

Academic Entrepreneurs and Entrepreneurial Academics: Are They the Same

Kizito Emmanuel Nyeko and Ngui Kwang Sing

Abstract—Some scholars have attempted to define academic entrepreneurship by classifying academics based on the types of entrepreneurial activities that they are engaged in thus academic entrepreneurship is described as the third mandate of academia. The purpose of this paper is to review and synthesise the literature on the classification of academic entrepreneurs. Three distinct identities of academic entrepreneurs are described, namely, the academic entrepreneur, the entrepreneurial academic, and the academic-entrepreneur. The nature and essence of entrepreneurship of each identity is discussed, based on the; types of activities, challenges academics face, and opportunities available. Propositions presented include; commercialisation is only one of many possible outcomes of academic entrepreneurship, different entrepreneurial activities may require different support to nurture entrepreneurial academics and researchers, and need to further explore how commercialisation can be an agenda for all entrepreneurial activities as it influences sustainability of entrepreneurial initiatives. The paper concludes by calling for further work on integrating academic and entrepreneurial identities.

Index Terms—Academic entrepreneurs, academic entrepreneurship, entrepreneurial university.

I. INTRODUCTION

Universities perform essential roles in creating and transmitting new knowledge within contemporary societies [1]-[3]. Academic entrepreneurship has started to be considered a third mission in which university institutions engage, in addition to the traditional mandates of teaching and research. To encourage entrepreneurship among academics and students, universities are now developing entrepreneurship policies and implementing these initiatives to embed entrepreneurial thinking and practices within teaching, research and administration [4].

This phenomenon has been described as the academic revolution [5], [6] and has resulted in the emergence of various types of universities, such as, research universities, technological universities, teaching universities, hybrid universities and of late, entrepreneurial universities.

However, findings from various studies show evidence that the performance of the ‘third mission’ differs widely among academics. This brings to the forefront the need to understand the different academic entrepreneurs who engage in entrepreneurial activities [7], [8].

It is crucial that universities, government, industry and

public get to understand entrepreneurial productivity and performance from the academic entrepreneur’s point of view in order to optimise performance outcomes of entrepreneurial ventures [9]-[11].

The main goal of this paper is to describe three classifications of academic entrepreneurs involved in academic entrepreneurship, namely, the academic entrepreneur; the entrepreneurial academic and the academic-entrepreneur.

The structure of the paper is as follows. In Section II, the concept of academic entrepreneurship is introduced, while in Section III, the different classifications of academics as entrepreneurs are presented. In Section IV, the challenges faced by academics and relevant stakeholders in transforming traditional universities into entrepreneurial universities are discussed, while opportunities for academic entrepreneurship are discussed in Section V. Lastly, a number of recommendations for facilitating academic entrepreneurship are presented in Section VI.

II. ACADEMIC ENTREPRENEURSHIP

In Malaysia, academic entrepreneurship is an emerging research area with research into technology commercialization receiving the most attention [12], [13].

In a university setting, academic entrepreneurship is the synthesis and integration of scientific, academic and commercial activities [14]-[17]. It is often characterised by formal arrangements to commercialise academic intellectual property through knowledge (e.g. consulting or contract research), transfer of technology (e.g. patent or licensing) and transfer of products or services (e.g. spin offs) [18].

Academic entrepreneurship occurs at the level of individuals or groups of individuals acting independently or as part of faculty or university systems, who create new organizations, or instigate innovation within or outside the university [19].

Given this background, [20] identified three dimensions of academic entrepreneurship, namely, organisational creation; organisational innovation; and organisational renewal in Table I below. The organisational creation dimension involves the deployment of mechanisms such as the setting-up of start-up companies, university spin-offs and joint ventures, in pursuit of academic entrepreneurship actions. The organisational innovation dimension involves the creation and commercialisation of new value, through mechanisms such as research groups and research centres. The organisational renewal dimension involves sustaining entrepreneurship through mechanisms of technology transfer schemes, patenting, design rights and licensing agreements.

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TABLE I: DIMENSIONS AND MECHANISMS OF ACADEMIC ENTREPRENEURSHIP

Dimensions	Mechanisms
Organisational creation- Venture creation by expanding operations in existing or new markets through university start-ups, companies, spin-offs or spin-outs and strategic alliances, joint ventures or collaboration with industry.	Start-up companies; University spin-offs; Joint- venture
Organisational innovation- The university's commitment to pursue research and development in creating and introducing scientific breakthrough, new inventions and products; introducing new ways of doing things in terms of production processes and organisational systems within the university; and; transferring and commercialising new knowledge and technology for economic and social development	Research groups; Research centers
Organisational renewal- The transformation of the existing academic organisations through the renewal or reshaping of the ideas in which they are built; by building or acquiring new capabilities and then creatively leveraging them to add value for stakeholders; and through revitalizing the organisation's operations by changing the scope of its business, its competitive approach or both	Technology transfer; Schemes; Patenting; Licensing; Design rights

III. ACADEMICS AS ENTREPRENEURS

Literature on the nature of academic work describes an academic as someone who works within a university, juggling the roles of generating new knowledge (research) and transmitting knowledge (teaching) with administrative duties [21]. These roles have been described as the traditional mandates of academics as employees of universities.

Some scholars have attempted to define academic entrepreneurship by classifying academics based on the types of entrepreneurial activities that they are engaged in. Three general classifications of academics are the academic entrepreneur, the entrepreneurial academic and the academic-entrepreneur.

The academic entrepreneur is one who engages in the commercialisation of academic intellectual property [17]. This term has become more known because of a few productive individuals who took initiative in universities and created successful commercial endeavours [22].

The entrepreneurial academic is a managerial change agent in university, who builds research and teaching enterprises outside the conventional walls of the university, and in most cases relying almost entirely on external funding sources, gathering their own research teams, competing for or joining research grants, concluding contracts with industry and including graduates into research teams [23]. They engage in various forms of entrepreneurial behaviours in academia related to teaching, research, administration or consulting [24].

The academic-entrepreneur is one who engages in commercial activities outside academia with or without the

involvement of the university [25], [26]. They have two career options, namely, to quit academia and start a business while employed in academia [27].

The classifications of academics based on the types of activities they are engaged in are summarized in Table II below adapted from [28].

TABLE II: CLASSIFICATION OF ACADEMICS BASED ON THE TYPES OF ENTREPRENEURIAL ACTIVITIES THAT THEY ARE ENGAGED IN

Academic	Related entrepreneurial activities
Academic entrepreneur	<i>Teaching related activities</i> 1. External teaching 2. Initiating the development of new degree programmes 3. Conducting seminars and training sessions for academia and industry
Entrepreneurial academic	<i>Teaching and Research related activities</i> 1. Working in the industry (research based) 2. Research based consultancy for industry through the university 3. Research based consultancy privately (but without forming a company) 4. Developing products or services with potential for commercialisation 5. Acquiring research funding (grants) from government, non-governmental or international bodies (those without collaboration with industry) 6. Collaboration with industry through joint research projects 7. Research related assistance to small business owners
Academic-entrepreneur	<i>Company related activities</i> 1. Contributing to the formation of joint ventures in which university and industry are the joint partners 2. The formation of joint venture(s) privately through collaborating with industry 3. Contributing to the formation of one or more new spin-off companies 4. Contributing to the establishment of university incubators and/or science parks 5. Contributing to the formation of university centres designed to carry out commercialisation activities 6. The formation of your own company/(s)

IV. CHALLENGES FACING ACADEMICS IN ACADEMIC ENTREPRENEURSHIP

Although education and research have traditionally been the university's main missions, this has gradually changed with the emergence of new perspectives on the role of the university in the system of intellectual property generation, production, sharing and distribution. [29] argues this 3rd university mission involving academic entrepreneurship, opens the possibility for many higher education institutions

to get a broader source of funding from non-governmental or public organisations.

The adaptation and adoption of “entrepreneurial flair” into the university appears to create discontent among academics to whom as the concept of entrepreneurship implies the creation of a new venture and income generation [4].

Literature reviewed highlight various challenges facing academicians and stake holders involved in face when transforming traditional universities into entrepreneurial universities as a result of universities engaging in activities beyond what they traditionally do, and are familiar with [30], [31]. The following sections describe the challenges that confront the academic entrepreneur, the entrepreneurial academic and the academic-entrepreneur.

A. Academic Entrepreneur

1) Role overload for academicians

The role of an academic and researcher and for some, administrative duties is already preexisting work burden. With the new role of becoming academic entrepreneurs, the major issue arising is the changing nature of academic work specifically properly prioritizing and juggling the roles of generating new knowledge (research), transmitting knowledge (teaching) and income generation (entrepreneur) [13], [15], [18].

2) Lack of entrepreneur-owned resources

Academics have to deal with enormous lack of resources impact the ability to be entrepreneurial will performing their roles as an academic. These include; limited financial resources, increasing capital costs, lack of infrastructure, delay in fund management and difficulty in finding private sector collaboration [30], [31].

B. Entrepreneurial Academic

1) Unattractive incentive packages

To be entrepreneurial in their various roles of research, teaching and administration requires extra effort, dedication and commitment from academics due to various uncertainties encountered [32]-[33]. To induce individual academics to embrace the new role of entrepreneurial academic, universities must distribute attractive incentives to them.

However, research findings reveal the high prevalence of unattractive incentive packages, for example, little or no royalty holding, little or no equity holding, little or no transfer fees and disagreements over intellectual property ownership causing dissatisfaction among entrepreneurial academics negatively impacting their involvement in such activities [34], [35].

2) Absence of entrepreneurial role model and expert

Literature describes an academic as someone who works in a university, juggling the roles of research, teaching and administrative duties [21]. Studies on entrepreneurial universities in Taiwan and Korea attribute the main reason for the lack of success in innovation and commercialization initiatives to the absence of entrepreneurial role model and expert [19].

With universities embracing entrepreneurial thinking and practices in their operations, the challenge is the absence of university entrepreneurial role model and expert to guide

entrepreneurial academics with little or no management and business experience to identify (business/market) entrepreneurial opportunities and act upon them given the diverse experts and personal entrepreneurial inclinations [47], [84].

C. Academic-Entrepreneur

1) Academics perception of the original purpose of university existence

Academic-entrepreneurs engage in commercial activities outside academia with or without the involvement of the university [32], [35]. These activities cause a loss of time allocated for the traditional academic roles of basic research, teaching and administrative duties challenging academics perception of the original purpose of university existence.

Findings from previous studies on academics involved in academic entrepreneurship suggest many academics argue the role of the university is not to “do business” but to “support business”, which reflects the fundamental understanding of the nature of universities [36].

Given the perceptions of fellow academics and uncertainty of outcomes, it is a challenge for academic-entrepreneurs to get peer and institutional support for their initiatives. Globally, only a few universities make lucrative income from academic-entrepreneurs led initiatives, for example, Stanford, MIT, and University of California [19], [37].

2) Legislative and policy issues

The existence of different legal systems and policies existing between nations that inhibit cross border academic-entrepreneurship. Policy issues act as barriers affecting the ability of academics to move between private and public sectors on temporary basis to develop their discoveries [38].

3) Lack of organisational-owned resources for entrepreneurial ventures

Academic-entrepreneurs have to deal with an enormous lack of resources, such as time, money and credibility. The required investments required in R&D are often considerable, while product life cycles are relatively short [39]. Although this problem is inherent to most newly established ventures, it is possibly even stronger in situations where the market is usually small or even non-existent [40].

V. OPPORTUNITIES FOR ACADEMIC ENTREPRENEURSHIP

Recent research shows the expansion of the academic entrepreneurship phenomenon.

This section describes entrepreneurial the various existing tangible and intangible academic entrepreneurship opportunities available to the academic entrepreneur, the entrepreneurial academic and the academic-entrepreneur to exploit.

A. Academic Entrepreneur

1) Universities' intellectual eminence/faculty quality

A critical human capital resource for the development of academic entrepreneurship is access to people with expert knowledge and talent. University faculty (academic staff) forms the primary source of this expertise. Research results

show that more eminent entrepreneurial universities have greater participation rates in academic entrepreneurship than other universities [41].

Given this evidence, then, a university that has built a high-quality faculty, something that takes considerable time, effort, and resources (hence, it is a likely source of competitive advantage) will likely be more successful in their technology transfer efforts than will a university with a faculty of lesser quality [42].

2) Prior entrepreneurial experience

Entrepreneurship research also highlights that prior entrepreneurial experience increases the probability of identification and exploitation of entrepreneurial opportunities since it helps to develop the mindset and skills necessary to undertake such functions [43].

For example, [44] point to increasing evidence of the phenomenon of recurrent academic entrepreneurs, that is, researchers who undertake multiple entrepreneurial ventures. Prior experience in identifying entrepreneurial opportunities is likely to increase a researcher's perception of the commercial potential of his/her current research activities [7].

B. Entrepreneurial Academic

1) Access to University venture capital funds

Access to university venture capital funds influences academics participation in academic entrepreneurship activity. Organizations require incentives and rewards to encourage people to embrace productive activities. Most universities are now giving venture capital funds to support academics to participate in academic entrepreneurship and exploit intellectual property [5].

2) Industry funding of research

[42] suggest that it is likely that industry R&D activity helps to stimulate a culture of entrepreneurship within the university. Academics engaged in industry sponsored entrepreneurial activity share their experiences with or involve other academics in their funded research [34]. As a result, the culture may be altered because culture is a reflection of the shared experiences of the members of the organization.

Furthermore, the investment by industry into numerous university research centers likely fosters an entrepreneurial spirit within entrepreneurial academics and the university itself, and builds industry/university linkages that may form the basis for further collaborative endeavors [40].

3) Ties to external academic research network

Networking and extended social capital have long been associated with the enhancement of entrepreneurial skills. According to [45] associated benefits include; networks enhancing the opportunity recognition capabilities of entrepreneurs, provision of access to critical resources and enable the entrepreneur to capitalise quickly on market opportunities. Indeed, [46] show that exposure to entrepreneurial colleagues increases the propensity of an academic to be entrepreneurial himself. Participation in research collaborations occurs for a range of reasons including: access to complementary expertise; access to

additional equipment and resources; and acquisition of prestige, visibility and recognition [47].

C. Academic-Entrepreneur

1) Intellectual property transfer policies and strategies

[41] found that two sets of university licensing policies—policies regarding the distribution of royalties to inventors and whether or not the university is permitted to take an equity stake in licensees—appear to influence entrepreneurial academics. Lower royalty rates may be an incentive to start a venture to exploit a technology rather than license it. In contrast, the ability for academics to take significant equity stakes in spin offs may be a greater incentive for them to create spin offs [48].

2) Licensing/ technology transfer policies and strategies

Introduction of licensing/ transfer policies and strategies are an incentive for academic-entrepreneurs to participate in the creation of new academic entrepreneurship ventures [5]-[6].

3) The quality of academic research

Entrepreneurial research shows that working at the frontier of research gives academic-entrepreneurs a comparative advantage in identifying new breakthrough opportunities [41]. Moreover, as [28] highlight, the best academic entrepreneurs probably enjoy superior access to high-value knowledge and a stronger natural excludability, leading to a comparatively stronger capacity to identify high-value entrepreneurial opportunities and exploit them.

VI. RECOMMENDATIONS

Academic entrepreneurship activity should not be solely evaluated via economic returns to the university, academics and stakeholders but should be considered by wider social and economic benefits such as the diffusion of knowledge or the contribution to employment. The areas highlighted below would help the academics, universities and stakeholders involved in academic entrepreneurship perform better.

A. Policies and Strategies

According to the different universities policies on academic entrepreneurship developed by universities, academic entrepreneurship activity can be encouraged or inhibited. Accordingly, universities must put in place structures to support academics and stake holders in academic entrepreneurship.

B. Stock of Knowledge and Tacit Skills of Academics

Entrepreneurial universities have the ability to generate a focused strategic direction, both in formulating academic goals and in translating knowledge produced within the university into economic and social utility [20].

Knowledge and tacit skills of academics are the main sources of business opportunities for a university. Therefore it's necessary to develop a data bank about; (a) analysis of captured data for the development of university policies, strategies and initiatives related to academic entrepreneurship, and (b) short, medium and long-term planning: target setting, monitoring of trends and analysis of

results,

C. Human Capital

The potential entrepreneurs that universities possess are a key element determining their academic entrepreneurship performance. The academics all have different individual entrepreneurial orientations impacting their willingness to get involved and performance. Conducting training courses will equip the academics with relevant and up to date skills and competencies to contribute to the transformation of traditional universities into entrepreneurial universities

It must be noted, previous studies on academic entrepreneurship have mainly focused on the United States and selected European countries. According to them, differences in education and public science systems, differences in stages of economic development and differences in patterns of university-industry relations may shape academics' responses to involvement in academic entrepreneurship, as well as the outcomes.

VII. CONCLUSION

It is necessary that each university develop their own strategic plans that include strategic objectives related to academic entrepreneurship and deliberate on what must be their priorities in order to distribute financial and other kind of resources for their academics. Entrepreneurial universities must be aware that there are different ways to achieve the expected results [28].

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