(9), 8450–8457. <https://doi.org/10.1166/asl.2017.9909>
- Jameson, A., Carthy, A., McGuinness, C. and McSweeney, F. (2016). Emotional intelligence and graduates – employer’s perspectives. *Procedia – Social and Behavioural Sciences*, 228: 515-522.
- Jamil, F., Ismail, K., Siddique, M., Khan, M. M., Kazi, A. G., & Qureshi, M. I. (2016). Business incubators in Asian developing countries. *International Review of Management and Marketing*, 6(4), 291–295. Retrieved from <http://www.econjournals.com/index.php/irmm/article/view/2501%5Cnhttps://www.scopus.com/inward/record.uri?eid=2-s2.0-84970027707&partnerID=40&md5=a904b3fa81db30b067742e8da83d9f72>
- Jensen, E. (2008), *Brain-based learning: The new paradigm of teaching*. 2nd ed, Corwin Press, Thousand Oaks, California.
- Jones, B. and Iredale, N. (2014), “Enterprise and entrepreneurship education: towards a comparative analysis”, *Journal of Enterprising Communities: People and Places in the Global Economy*, Vol.8 No.1, pp. 34-50.
- Jones, B. and Iredale, N. (2010), “Enterprise education as pedagogy”, *Education + Training*, Vol.52 No.1, pp.7-19.
- 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*. <https://doi.org/Retrieved from Business Source Complete database>.
- Khalid, F. A., Jabar, J., Kayani, A. A., & Gilbert, D. (2017). Business Incubation Performance in the Malaysian ICT Sector. *Advances in Social Sciences Research Journal*, 4(17), 1–14. <https://doi.org/10.14738/assrj.417.3540>
- Knemeyer, D. (2015). ‘Design thinking and UX: Two sides of the same coin’. [online]. *Interactions*. Available from: <http://interactions.acm.org/archive/view/september-october-2015/design-thinking-and-ux> [Accessed 9 November 2017].
- Kolympiris, C., & Klein, P. G. (2017). The Effects of Academic Incubators on University Innovation. *Strategic Entrepreneurship Journal*, 11(2), 145–170. <https://doi.org/10.1002/sej.1242>
- Lasi, H., Fettke, P., Kemper, H. G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business and Information Systems Engineering*, 6(4), 239–242. <https://doi.org/10.1007/s12599-014-0334-4>
- Liu, H., & Li, L. (2011). Effects of business incubator’s intellectual capital on incubatees’ growth: The mediating role of knowledge transfer. In *Proceedings - 2011 4th*

- International Conference on Information Management, Innovation Management and Industrial Engineering, ICIII 2011*. <https://doi.org/10.1109/ICIII.2011.393>
- MacCarthy, M. (2014). Time to kill the tech job-killing myth. Retrieved July 15, 2018, from <http://thehill.com/blogs/congress-blog/technology/219224-time-to-kill-the-tech-job-killing-myth>
- Mamun, A. Al, Nawi, N. B. C., Mohiuddin, M., Shamsudin, S. F. F. B., & Fazal, S. A. (2017). Entrepreneurial intention and startup preparation: A study among business students in Malaysia. *Journal of Education for Business*, 92(6), 296–314. <https://doi.org/10.1080/08832323.2017.1365682>
- Mas-Verdú, F., Ribeiro-Soriano, D., & Roig-Tierno, N. (2015). Firm survival: The role of incubators and business characteristics. *Journal of Business Research*, 68(4), 793–796. <https://doi.org/10.1016/j.jbusres.2014.11.030>
- McAdam, M., & 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*. <https://doi.org/10.1016/j.technovation.2007.07.012>
- McCabe, B. (2016). Short history of the fourth industrial revolution. Retrieved April 15, 2018, from <https://www.linkedin.com/pulse/short-history-fourth-industrial-revolution-bill-mccabe>
- McClelland, D. (1999), *The achieving society*. The Free Press, New York.
- McKevitt, D., & Marshall, D. (2015). The legitimacy of entrepreneurial mentoring. *International Journal of Entrepreneurial Behavior & Research*, 21(2), 263–280. <https://doi.org/10.1108/IJEBr-05-2014-0089>
- Memon, J., Rozan, M. Z. A., Ismail, K., Uddin, M., & Daud, D. (2015). Mentoring an Entrepreneur. *SAGE Open*, 5(1), 1–10. <https://doi.org/10.1177/2158244015569666>
- Miles, M. P., de Vries, H., Harrison, G., Bliemel, M., de Klerk, S., & Kasouf, C. J. (2017). Accelerators as authentic training experiences for nascent entrepreneurs. *Education and Training*, 59(7–8), 811–824. <https://doi.org/10.1108/ET-01-2017-0007>
- Ministry of Education Malaysia. (2016). Executive Summary: Malaysia Blueprint 2015 - 2025 (Higher Education). Retrieved July 15, 2018, from <http://mohe.gov.my/muat-turun/awam/penerbitan/pppm-2015-2025-pt/6-executive-summary-pppm-2015-2025>
- MITI. (2018). Industry 4.0. Retrieved July 15, 2018, from <http://www.miti.gov.my/index.php/pages/view/industry4.0?mid=559>
- Morgan, J. (2016). 'What is the fourth industrial revolution?'. [online]. *Forbes*. Available from: <https://www.forbes.com/sites/jacobmorgan/2016/02/19/what-is-the-4th-industrial-revolution/#6ca9a599f392> [Accessed 8 November 2017].
- Mulholland, G., & Turner, J. J. (2018). Enterprise education in the 21st century. In J. J. Turner & G. Mulholland (Eds.), *Enterprise Education in UK Higher Education: Challenges for Theory and Practice*. London: Routledge.
- National Center for O*NET Development for USDOL. (2017). *The O*NET Content Model*. [online]. *O*NET Resource Centre*. Available from <https://www.onetcenter.org/content.html> [Accessed 8 November 2017].
- Newman, J. a. (2015). An Integrated Coaching Model for the Student and Graduate Entrepreneurial Learning Environment. *Journal of Pedagogy Research*, 6.
- Overall, J., & Wise, S. (2016). The Antecedents of Entrepreneurial Success: A Mixed Methods Approach. *Journal of Enterprising Culture*, 24(3), 209–241. <https://doi.org/10.1142/S0218495816500096>
- Peters, M. A. (2017). Technological unemployment: Educating for the fourth industrial revolution. *Educational Philosophy and Theory*. <https://doi.org/10.1080/00131857.2016.1177412>

- Rae, D. (2005). Entrepreneurial learning: A narrative-based conceptual model. *Journal of Small Business and Enterprise Development*, 12(3), 323–335. <https://doi.org/10.1108/14626000510612259>
- Rao, M.S. (2014). Enhancing employability in engineering and management students through soft skills. *Industrial and Commercial Training*. 46(1): 42-48.
- Rao, M.S. (2013). Blend hard and soft skills to fast-track a management career. *Human Resource Management International Digest*. 21(7): 3-4.
- Rajasinghe, D., & Mansour, H. (2018). Coaching as an Entrepreneurship Learning and Development Tool. In J. J. Turner & G. Mulholland (Eds.), *Enterprise Education in UK Higher Education: Challenges for Theory and Practice*. London: Routledge.
- Ratinho, T., Harms, R., & Groen, A. (2013). *Business Incubators: (How) Do They Help Their Tenants? New Technology-Based Firms in the New Millennium* (Vol. 10). Emerald Group Publishing Limited. [https://doi.org/10.1108/S1876-0228\(2013\)0000010011](https://doi.org/10.1108/S1876-0228(2013)0000010011)
- 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. <https://doi.org/10.1108/JBIM-01-2016-0018>
- Redondo, M., & Camarero, C. (2018). Social Capital in University Business Incubators: dimensions, antecedents and outcomes. *International Entrepreneurship and Management Journal*, 1–26. <https://doi.org/10.1007/s11365-018-0494-7>
- Roth, F. and Thum, A-E. (2010), “The key role of Education in the Europe 2020 Strategy”, *CEPS Working Document*, No. 338/October 2010, pp.1-16.
- Rubin, T. H., Aas, T. H., & Stead, A. (2015). Knowledge flow in Technological Business Incubators: Evidence from Australia and Israel. *Technovation*, 41, 11–24. <https://doi.org/10.1016/j.technovation.2015.03.002>
- Saurin, R., Ratcliffe, J., & Puybaraud, M. (2008). Tomorrow's workplace: A futures approach using prospective through scenarios. *Journal of Corporate Real Estate*. <https://doi.org/10.1108/14630010810925118>
- Sail, R.M. and Alavi, K. (2010). Social skills and social values training for future k-workers. *Journal of European Industrial Training*. 34(3): 226-258.
- Schumpeter, J.A. (2008), *Capitalism, Socialism and Democracy*. 3rd ed. Harper Perennial Modern Classics, London.
- Schwab, K. (2016). The Fourth Industrial Revolution: what it means, how to respond. Retrieved June 15, 2018, from <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond>
- Scillitoe, J. L., & Chakrabarti, A. K. (2010). The role of incubator interactions in assisting new ventures. *Technovation*. <https://doi.org/10.1016/j.technovation.2009.12.002>
- Sharman, J. (2018). Four phases of industrial revolution: Phase four. Retrieved April 15, 2018, from <https://www.thenbs.com/knowledge/four-phases-of-industrial-revolution-phase-four>
- Siegel, D. S., Wright, M., & Lockett, A. (2007). The rise of entrepreneurial activity at universities: Organizational and societal implication. *Industrial and Corporate Change*. <https://doi.org/10.1093/icc/dtm015>
- Somsuk, N., & Laosirihongthong, 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. <https://doi.org/10.1016/j.techfore.2013.08.007>
- Somsuk, N., Wonglimpiyarat, J., & Laosirihongthong, T. (2012). Technology business incubators and industrial development: resource-based view. *Industrial Management & Data Systems*, 112(2), 245–267. <https://doi.org/10.1108/02635571211204281>

- St-Jean, E., Radu-Lefebvre, M., & Mathieu, C. (2018). Can less be more? Mentoring functions, learning goal orientation, and novice entrepreneurs' self-efficacy. *International Journal of Entrepreneurial Behavior & Research*, 24(1), 2–21. <https://doi.org/10.1108/IJEBR-09-2016-0299>
- Summers, L. H. (2014). Lawrence H. Summers on the Economic Challenge of the Future: Jobs. Retrieved July 15, 2018, from <https://www.wsj.com/articles/lawrence-h-summers-on-the-economic-challenge-of-the-future-jobs-1404762501>
- Sullivan, R. (2000). Entrepreneurial learning and mentoring. *International Journal of Entrepreneurial Behavior & Research*, 6(3), 160–175. <https://doi.org/10.1108/13552550010346587>
- The StarOnline. (2018). Redesigning Malaysia's Higher Education System. Retrieved July 15, 2018, from <https://www.thestar.com.my/news/education/2018/05/06/redesigning-malysias-higher-education-system/>
- Turner, J. J., & Mulholland, G. (2017). Enterprise education: Towards a framework for engaging with tomorrow's entrepreneurs. *Journal of Management Development*, 36(6), 801–816.
- UCL Human Resources. (n.d.). Coaching. Retrieved August 10, 2018, from <http://www.ucl.ac.uk/hr/od/coaching/differences.php>
- UKBI. (2016). Business to Business Training. Retrieved August 9, 2018, from <http://www.ukbi.co.uk/b2b-training>
- Van Hooijdonk, R. (2017). 'The 4th industrial revolution: "A fusion of our physical, digital and biological worlds"'. [online]. *Richard Van Hooijdonk blog*. Available from: <https://www.richardvanhooijdonk.com/en/4th-industrial-revolution-fusion-physical-digital-biological-worlds/> [Accessed 8 November 2017].
- Vesper, K.H. and Gartner, W.B. (1997), "Measuring progress in entrepreneurship education". *Journal of Business Venturing*, May, pp.403-421.
- Voisey, P., Gornall, L., Jones, P., & Thomas, B. (2006). The measurement of success in a business incubation project. *Journal of Small Business and Enterprise Development*. <https://doi.org/10.1108/14626000610680307>
- Wahid, A., Ibrahim, A., & Hashim, N. B. (2017). The Review Of Teaching And Learning On Entrepreneurship Education In Institution Of Higher Learning. *Journal of Technical and Vocational Education.*, 1(2), 82–88. Retrieved from <http://upikpolimas.edu.my/ojs/index.php/JTVE/article/view/64>
- Wamba, L.D. and Hikkerova, L. (2014), "L'entrepreneur: un input non négligeable pour la pérennité de son entreprise", *Gestion 2000*, Vol. 31 No. 4, pp.111-131.
- Wright, M., Siegel, D. S., & Mustar, P. (2017). An emerging ecosystem for student start-ups. *Journal of Technology Transfer*, 42(4), 909–922. <https://doi.org/10.1007/s10961-017-9558-z>
- Zatyka, M. (2013). Entrepreneurship versus Enterprise. Retrieved February 12, 2018, from <https://youngfoundation.org/uncategorized/entrepreneurship-versus-enterprise/>
- Zibarzani, M., Zaidi, M., & Rozan, A. (2018). *The Role of Knowledge Sharing in Business Incubators Performance*. (F. Saeed, N. Gazem, S. Patnaik, A. S. Saed Balaid, & F. Mohammed, Eds.) (Vol. 5). Cham: Springer International Publishing. <https://doi.org/10.1007/978-3-319-59427-9>
- Zimmerman, H. (2018). In the fourth industrial revolution we need an education overhaul. Retrieved July 15, 2018, from <https://www.theaustralian.com.au/higher-education/opinion/in-the-fourth-industrial-revolution-we-need-an-education-overhaul/news-story/6a7705967731f3413d6bb52c0872e8fa>