

Academic Entrepreneurial Intentions and the Creation of University Spin-Off Firms: Critical Review

Wilberforce Senelwa¹

Assistant Lecturer, School of Entrepreneurship, Procurement and Management, Jomo Kenyatta University of Agriculture and Technology, P.O BOX 62000-00200, Nairobi, Kenya

Elegwa Mukulu

Associate Professor, School of Entrepreneurship, Procurement and Management, Jomo Kenyatta University of Agriculture and Technology, P.O BOX 62000-00200, Nairobi, Kenya

John Kihoro

Director, Directorate of Computing and eLearning, Cooperative University, College of Kenya (CUCK), P.O BOX 24814-00502, Karen, Nairobi, Kenya

Abstract

This paper examines the extent to which academic entrepreneurial intentions influences the creation of University Spin-offs firms from various significant viewpoints. Commercialization and technology transfer of innovations from universities and other research institutions is progressively considered by scholars and policymakers as the key ingredient in the developing and sustaining regional economic growth. It is always argued that; for effective conversion of research findings into new business venture, a close collaboration of the government – university – industry must be active, the connection of individual academic and prevailing university environment forms the requisite solid foundation of academic entrepreneurship. This is resolutely determined by the entrepreneurial intentions of the researcher towards commercializing the final findings to meet a crucial market need on one hand or through a creation of a spin-off firm on the other hand. Finally, this article develops a conceptual framework that explains the relationship between academic entrepreneurial intentions, university context and creation of university spin-offs firms.

¹ Corresponding author's email address: wsenelwa@jkuta.ac.ke

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Introduction

Entrepreneurship plays a vital role for new venture creation; existing venture expansion, social, technological and economic development of the country (Lumpkin & Dess, 1996). To this end, many countries and universities have undertaken reforms to increase the extent of commercialization of research, both by changes in the academic system and instruments for research funding (Benner and Sandstrom, 2000; Slaughter and Leslie, 1997), and by setting up structures to support such activities (Guston, 1999; Hellström and Jacob, 2003; Mian, 1997). But entrepreneurship is a process integrating opportunity, resources and people/the entrepreneurs (Timmons & Spinelli, 1999). Opportunity identification is the very first step in entrepreneurship and this process is clearly an intentional process.

It is now widely acknowledged that venture creation is an outcome of intentions and entrepreneurship is a planned behaviour (Bird, 1988; Katz & Gartner, 1988). Since, intention is a state of mind that focuses the academic's attention, experiences and behavior etc towards a goal or path then, academic's entrepreneurial intention can be seen as an accurate predictor of planned behavior towards starting a new business (Fishbein & Ajzen, 1975).

Entrepreneurial intention models emphasize the convergence of individual attitudes and situational factors to influence intentions which leads to new venture creation (Boyd & Vozikis, 1994). Therefore, this review aims to shed light on the determinants of academic entrepreneurial intentions on the creation of spin-off firms.

Background of the Study

The spin-off firms in Kenya are a product of interaction between three main actors: university, industry and government. This is proposed in the Triple Helix model developed by (Etzkowitz & Leydesdorff, 1997). In the model, universities focus on establishing institutional interface structures including industry liaison/technology transfer offices, business and technology incubators, science and industrial parks and fostering entrepreneurialism through various policies and incentives (Etzkowitz, 2008; Kalar & Antoncic, 2015).

According to Science, Technology and Innovation Policy and Strategy report (2010) Science, Technology and Innovation (ST&I) are the foundations for socio-economic transformation in the Kenya Vision 2030. It is at the core of enabling creation of new knowledge which plays a central role in wealth creation, social welfare and international competitiveness. At the economic front, STI is touted to play a critical role in ensuring that productivity growth occurs, and that the economy is progressively transformed into a knowledge - based economy. The universities and research institutions with academics

at the helm have continuously been critical drivers of innovation systems and the resultant developments in ST&I and application of knowledge has led to industrial and entrepreneurial development with new products and services, and areas of economic growth.

In this regard, several public and private universities have since established industrial, science and technology parks promote the creation of spin-off firms. For instance, in 2007, Masinde Muliro University of Science and Technology (MMST) established the Directorate of Science & Technology Park and Industrial Linkages (STPIL) under Planning, Research and Extension Division. The mandate was to start, develop and manage the university Science and Technology Park (STP) and market investment opportunities emanating from the research carried out within and outside the university. Its role also includes linking the industry to the Science Park through collaboration with both private and public sectors keen to incubate and establish their business in the S&TP. In January 2012, Egerton University started an Agro-Park Project to act as a major player in provision of some practical solutions to the problems encountered in the implementation of projects under the Kenya Vision 2030. The aim is to improve the livelihoods of people, 75% of whom are dependent on agriculture and livestock production. In February, 2012, Ministry of Industrialization and Jomo Kenyatta University of Agriculture and Technology (JKUAT) launched a 2.2 billion Industrial and Technology Park designed to contribute to Kenya's growth to a newly industrialized economy within the broad framework of Vision 2030 by providing avenue for university researchers to incubate and commercialize their innovations.

Therefore, it is evident from this background that over the last decades, an increasing interest has developed in the field of technology transfer from academic institutions, and as part of this a growing awareness of the importance of university spin-offs that academic entrepreneurship has evolved. The literature on academic entrepreneurship intention, commercialization of research based knowledge and university spin-offs is fairly rich, but the determinants of academic-entrepreneurial intention hugely lack empirical evidence (Prodan & Drnovsek, 2010).

Academic Entrepreneurial Intentions and Creation of University Spin-off firms.

Entrepreneurial intentions among academics and students at the universities has emerged as an important element within entrepreneurship literature over the last few decades and continues to attract attention of many researchers due to its contribution to the development for many countries (Pruett, Shinnar, Toney, Llopis, & Fox, 2009; Zain, Akram, & Ghani, 2009). Entrepreneurial intentions are the academics' states of mind that direct attention, experience, and actions towards a business concept (Barbara, 1988; Rashid et al., 2012). Within the universities the academic staff and students are prospective academic entrepreneurs, they have critical in the identification of the best way for commercialize the results of their research to improve the technology transfer process. This kind of process is a consequence of two broad categories of determinants: individual with certain characteristics, abilities, and perceptions; a context which is conducive to venturing (Barbara & David, 1989).

Numerous studies have been conducted on entrepreneurial intention in universities with most of them focusing on students. According to study by Zain, Akram and Ghani (2009) on 288 business students in a Malaysian public university, entrepreneur's personality trait is an important determinant to entrepreneurship intention. The results showed a significant relationship between personality trait and entrepreneurship. In addition, Gurbuz and Aykol (2008) that investigated the entrepreneurial intention of young educated public in Turkey, the results showed that gender, having entrepreneurial parents, subjective norm, perceived control, attitudes, favourable environmental conditions and academic support were the determinants of entrepreneurial intention. These findings were consistent with the entrepreneurial intention literature (Guerrero, Kirby, & Urbano, 2006). However, this study could not provide evidence that environment influences the students to become entrepreneurs. The key finding was that apart from family members and academics, more parties such as the career counsellors and trade or entrepreneurs association need to be involved more rigorously in providing assistance or advice to existing and future entrepreneurs (Gurbuz & Aykol, 2008).

In conclusion, Wang, Lu and Millingotn (2011) used Entrepreneurial Event model postulated by Shapero and Sokol-1982 to examine the determinants of entrepreneurial intention among the two groups' college students in China and US. The researchers observed that the model is partially supported in the context of college students except for the role of entrepreneurial personality. The positive impacts of perceived desirability and perceived feasibility on entrepreneurial intention are proven (Wang, Lu, & Millington, 2011).

In Kenya's perspective, Maina (2011) posits that unlike other universities across the world, Kenya's universities have paid little attention to entrepreneurship studies that involves entrepreneurial attitudes, beliefs and values. Apparently, studies elsewhere have linked entrepreneurial intentions to venture creation (Carter, Gartner, Shaver, & Gatewood, 2003; Kolvereid & Moen, 1997; Krueger Jr, Reilly, & Carsrud, 2000) . For instance, in Kenya, studies have typically concerned with career choices and the extent to which institutions prepare students for their chosen careers without concrete empirical studies to the entrepreneurial intentions among college graduates (Maina, 2011).

In a study by Kilonzo and Nyambegera (2014) that was conducted on 396 randomly selected business students at Kenyatta University using the theory of planned behavior, results showed that the level of entrepreneurial intent is moderate among university students with the need for provision of appropriate information on the merits of self-employment, and the need to modify current educational practices as the eminent. It also showed partial support for the theory of planned behavior with subjective norms being the most important correlate of entrepreneurial intent (Kilonzo & Nyambegera, 2014). Using data were collected from 326 fourth year Bachelor of Commerce students from Egerton, Kabarak and Kenyatta universities Ayuo and Kubasu (2014) found out that attitudes and contextual factors influence entrepreneurial intentions of university students. Furthermore, the universities and governments need to understand factors which influence entrepreneurial intention among the would-be entrepreneurs thereby develop programs that turn these latent entrepreneurs into nascent entrepreneurs (Verheul, Uhlaner, & Thurik, 2005). In order to gain further insight on entrepreneurial intentions, this study combines both postgraduates' students' and academic staff personal academic

orientations with support of the opportunity identification and recognition skills and university contextual environment in promoting the creation of spin-off firms in Kenya.

Theoretical Review

In an attempt to explain the relationship between AEI and creation of university spin-off firms, the researcher focused on one model and two theories as discussed by various scholars: A stage model of academic spin-off creation on one hand and, Social Learning and Social Network theories on the other hand.

A stage model of academic spin-off creation

Academic entrepreneurship is not a single event, but rather a continuous process comprised of a series of events (Friedman & Silberman, 2003) hence the formation of university spin-offs was viewed under the stage model of academic spin-off creation. Ndonzuau, Pirnay and Surlmont (2002) identify four stages as relevant in explaining the transformation of academic research results into economic value. Each of these four stages has a specific function in the global spin-off process. The first stage generates and assesses ideas with regard to possible commercialisation; the second stage considers these ideas and translates the most promising of them into genuine entrepreneurial projects; the third stage realizes the best projects by creating new spin-off firms; and the fourth stage consolidates and strengthens the economic value created by these new firms (Ndonzuau, Pirnay, & Surlmont, 2002).

Ndonzuau et al., (2002) observed that the four stages are wholly dependent of each other. Economic value depends on the quality of firms, which depends on the quality of finalized projects, which themselves depend on the quality of the initial ideas. However, the third stage deals with the creation of a new firm to exploit an opportunity managed by a professional team and supported by available resources. These are the three key pillars of any entrepreneurial success (Timmons & Spinelli, 1999). The issues that have to be dealt with will progressively move away from specific academic contingencies towards business considerations. In this regard, a stage model of academic spin-off creation clearly explains the current study by focusing on the global process of valorisation by spin-off from academic research institutions such as universities, laboratories, research centres.

Wood (2011) contends that there are two most commonly used formal mechanisms by which universities transfer intellectual property to outside parties is via use of technology licensing agreements or the launch of a completely new business, typically called a 'spin-off.' From this theoretical underpinning, creation of new firm invariably became the depend variable whose response not only concretely showed the transfer of research results to the market place but it response to academic entrepreneurial intentions was observed as the main objective of the study.

Social Learning Theory

Self-efficacy is grounded in social cognitive theory (Bandura, 1977). The theory explains human behavior as "a product of the interplay of intrapersonal influences, the

behavior individuals engage in, and the environmental forces that impinge upon them” (Bandura, 1977). The interactions among these factors shape one’s beliefs in having the ability to successfully perform a specific behavior in a certain situation and his/her expectations towards the outcomes of the behavior (Bandura, 1982). Boyd and Vozikis (1994) suggest that the concept of self-efficacy, derived from social learning theory plays an important role in the development of entrepreneurial intentions and actions. The self-efficacy perspective is highly appropriate for this study because entrepreneurial self-efficacy is about individuals’ beliefs regarding their capabilities for attaining success and controlling cognitions for successfully tackling challenging goals during the entrepreneurial tasks. In other words, entrepreneurial self-efficacy refers to the strength of an academic’s belief that he or she is capable of successfully performing the roles and tasks of an entrepreneur (Boyd & Vozikis, 1994; Scherer, Adams, & Wiebe, 1989).

Social Network Theory

Social network theory views social relationships in terms of nodes and ties. Nodes are the individual actors within the networks, and ties are the relationships between the actors. The importance of social ties to successful entrepreneurship is well established (Birley, 1986; Wood, 2011). Social network theory emphasizes that the attributes of individuals are less important than their relationships and ties with other actors within the network. Numerous review of literature divides the challenges facing the academic entrepreneur into two basic tasks: the identification of a promising opportunity and the mobilization of resources to exploit it. Tesfom (2006) posits that social networks influence both of these stages of the entrepreneurial process: they shape information flows and trace the ties through which financial capital flows.

Conceptual Model

The purpose of this study is to develop a model to show the relationship between academic entrepreneurial intentions (AEI) and the creation of university spin-off firms. As hypothesized in the earlier discussions, AEI is the independent variable that influences creation of University spin-off firms which is the dependent variable in this study. With reference to the reviewed literature, it is assumed that university context moderates the relationship between AEI and creation of university spin-off firms, hence it is the moderating variable that has a strong contingent effect on the independent-dependent variable relationship. This is diagrammatically illustrated in Figure 1.

Academic Entrepreneurial Intentions

The relationship between Entrepreneurial Self Efficacy (ESE) perception and entrepreneurial intention that leads to creation on new venture has been discussed in several studies (Chen, Greene, & Crick, 1998; Jung, Ehrlich, De Noble, & Baik, 2001; Kickul & D’Intino, 2005). Individuals and their behavioural processes are the first concepts that appear when entrepreneurship is discussed. For this reason, individuals with higher ESE belief are likely to be entrepreneurs. ESE belief can be defined as the perception of an individual about the capabilities of being an entrepreneur and the belief for performing entrepreneurship roles and tasks successfully (Boyd & Vozikis, 1994; Chen et al., 1998; Forbes, 2005; Luthans & Ibrayeva, 2006).

Launching a new venture is a social process, because the entrepreneur is at the interaction with other people in the society while gathering the required resources so as to find the opportunity. Also, the social environment, from the point of socio-psychological context, has important effect on the motivation, perception and attitude of the individual. Within this framework, ESE belief may be considered as an attitude towards launching a new venture in a specific social environment (Jung et al., 2001). High ESE is one of the prerequisites of potential entrepreneurs. Although high self-efficacy individuals evaluate the business environment as full of opportunities, low self-efficacy individuals perceive the same environment as full of obstacles.

Academic Entrepreneurs require information, capital, skills, and labor to start business activities. While they hold some of these resources themselves, they often complement their resources by accessing their contacts and social relations (Arnold, Timothy, & Carolyn, 1995; Hansen, 1995; Tesfom, 2006). Therefore, Personal networks enhances academic entrepreneurial intentions into three components: provide academic entrepreneurs with information (e.g., market information, new opportunities) as well as tangible resources (e.g., human resources, financial resources) as well as in- tangible resources (e.g., social support, problem solving) held by other actors (Hoang & Antoncic, 2003; Nicolaou & Birley, 2003; Shane & Stuart, 2002; Walter, Auer, & Ritter, 2006).

University Context

Environmental conditions such as access to venture funding, governmental regulations, and closeness to markets is seen as attributes of the opportunity or business idea. For instance, commercializing a new invention might be easier in an environment (region) with many potential customers. Individuals in other environments may, however, not consider the same invention to be an entrepreneurial opportunity at all. Hence, the external environment affects which opportunities are created and pursued (Chrisman, Hynes, & Fraser, 1995; Smilor, Gibson, & Dietrich, 1990).

Smilor et. al (1990) found in their survey that the university played an important or very important role in 56% of the spin-off company formations, a highly more significant role than any other organization. The most important role of the university was as a source of personnel. Academic entrepreneurship is found to be considerably higher in some research departments than other, even within the same field of science (Franklin, Wright, & Lockett, 2001; Louis, Blumenthal, Gluck, & Stoto, 1989). Thus, the specific university context is probably playing an important role in the spin-off process. The formal university involvement in spin-offs can vary, and Steffensen et al., (2000) distinguishes between spontaneous and planned spin-offs, the latter including an organized effort from the parent organization. Franklin et al., (2001) found that more successful universities in fostering spin-offs tended to be less skeptical of the role of surrogate entrepreneurs. Di Gregorio and Shane (2003) found evidence that a low inventor's share of royalties and a willingness to make equity investments in university start-up companies increase start-up activity. Hence, university policies seem to have an effect on the spin-off process.

The academic culture values publishing and disinterested research, while entrepreneurial activity may be a sensitive issue (Ndonzuau et al., 2002). Studies have found that the most significant barriers to the adoption of entrepreneurial friendly policies at universities are cultural and informational (Franklin et al., 2001). Chrisman et al. (1995) concluded that “supporting research and sending a message that faculty entrepreneurship will be valued is perhaps more important than the specific programs designed to foster economic development”. Based on their study of professorial entrepreneurship, (Kenney & Richard Goe, 2004) suggests that “being embedded in an academic department and disciplines with cultures that are supportive of entrepreneurial activity can help counteract the disincentives created by a university environment that is not strongly supportive of these activities.” This indicates a complex structure where academics are part of different cultures in their discipline, department, university, and external environment.

Contact between persons with technical and market knowledge may induce identification of entrepreneurial opportunities. (Pruett et al., 2009) stress the importance of networks in the early development of university spin-offs. Further, Shane and Stuart (2002) found that founders of university spin-offs having prior relations to venture capitalists are more likely to receive venture funding and less likely to fail. Another way of developing the business concept is through strategic alliances (Carayannis, Kassicieh, & Radosevich, 2000). Chrisman et al. (1995) found that formal university programs can enhance economic development activities such as spinoff formation. Boundary organizations (Hellstrom & Jacob, 2003) like incubators (Etzkowitz, 2008), technology transfer offices (Guston, 1999), entrepreneurship centers (Dill, 1995) and science parks (Stankiewicz, 1986) does also play a role in university spin-off creation. The university and its departments and research groups plays an important role in the creation of spin-off ventures by providing a setting rich on entrepreneurial opportunities, and by stimulating and attracting entrepreneurial individuals who can develop and pursue opportunities. The university setting may also provide valuable resources throughout the process of developing an opportunity into a new business venture.

Creation of University spin-off firms

Creation of University was seen through ‘a stage model of academic spin-off creation, (Ndonzuau et al., 2002) . Ndonzuau et al. (2002) build up a general model that puts forward the major issues involved in the transformation of research results into the creation of economic value within the perimeter of universities. Hence the model is composed of four successive stages interacting in a sequential manner i.e Stage 1: to generate business ideas from research; Stage 2: to finalize new venture projects out of ideas; Stage 3: to launch spin-off firms from projects; Stage 4: to strengthen the creation of economic value by spin-off firms.

Summary and Concluding Remarks

This paper has reviewed the relevant literature and the considerable discussion and deconstruction of AEI, various elements of university context and the links between these elements. It is therefore factual that understanding the backgrounds of entrepreneurial intention allows academics, consultants, advisors and policy makers to get a from an informed viewpoint how intentions are formed and how new venture founders’ beliefs,

perceptions and motives impact the intent to start a business. It is worth noting that knowledge of the determinants of entrepreneurial intention can help entrepreneurial training find the right way to mold the intention and enhance the probability of the consequent behavior new venture creation. This observations are in congruent with finding by Wang et al (2011).

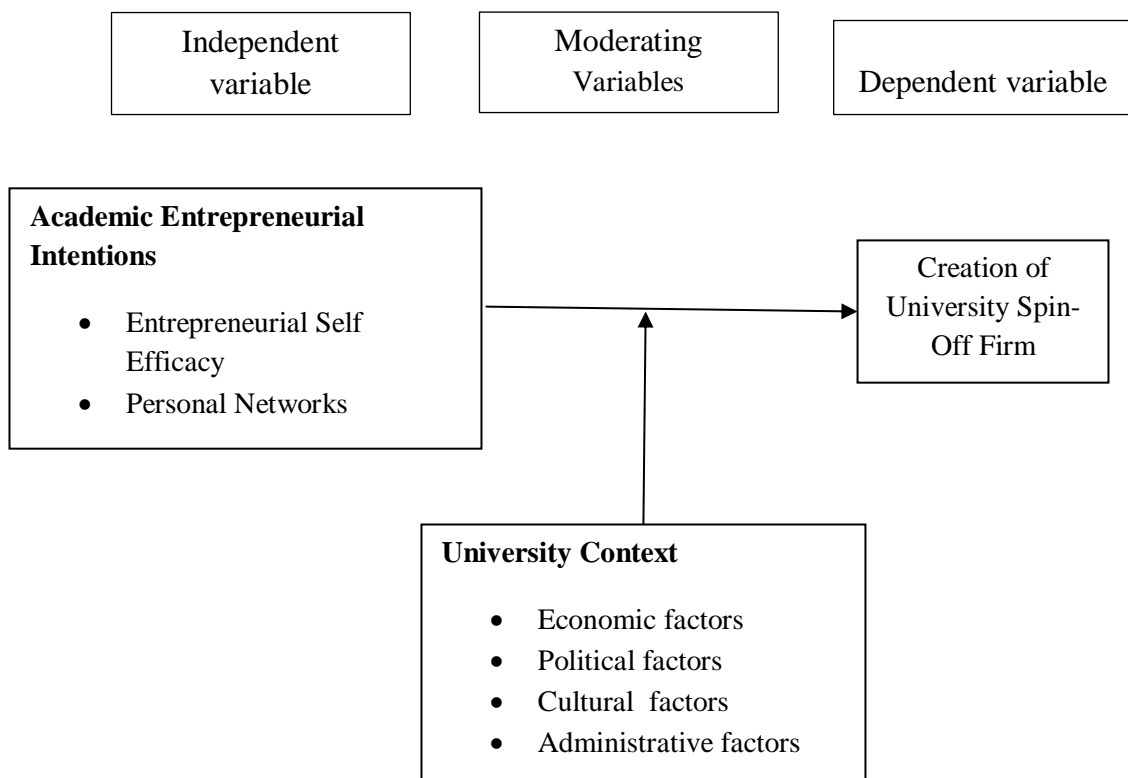


Figure 1: Conceptual Framework linking Academic Entrepreneurial Intentions, University Context and Creation of Spin-off firms.
 Source: (Rasmussen, 2005)

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