

Consensus study on factors influencing the academic entrepreneur in a middle-income country's university enterprise

Factors
influencing the
academic
entrepreneur

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Alfred Austin Farrell, James Ashton, Witness Mapanga, Maureen Joffe, Nombulelo Chitha, Mags Beksinska, Wezile Chitha, Ashraf Coovadia, Clare L. Cutland, Robin L. Drennan, Kathleen Kahn, Lizette L. Koekemoer, Lisa K. Micklesfield, Jacqui Miot, Julian Naidoo, Maria Papathanasopoulos, Warrick Sive, Jenni Smit, Stephen M. Tollman, Martin G. Veller, Lisa J. Ware, Jeffrey Wing and Shane A. Norris

(Author affiliations can be found at the end of the article)

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Abstract

Purpose – This study aims to ascertain the personal characteristics of a group of successful academic entrepreneurs in a South African university enterprise and the prevalent barriers and enablers to their entrepreneurial endeavour.

Design/methodology/approach – The authors used a Delphi process to identify and rank the characteristics, enablers, barriers and behaviours of entrepreneurial academics, with a Nominal Group Technique applied to establish challenges they encounter managing their enterprise and to propose solutions.

Findings – Perseverance, resilience and innovation are critical personal characteristics, while collaborative networks, efficient research infrastructure and established research competence are essential for success. The university's support for entrepreneurship is a significant enabler, with unnecessary bureaucracy and poor

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access to project and general enterprise funding an impediment. Successful academic entrepreneurs have strong leadership, and effective management and communication skills.

Research limitations/implications – The main limitation is the small study participant group drawn from a single university enterprise, which complicates generalisability. The study supported the use of Krueger's (2009) entrepreneurial intentions model for low- and middle-income country (LMIC) academic entrepreneur investigation but proposed the inclusion of mitigators to entrepreneurial activation to recognise contextual deficiencies and challenges.

Practical implications – Skills-deficient LMIC universities should extensively and directly support their entrepreneurial academics to overcome their contextual deficiencies and challenging environment.

Originality/value – This study contributes to addressing the paucity of academic entrepreneur research in LMIC contexts by identifying LMIC-specific factors that inhibit the entrepreneur's movement from entrepreneurial intention to entrepreneurial action.

Keywords Academic entrepreneurship, Academic entrepreneur, Entrepreneurial academic, Entrepreneurial intentions, LMIC, Delphi technique, Nominal group technique

Paper type Research paper

1. Introduction

The entrepreneurial university is a phenomenon consequent of a university's transition from conserving knowledge to being an originator of knowledge, introducing a "third mission" duty for economic, social and regional development beyond the traditional teaching and research roles (Etzkowitz, 1983; Etzkowitz *et al.*, 2000; Etzkowitz, 2013; Broström *et al.*, 2021). In low- and middle-income country (LMIC) settings facing profound socioeconomic challenges, universities are required to prioritise work aligned with social innovation and entrepreneurship, dualistically having to balance the economic rationale of an "entrepreneurial university" against the social obligation of an "engaged university" (Thomas and Pugh, 2020).

From an organisational management perspective, entrepreneurship places primary importance on the opportunity without consideration of the resources necessary for its exploitation (Stevenson, 1983). Entrepreneurship is an individual's inclination to identify and act on opportunities, irrespective of being employed or not within the corporate structure (Stevenson and Jarillo, 2007). The academic as an entrepreneur is the main actor fulfilling the university's third mission objective. Understanding the nature and needs of the academic entrepreneur is thus critical if universities are to meet their third mission responsibility.

The study applied a consensus-based process to a group of successful academic entrepreneurs in a middle-income country university enterprise, to investigate their intra- and inter-personal characteristics and the prevailing barriers and enablers to their entrepreneurial activation. We also related the study results to the Krueger Entrepreneurial Intention (KEI) model (Krueger, 2009) to examine its relevance for the group of LMIC-based academic entrepreneurs included in the study.

Whilst the academic entrepreneur fulfils a crucial role in addressing economic and social inequities in LMIC settings, little is known of their entrepreneurial character and the impact significant environmental challenges and societal expectations have on their entrepreneurial behaviour (Farrell *et al.*, 2022; van Niekerk *et al.*, 2020). This study contributes to addressing the need for more investigation into the nature of academic entrepreneurs in an LMIC.

2. Literature review

2.1 Academic as entrepreneur

Academic science is being transformed into both a socioeconomic and an intellectual endeavour (Mollas-Gallart *et al.*, 2002) where academic entrepreneurship can now be considered an intellectual enterprise in which universities cooperate with society at large for

economic and social value (Beckman and Cherwitz, 2009). Furthermore, the growing prominence of universities in shaping and developing regional entrepreneurial ecosystems has necessitated a more entrepreneurial approach to the university's offerings, outlook and culture (Miller *et al.*, 2018). However, it is the academics within the university who are expected to drive and pursue entrepreneurial activities beyond their traditional roles for universities to meet their third mission objectives (Goethner *et al.*, 2012; Grünhagen and Volkmann, 2014; Krueger, 2000; Miller *et al.*, 2018). In this sense, the academic entrepreneur is the individual who must be motivated within their university to pursue bringing the benefits of newly generated knowledge to society at large for the university to achieve its third mission mandate (Sormani *et al.*, 2022).

2.2 Academic entrepreneurship in low- and middle-income countries

We recently conducted a scoping review to assess the state of investigation into academic entrepreneurship in LMICs (Farrell *et al.*, 2022), using the KEI conceptual model to investigate the characteristics, enablers and barriers affecting the entrepreneurial behaviour of academics in this setting. The scoping review highlighted the paucity of studies investigating academic entrepreneurship in LMICs; a deficiency given the importance and potential of academic entrepreneurship for LMIC academic institutions (Al-Bader *et al.*, 2010; Behroozi, 2012; Chang *et al.*, 2006; Gür *et al.*, 2017; Heng *et al.*, 2012). Proposed is the need to shift from the narrow conception of “entrepreneurial universities” to a conception of “engaged universities” where equal weight is accorded to social and economic innovation, entrepreneurship and development relevant to LMIC settings, and where academics are expected to develop solutions to more complex societal challenges (Thomas and Pugh, 2020). The scoping review revealed difficulties applying entrepreneurship models developed for high-income country (HIC) university settings to LMICs because of different macroeconomic variables, with attempts at model translation typically ineffective (Dalmarco *et al.*, 2018; Fischer *et al.*, 2019; Kafouros *et al.*, 2015). For example, establishing technology transfer offices are less effective in LMICs, where direct industrial funding has proven more effective when commercialising university research (Belitski *et al.*, 2019). Background factors within the LMIC context which are unfriendly to academic entrepreneurship included:

- barriers to establishing a new business;
- weak entrepreneurial ecosystems (lack of demand from the private sector);
- poorly implemented government science and technology policy (primarily related to technology transfer);
- low government expenditure on science and technology research (incentives for university and business to foster joint research);
- import substitution industrialisation policies (reliance on imported solutions to local problems);
- restrictive trade barriers;
- institutional factors (poor reward systems for innovation and absence of collaboration with the private sector);
- entire burden for commercialisation placed onto individual researchers; and
- the socioeconomic context, political instability and severe criminality.

These factors are so far-reaching that they often nullify university strategies aimed at promoting entrepreneurship (Al-Bader *et al.*, 2010; Dalmarco *et al.*, 2018; Fischer *et al.*, 2019; Guerrero and Urbano, 2017). Furthermore, many of these factors pose challenges when

applying intention-based models of entrepreneurship developed in HICs to LMIC settings, necessitating model adaptation for relevance. The factors identified during our scoping review are detailed in Supplementary Table 1.

3. Framework development

Understanding academic entrepreneurship requires comprehending the individual as the primary actor delivering on the entrepreneurial promise and how the entrepreneurial ecosystem influences their entrepreneurial motivation. Static content models that aim to profile typical successful entrepreneur personality traits have generally failed to explain entrepreneurship comprehensively (Low and MacMillan, 1988). Process-oriented cognitive models, based on attitudes and beliefs which describe how behaviour is initiated, directed, sustained and terminated, are more effective at describing entrepreneurship (Segal *et al.*, 2005). People's cognitive processes are responsible for their endeavours, particularly complex endeavours such as the launch of a new business. Humans can consider potential future outcomes, determining which are most desirable and determining whether it is possible to pursue achieving these outcomes. The theory of planned behaviour (TPB) (Ajzen, 1991) is one of the most popular and effective process-oriented frameworks for predicting future behaviour (Lortie and Castogiovanni, 2015). Several studies have shown that the TPB is a reliable model for explaining and predicting entrepreneurial intention and behaviour (Kautonen *et al.*, 2013; Kolvereid, 1996), with the KEI model being one of the adaptations used to assess entrepreneurial motivation (Lortie and Castogiovanni, 2015).

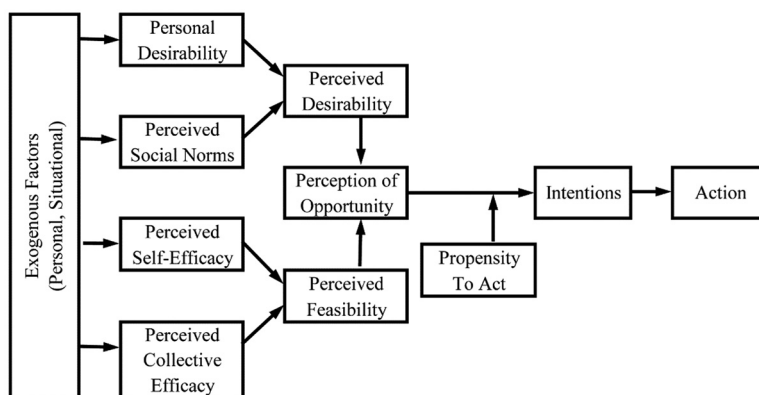
3.1 Krueger entrepreneurial intention model

Intention-based models offer a cogent and reliable framework for comprehending the entrepreneurial process, where attitudes influence behaviour through intentions (Krueger, 2000).

This model (Figure 1), developed by Krueger (2003, 2009) with reference to Ajzen's TPB (Ajzen, 1991) and Shapero's entrepreneurial event model (Shapero and Sokol, 1982), posits that the intention to initiate an entrepreneurial event requires five critical antecedents:

- (1) the individual's personal belief of how desirable or undesirable the outcomes are (personal desirability);
- (2) the perceived normative beliefs within their peer group and the individual's motive to comply with the beliefs (perceived social norms);
- (3) the individual's perception of having the skills and self-confidence necessary to perform the task (perceived self-efficacy);
- (4) where fellow members are needed to support the entrepreneurial event, the group's shared belief in its capabilities to organise and execute the actions required to perform the task (perceived collective efficacy); and
- (5) the ability of the individual to independently execute a plan of action and act on new opportunities identified (propensity to act).

Based on the KEI model, the development of entrepreneurial intentions sufficient for activation is premised on the above characteristics and a motivating event that precipitates a disruption in behaviour (precipitating event). There is a predictable transition from entrepreneurial intention to action (Krueger, 2000) once barriers are weighed (Goethner *et al.*, 2012).



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Figure 1.

4. Methods

4.1 Study approach

The study applied a modified Delphi process technique (Delphi) (Okoli and Pawlowski, 2004) on a heterogeneous expert panel of successful academic entrepreneurs to reach agreement (consensus) on the most important individual characteristics (attributes, drivers and motivators), behaviour, enablers and barriers for sustained, successful academic entrepreneurial pursuit within their setting.

The Delphi process is an effective technique to derive consensus and overcomes the weaknesses of relying on a single expert, a one-time group average or round-table discussion (Clayton, 1997) and is substantially more accurate than individual experts and traditional groups, and somewhat more accurate than statistical groupings of noninteracting individuals where judgments are aggregated (Rowe and Wright, 2001). An effective Delphi includes:

- a diverse group of domain experts who are sufficiently opinionated to resist changing their view unless feedback is valued;
- self-administered questionnaires that let participants voice their opinions without social pressure from dominant voices;
- an iterative process that let participants revise their input;
- controlled feedback that gives participants opportunities to clarify or change their views based on group results; and
- results statistically formulated to represent the group's opinions (Clayton, 1997; Okoli and Pawlowski, 2004; Rowe and Wright, 2001).

Findings from the Delphi process were then shared with the study group in an engagement workshop to reflect on the challenges they faced. For this, the nominal group technique (NGT) (Evaluation Briefs, 2018; Van de Ven and Delbecq, 1974) was used to express ideas and reach agreement. The NGT provides an orderly procedure for obtaining relevant and reliable qualitative information from a group of experts in the context of a focus group (Van de Ven and Delbecq, 1974). The NGT typically uses a four-step process (generating ideas,

recording ideas, discussing ideas and voting on ideas) to collect information from participants through a moderated discussion ([Evaluation Briefs, 2018](#)).

The University of the Witwatersrand Human Research Ethics Committee approved the study (Medical Clearance Certificate M1911115 dated 29 November 2019). Study participants were supplied with an information pack and they provided signed informed consent. Where necessary, the study was managed to ensure anonymity and confidentiality.

4.2 Stakeholder recruitment

Study participants were recruited from the academics who operate successful, self-funded research and innovation entities within the Wits Health Consortium (Pty) Ltd (Consortium), which is an enterprise owned by the University of the Witwatersrand, Johannesburg (Wits) based in South Africa. The Consortium supports the third mission activities of the Faculty of Health Sciences of Wits. The Consortium has created an environment conducive to an entrepreneurial approach in academia, with a governance structure that facilitates Entity operation without unnecessary bureaucracy, while maintaining risk management and control. Faculty of Health Sciences academics form Entities (also known as “Syndicates”) within the Consortium, which they direct and operate for their academic benefit while adhering to the Consortium’s administrative rules. While the Consortium provides administrative and business support to the Entities (via its Shared Services Centre) and bridging funding, the Entities develop their own operational strategy and raise their own funds to support all aspects of Entity operations. Staff employed by the Entities (the Consortium being the legal employer) are jointly appointed with Wits as a mechanism for academic oversight, appointment and promotion. Most of the Consortium’s Entity staff (including many Entity leaders) are employed in “soft money” positions (not covered by the Wits budget), and their employment is contingent upon the Entity leadership’s ability to develop and implement a sustainable financial model for their Entity. Being LMIC-based, much of the Consortium Entity’s activities target the social deficiencies in its setting. During 2020, the Consortium’s roughly 100 Entities generated almost \$160m and employed over 4,700 staff ([Wits Health Consortium Annual Report, 2020](#)).

Eligible study participants met the following criteria:

- Entity director or senior team member of the Entity for at least 12 months; and
- established academic track record – minimum of 30 peer-reviewed research articles and a minimum of 3 research grants awarded

A total of 50 study participants met the inclusion criteria and were invited to participate in the Delphi. The study population was diverse, being drawn from the Faculty of Health Sciences’ various schools, departments, academic disciplines and professions.

4.3 Study component 1: Delphi

4.3.1 *Delphi round 1.* The REDCap survey tool ([Harris et al., 2019](#)) was used for informed consent and managing participant responses. Respondents were asked the following questions (the research questionnaire was based on the lead author’s own development):

What, in your opinion, are the five to ten most important?

- Personal entrepreneurial *characteristics* (attributes, drivers or motivators) of academics who operate Entities in the Consortium?
- *Enablers* that would motivate an academic to establish and develop an Entity in the Consortium?

- *Barriers* that would dissuade an academic from establishing and developing an Entity in the Consortium?
- *Behaviours* (actions) required to successfully establish an Entity in the Consortium?

The lead authors (AF, JA, WM and MJ) coded the data into common themes using a consensus-based approach to categorising and collating these initial responses. The responses received were not ranked according to frequency during the first round.

4.3.2 Delphi round 2. The common derived factors were then carried into round 2. The study group selected the dominant factors for each domain (individual anonymised deliberation, prioritisation and selection, without ranking, of the ten most important factors for each question). The factors selected by the study group were then ranked according to frequency (if the 10th and 11th factors were tied on counts, then both answers were included).

4.3.3 Delphi rounds 3–5 (consensus workshop). The Delphi allows participants to change their views at each round to reflect and reconsider their position in response to new information. However, this flexibility may introduce bias as participants change their responses to match the majority view (the “bandwagon effect”) (Winkler and Moser, 2016). To mitigate bias, the outcomes derived from Round 2 were presented at a consensus workshop for final selection and ranking purposes, during which the private voting principle was upheld (Mapanga *et al.*, 2021; Woodcock *et al.*, 2020), followed by a discussion to confirm final selection and ranking. The study participants were initially asked (in Round 3) to select the five factors they considered most important of the Round 2 tabulated data concerning the four questions asked. The top five factors for each question, determined in Round 3 by selection frequency, were carried through to Round 4 (in the event of a tie between the fifth and sixth most frequently cited factors, both were carried to the next round). In Round 4, the study participants were asked to rank the top five factors in order of importance. The most important factor was assigned a score of 1, with the least important factor assigned a score of 5. The scores for each question were ranked using aggregated means, with standard deviation used as a tiebreaker where required. The threshold for consensus was set at 95% of the voting participants agreeing with the ranking. This method was applied through three rounds of group consultation using a consensus-based approach, with voting conducted using anonymous real-time electronic surveys. In Round 5, study participants were invited to discuss and motivate for changes in factor ranking. Consensus was achieved on the final ranking for each factor. Delphi scoring was conducted anonymously and individually via electronic voting for each round. The individual participant scores were not shown but presented as an aggregated mean for each question. All scores were weighted equally in determining the aggregation of the mean.

4.4 Study component 2: applying the nominal group technique to agreeing on challenges and proposing solutions

Using the Delphi results and with the assistance of a facilitator using the Greiner (1998) growth model for context, the study group reflected on the challenges faced by academic entrepreneurs operating Entities in the Consortium, and proposed ways to enhance the Consortium to meet these challenges at each Entity growth stage. The facilitator used the NGT to encourage brainstorming and contributions from all stakeholders, with final selections based on a consensus decision.

4.5 Krueger Entrepreneurial Intention model results coding

To mitigate bias, AF and JA coded the Delphi and NGT results to the KEI model domains using a consensus-based approach.

5. Results

A total of 31 eligible study participants consented to participate in the Delphi study with a median age of 58 years and 129 journal articles per participant on average (Supplementary Table 4: Study Participant Profile); of these, 19 participated in the in-person consensus workshop. Because of Covid-19 restrictions and work pressures, we could only have some study participants attend the workshop in person, and thus some participated via video conference. As Delphi studies are time-consuming, multiple rounds of participant attrition can compromise the study's validity (Winkler and Moser, 2016). To compensate for attrition, the number of study participants recruited for the Delphi exceeded the ranges proposed by Okoli and Pawlowski (2004) of 10–18, Rowe and Wright (2001) of 5–20 and Clayton (1997) of 5–10 (15–30 for a homogeneous population).

5.1 Process of the Delphi survey

5.1.1 Round 1. A total of 31 consented study participants identified 22 Characteristics, 24 Enablers, 40 Barriers and 21 Behaviours (Supplementary Table 2).

5.1.2 Round 2. The unranked top ten (11 in the case of Enablers because of a tie) factors for each of the four questions are listed in Table 1.

5.1.3 Consensus workshop (Delphi rounds 3–5). The consensus workshop arranged for Rounds 3–5 of the Delphi was attended by 19 study participants. The results of the final consensus rankings for each of the questions are summarised in Table 2, with the score range of 1 being the most important and 5 the least important.

5.2 Study component 2: nominal group technique agreement of challenges and potential solutions

The NGT process identified seven challenges affecting the academic entrepreneurs as leaders of Entities in the Consortium:

- (1) professional aloneness;
- (2) busyness (workload);
- (3) insufficient shared services support;
- (4) the relative bureaucracy of Wits concerning the entrepreneurial requirements of the Entities;
- (5) general funding constraints;
- (6) problems associated with the growth of Entities; and
- (7) a university with entrepreneurial aspirations not matched by a commercial approach or structure [refers to the perception of a mismatch between the culture of the university, shaped by faculty boards, faculty members, administrative managers and students and the more direct “one-handed CEOs” of the business world (Min, 2017)].

The study group made practical suggestions regarding mentorship and leadership training, in addition to requests to provide systems to empower more direct financial control over their grants and Entity. Furthermore, the study group emphasised the need for developing

Characteristics (Q1)	Enablers (Q2)	Barriers (Q3)	Behaviours (Q4)
• Perseverance and resilience • Displays professional confidence • Building collaborative relationships • Calculated chance-taker • Curious and intellectually adventurous • Creates and innovates • Research competence • Acts ethically, applies ethical judgement, displays honesty and personal integrity • Drive for results (includes ambition) • Networking and connecting	• Networks and collaborators • Reduced bureaucracy • Organisation brand • Wide and varied funding options • Research infrastructure • Seed funding • Association with a prestigious university • Manageable balance between research, clinical, administration and teaching obligations • Available and willing experienced mentors • Values intellectual independence and freedom • Entrepreneurial organisation culture	• Lack of appreciation for the work of the science-leader • Financial sustainability of Entities • Limited funding opportunities or low success rate • Bureaucracy • Inefficiencies when both the Consortium and Wits are involved as parties to the contract • Shortage of discretionary funds for ongoing unfunded activities • Non-responsive shared services support • Innovation not valued or prioritised internally • Finding and employing talented staff • Inefficient research regulatory environment	• Communicate effectively • Manage teams effectively • Be determined and tenacious • Demonstrate leadership ability • Manage projects with discipline • Publish to develop reputation • Take risks mindfully • Acts with courage • Identify, choose and master academic niche area • Work hard and consistently

Source: Authors' own work

Table 1.
Unranked top ten
characteristics,
enablers (11),
barriers and
behaviours of
consortium entity
entrepreneurship

Table 2.
Final Delphi
consensus workshop
ranking results

<i>Question 1: Personal entrepreneurial characteristics</i> (attributes, drivers or motivators) of academics who operate Entities in the Consortium			
Ranking	Characteristics	Mean	SD
1	Perseverance and resilience	2.5	1.6
2	Creates and innovates	2.7	1.2
3	Building collaborative relationships	3.1	1.1
4	Research competence	3.3	1.6
5	Networking and connecting	3.3	1.5
<i>Question 2: Enablers</i> that would motivate an academic to establish and develop an Entity in the Consortium			
Ranking	Enablers	Mean	SD
1	Entrepreneurial organisation culture	2.6	1.4
2	Wide and varied funding options	2.8	1.3
3	Research infrastructure	3.0	1.3
4	Networks and collaborators	3.2	1.5
5	Reduced bureaucracy	3.4	1.6
<i>Question 3: Barriers</i> that would dissuade an academic from establishing and developing an Entity in the Consortium			
Ranking	Barriers	Mean	SD
1	Limited funding opportunities or low success rate	2.6	1.5
2	Non-responsive shared services support	2.8	1.6
3	Shortage of discretionary funds for ongoing, unfunded activities	3.1	1.2
4	Bureaucracy	3.2	1.3
5	Inefficiencies when both the Consortium and Wits are involved as parties to the contract	3.3	1.6
<i>Question 4: Behaviours</i> (actions) required to successfully establish an Entity in the Consortium			
Ranking	Behaviours	Mean	SD
1	Demonstrate leadership ability	2.3	1.5
2	Identify, choose, and master academic niche area	2.8	1.6
3	Work hard and consistently	3.1	1.3
4	Manage teams effectively	3.2	1.3
5	Communicate effectively	3.7	1.1
Source: Authors' own work			

networks and collaborative relationships. The NGT results are detailed in Supplementary Table 3.

6. Discussion

The Delphi and NGT processes drew upon the expertise of successful academic entrepreneurs, with findings generally aligning with our previous scoping review (Farrell *et al.*, 2022) and a recently published article by Garbutt *et al.* (2019) investigating innovation and entrepreneurship skills of HIC (USA) biomedical researchers. For the *Characteristics* domain, all factors selected during the Delphi aligned with the scoping review findings and the study by Garbutt *et al.* (2019). The scoping review also highlighted collaboration with industry as the more meaningful path to economic entrepreneurship in an LMIC, compared with HICs where licencing of intellectual property, royalties and spinouts are the primary activities (Belitski *et al.*, 2019; Fischer *et al.*, 2019). Despite well-developed research programmes with meaningful output, their application and commercialisation potential are limited in LMICs (Al-Bader *et al.*, 2010; Belitski *et al.*, 2019). The *Enabler* domain Delphi and scoping review findings aligned. The scoping review also highlighted that state funding of

research and development was an essential enabler of entrepreneurship (Al-Bader *et al.*, 2010; Chang *et al.*, 2006; Guerrero and Urbano, 2017; Gür *et al.*, 2017). Garbutt *et al.*s. (2019) study only aligned with “wide and varied funding options” and, to some degree, “working with outside partners and institutions”, being a nod to our study’s “*strong networks and collaborators*” factor. There was less correlation between this study and the previous scoping review findings concerning the *Barrier* domain because the Delphi study participants focused on organisational issues relating to the relationship between their Entity, Wits and the Consortium. However, there was an alignment of “limited funding opportunities or low funding application success rate” and “shortage of discretionary funds for ongoing unfunded activities”. Garbutt *et al.* (2019) identified knowledge of funding sources and how to apply for these as a necessary competence. Lastly, there was limited alignment for the *Behaviour* domain between our Delphi findings and the scoping review other than “demonstrate leadership ability” highlighted as significant (Behroozi, 2012). All our Delphi Behaviour domain factors were similar to the competencies that Garbutt *et al.* (2019) identified.

The NGT discussion centred on challenges faced by the study participants operating and sustaining their Entities within the Consortium. Funding constraints are a well-documented aspect of academic entrepreneurialism (Davey, 2016; King and Sen, 2013) and the findings of this study align with the literature. While entrepreneurs may be focused more on opportunity than resources (Grünhagen and Volkmann, 2014), their capacity to capitalise on knowledge becomes a basis for the enhanced role of the university in society (Etzkowitz, 2004). Environmental constraints for funding result in the emergence of academic capitalism (Slaughter and Leslie, 2001), through which academics act as capitalists, responding to markets with for-profit, market-like behaviours, competing for funding from external providers and “going without” if they fail. “The lack of funding can constitute a formal institutional barrier that may deter the intention of the academic to pursue the opportunity” (Davey, 2016). It also forms a schism between the Entity’s leader and Wits, as Entity personnel receive non-project-specific funding, managed according to Wits’ regulations that inefficiently align with how Entities operate.

The misalignment of entrepreneurial aspiration and a commercial approach and structure, and the non-supportive attitude of universities towards academic entrepreneurs, are widely described (Grünhagen and Volkmann, 2014). Maintaining a balance between traditional academic duties and entrepreneurial activities is challenging for those academics operating at the boundary of two organisations. Academic and administrative university actors often draw on market ideology to justify their activities, demonstrating and confirming their ideology to the university (Slaughter and Leslie, 2001); “Ironically, these groups of organisational actors do not necessarily have to be successful at what they do”. While some have a tangible impact on the university and the research programme, others only have to maintain their engagement with market-like activity to continue receiving institutional support. The reason for this is the lack of clear rules or expectations and because “virtually any market activities are considered good in and of themselves” (Slaughter and Leslie, 2001). It is easy for entrepreneurially orientated Entity leaders to misunderstand peers or administrators as each has their own understanding of what makes universities function. This malalignment is highlighted in this study by the view of a perceived lack of urgency and mission alignment on the part of administrators within Wits and the Consortium.

A theme emerging from the NGT is that of the Entity leader’s loneliness. Levinsohn (2015) suggests loneliness as part of the learning experience that entrepreneurs (not specifically academic entrepreneurs) move through in the process of building ventures in

unstructured environments. [Fernet et al. \(2016\)](#) find that small venture owner-managers who are less proactive, innovative or risk-taking react more negatively to loneliness and are at greater risk for burnout. Throughout the NGT, study participants proposed mentorship as a potential solution to loneliness. Study participants uniformly used the word “mentor” to describe both conventional mentorships, whereby an asymmetrical support relationship provides a less experienced person with the support and guidance of one who is more experienced and skilled, and an additional form of support that is akin to “executive coaching” ([Peterson, 2011](#)). The NGT proposed the value of mentoring, networking and collaboration [aligns with [Garbutt et al. \(2019\)](#)] as supportive enablers for the Entity leader; each works to reduce the experience of loneliness and connect the academic entrepreneur to peers.

A theme emerging from the discussion was problems associated with Entities’ growth. [Greiner \(1998\)](#) provides an architecture for understanding the various crises of control that a growing organisation is likely to experience throughout its development, and members of the panel recognised its value in their context. Two themes were particularly notable:

- (1) the rising level of complexity that academic entrepreneurs need to deal with as the Entity expands; and
- (2) the increasing number of projects, number of staff and stakeholder expectations.

From simple, single project origins, the destiny of successful Entities is to become large, multifaceted organisations that require the academic entrepreneurs to lead in sophisticated ways, to maintain the values and direction of the operation while simultaneously managing staff and organisational performance, resources, university and other stakeholders (including funder) expectations ([Boal and Whitehead, 1992](#)).

The NGT also identified the difficulty faced in spawning new Entities. At a time in the life of an Entity, scientists who have been part of the team may wish to leave to establish their own Entity. This newly spawned Entity competes potentially for the same resources as the parent Entity, and whilst for its newly independent members, the split can be exciting and energising, for their former team members, it can be a disappointing and tiring experience.

6.1 Revised conceptual model

Our findings coded to the KEI model domains ([Table 3](#)) highlight the need for an adaptation of the KEI model when applied in LMIC settings in the following:

- reintroducing the precipitating event element as a precursor to intention, as is included in [Krueger and Brazeal \(1994\)](#) model; and
- proposing the introduction of an activation mitigator (disruptors and enhancers) to the intentions-to-action link that may serve to identify obstacles to poor success in fostering academic entrepreneurship in LMICs

Our suggested changes to the KEI model are presented in [Figure 2](#).

We coded the results of our study to the KEI model to test its efficacy in respect of the cohort investigated as a method of assessing differences between academic entrepreneurship in HIC and LMIC settings. The personal and situational context-specific exogenous factors that emerged from our study and which we coded to the adapted KEI model domains are detailed in [Table 3](#).

The first contribution of this study to an adapted KEI model is the issue of displacement or precipitating factors. [Shapero and Sokol \(1982\)](#) first introduced the concept of

Adapted KEI model domain	Factors identified during the Delphi and NGT process
Personal desirability (exogenous contextual factors)	• Sense of isolation and feeling alone • Risk of senior academic staff career mobility when exposed to new opportunities
Perceived social norms (exogenous contextual factors)	• Entrepreneurial organisation culture • Networks and collaborators
Perceived self-efficacy (exogenous contextual factors)	• Research competence • Networking and connecting • Research infrastructure • Identify, choose and master academic niche area • Demonstrate leadership ability • Manage teams effectively • Communicate effectively • Empowering academics to manage their grants more closely
Perceived collective efficacy (exogenous contextual factors)	• Wide and varied funding options • Networks and collaborators • Reduced bureaucracy • Limited funding opportunities or low success rate • Non-responsive shared services support • Bureaucracy • Institutional inefficiencies around contract • Mentoring and guidance • Project management support and training • Establishment of a fund for intramural programmes
Propensity to act (characteristics)	• Perseverance and resilience • Creates and innovates • Building collaborative relationships • Work hard and consistently • Directors over-stretched
Activation mitigators (disruptors and enhancers)	• Shortage of discretionary funds for ongoing, unfunded activities • Pressure solely on Entity director for establishment and maintenance of the Entity • Pressure of unreasonable institutional expectations on Entity directors at each maturity stage as the Entity grows and evolves • Administration complexities associated with international grants at odds with limited funding for the development of a platform to enable compliance – requires lobbying international funders for higher indirect rates on grants • Universities are not established as corporate entities, which is an impediment to entrepreneurial activation

Source: Authors' own work

Table 3.
Assignment of
Delphi workshop and
NGT factors to the
adapted Krueger
entrepreneurial
intentions model

“displacement event” as a central component of their entrepreneurial event formation model but contributed nothing to a theory-based conceptualisation beyond a helpful categorisation of triggers. In early versions, [Krueger \(2000\)](#) and [Krueger and Brazeal \(1994\)](#) follow [Shapero and Sokol \(1982\)](#) by including “Precipitating Event” in their model graphic. However, in later versions, [Krueger \(2003\)](#) and [Krueger \(2009\)](#) omit this inclusion, despite noting in their discussion that the “Precipitating Event” factor should be considered as a precursor to the development of “Intentions”. Thus, there is yet to be a finalised view from Krueger about the

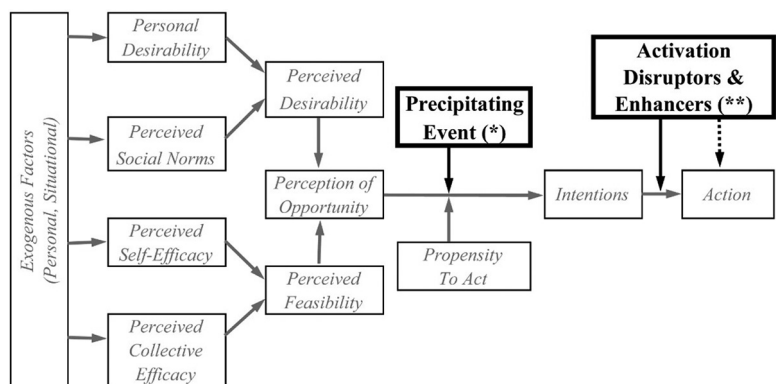


Figure 2.
Adapted Krueger
Intention-Based
Model (Krueger, 2009)

Notes: MODEL ADAPTATION: (*) “Precipitating Event” included as per Krueger & Brazeal (1994). (**) “Activation Mitigators (Disruptors & Enhancers)” adaptation

fate of precipitating events as an element in a finalised intention-based model, although he did propose further investigation on how social entrepreneurs deal with precipitating events (Krueger *et al.*, 2008).

Whilst the issue of factors precipitating intention did not emerge in the Delphi rounds, there was discussion at the consensus workshop regarding the role of Covid-19 in stimulating academic entrepreneurs to align research and access new funding for those who could adapt to the new research opportunity. Also, the discussion highlighted how precipitous moments resulted when new entities were spawned from their established parent organisations. Therefore, including *Precipitating Event* in the model graphic requires additional investigation, but we believe there is merit in adding it to the adapted model.

A further adaptation to the KEI model, suggested by this study, is the inclusion of a category of *Activation Mitigators*, factors that may positively or negatively affect the intention–action link. These factors may reduce or derail the academic’s transition to entrepreneurial action in unfavourable settings. Intentions are only indirectly affected by the perceived benefits of academic entrepreneurial engagement, although longitudinal results show that entrepreneurial intentions can forecast entrepreneurial behaviour with certain barriers potentially diminishing this relationship (Goethner *et al.*, 2012). The results highlighted a series of factors that may moderate entrepreneurial activation. These include issues such as:

- the shortage of funds for activities or resources needed to build the research entity and the high levels of demand this places on leaders to be everywhere and involved in every level of operation;
- general organisational pressures faced by the director;
- the pressure of institutional expectations on directors as each new maturity stage is reached;
- the inherent misalignment between the entrepreneurial Entity and the non-business-like Wits; and
- international funding being so prescriptive about indirect funding with consequent limited institutional support provided.

We propose grouping these activation mitigators into three groups, and addressing these is crucial in promoting academic entrepreneurship in LMICs:

- (1) Entrepreneurial ecosystem: academics can only engage with society and be entrepreneurial if the system within which they exist supports this approach. Entrepreneurial anxiety is an emotional response caused by a person's cognitive evaluations of potential threats to the pursuit of an entrepreneurial behaviour, which affects the person's intent to be an entrepreneur, primarily caused by a lack of an appropriate entrepreneurial ecosystem (Ukil, 2022). The weak entrepreneurial ecosystems prevalent in LMICs add complexity to the entrepreneurial university notion, which requires a holistic macro response involving reconsideration of labour market policies, financial market regulation, competition policy, trade regimes and others, failing which the independent initiatives at the micro (university) level will prove fruitless (Fischer *et al.*, 2019).
- (2) University's organisational structure: As universities move towards a greater entrepreneurial orientation, consideration of the organisational structure necessary to support this aspiration is vital. It has been shown that managerial support is a crucial element in the creation of an organisational environment that fosters innovation and entrepreneurship (Moraes *et al.*, 2023). Despite being successful academic entrepreneurs, the study participants still expressed dissatisfaction with the structural deficiencies within the Consortium and Wits. This aligns with Guo *et al.* (2019), who identified the importance of contextual contingencies on academic entrepreneurship, proposing a dynamic, rather than static, environment that legitimises the entrepreneurial pursuit of academics. This is supported by Kalar and Antoncic (2015), who found that the academics' perception of entrepreneurial orientation within their institution influenced their engagement in certain activities.
- (3) Debilitating environmental factors: Serious crime (Guerrero and Urbano, 2017), academic independence challenges (Bergan and Harkavy, 2020; Habib *et al.*, 2008), lack of human and other resources (Kamunyori *et al.*, 2010), poor to non-existent infrastructure (Kamunyori *et al.*, 2010) and political instability (Kamunyori *et al.*, 2010) are all severe barriers to entrepreneurial activation, with these factors being typical of an LMIC setting.

7. Practical implications

University leadership should optimise the ability of their scarce academic entrepreneur resource to navigate their deficient environment by providing formal coaching support, mentoring programmes and strategic leadership training to develop the skills and confidence to optimise the limited resources in their setting.

Universities must support academic entrepreneurs to develop and maintain their professional networks by instituting knowledge-sharing opportunities amongst their peers to promote network creation. Whilst the preference is for collaboration with HIC counterparts, LMIC universities should also encourage local collaboration as this provides additional locally relevant opportunities and benefits.

The university should establish a fund for seed capital and Entity investment purposes, allocated on a return-on-investment basis. In addition, to minimise dependence on the university for funding, it should provide a pool of mentors with experience securing finance and investment who can assist academic entrepreneurs with their finance and capital-raising requirements.

The university business model must integrate academic entrepreneurship alongside the research and teaching priorities that have traditionally informed strategy. This includes setting entrepreneurially oriented targets and allocating resources. In addition, performance evaluation processes should include entrepreneurial indicators so that the academic entrepreneurs' performance is fairly and equitably evaluated and appropriately recognised.

8. Limitations and directions for future research

This study's main limitation arises from using a group decision-making approach with a smaller localised study group complicating generalisability. In addition, the Consortium's structure impedes generalisability as the input from the study group may not be relevant in other university contexts.

A challenge of the Delphi approach is the loss of participants during the study period and the time between study stages because of COVID-related disruptions (more than 12 months from study commencement to consensus workshop). While we mitigated this by commencing the study with a larger cohort than recommended and used a consensus workshop for final selection and ranking, the lengthy and inconsistent continuity should be noted.

The study identified entrepreneurship factors that were reasonably consistent with similar studies conducted in HIC settings and generally supported the KEI model application in LMIC settings. However, intentional behaviours do not necessarily lead to action, even for active entrepreneurs (Botha *et al.*, 2019), and further research would be valuable in exploring this for LMIC settings where many factors such as crime, over-work, low levels of funding and socioeconomic deficiencies serve to negatively moderate activation. Therefore, we recommend investigating the inclusion of the *Precipitating Event* and *Activation Mitigator* domains in the KEI model to advance its use in LMIC settings.

9. Conclusion

Using intentions-based models to explain entrepreneurship in academic settings in LMICs is less efficacious than when applied in HICs. We have found that this is because of the predominance of the economic metric when evaluating entrepreneurial activity in HICs, and the failure to recognise significant structural, economic and environmental barriers facing entrepreneurial academics in LMICs. Models must be adapted or developed to support the investigation of the academic as entrepreneur in LMIC settings, with universities in these contexts compelled to adopt an entrepreneurial approach in response to an increasingly competitive sector, with the academic as the principal actor giving substance to the strategy.

References

- Ajzen, I. (1991), "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211, doi: [10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
- Al-Bader, S., Daar, A.S. and Singer, P.A. (2010), "Science-based health innovation in Ghana: health entrepreneurs point the way to a new development path", *BMC International Health and Human Rights*, Vol. 10 No. S1, p. S2, doi: [10.1186/1472-698X-10-S1-S2](https://doi.org/10.1186/1472-698X-10-S1-S2).
- Beckman, G.D. and Cherwitz, R.A. (2009), "Intellectual entrepreneurship: an authentic foundation for higher education reform", *Planning for Higher Education*, Vol. 37 No. 4, p. 27, available at: <http://ut-ie.com/articles/ed-reform.pdf> (accessed 12 December 2022).
- Behroozi, M. (2012), "Survey on university role in preparation graduated students in to entrepreneurs universities towards a conceptual framework: Iran's perspective", *Procedia – Social and Behavioral Sciences*, Vol. 46, pp. 2414-2418, doi: [10.1016/j.sbspro.2012.05.495](https://doi.org/10.1016/j.sbspro.2012.05.495).

- Belitski, M., Aginskaja, A. and Marozau, R. (2019), "Commercializing university research in transition economies: technology transfer offices or direct industrial funding?", *Research Policy*, Vol. 48 No. 3, pp. 601-615, doi: [10.1016/j.respol.2018.10.011](https://doi.org/10.1016/j.respol.2018.10.011).
- Bergan, S. and Harkavy, I. (2020), *Academic Freedom, Institutional Autonomy and the Future of Democracy*, Council of Europe, Higher Education, Series, 24, pp. 15-28, ISBN 978-92-871-9018-5, available at: <https://rm.coe.int/prems-025620-eng-2508-higher-education-series-no-24/1680a19fdf>
- Boal, K. and Whitehead, C. (1992), "A critique and extension of the stratified systems theory perspective", in Phillips, R.L. and Hunt, J.G. (Eds), *Strategic Leadership: A Multiorganizational-Level Perspective*, Quorum Books/Greenwood Publishing Group, Vol. 14, pp. 237-253, ISBN 10: 0899307566, ISBN 13: 9780899307565, available at: <http://kimboal.ba.ttu.edu/Selected%20writings/Critique%20&%20Extension%20of%20Stratified%20Systems1.pdf>
- Botha, M., Carruthers, T.J. and Venter, M.W. (2019), "The relationship between entrepreneurial competencies and the recurring entrepreneurial intention and action of existing entrepreneurs", *The Southern African Journal of Entrepreneurship and Small Business Management*, Vol. 11 No. 1, pp. 1-15, doi: [10.4102/sajesbm.v11i1.191](https://doi.org/10.4102/sajesbm.v11i1.191).
- Broström, A., Buenstorf, G. and McKelvey, M. (2021), "The knowledge economy, innovation and the new challenges to universities: introduction to the special issue", *Innovation*, Vol. 23 No. 2, pp. 145-162, doi: [10.1080/14479338.2020.1825090](https://doi.org/10.1080/14479338.2020.1825090).
- Chang, Y.C., Chen, M.H., Hua, M. and Yang, P.Y. (2006), "Managing academic innovation in Taiwan: towards a 'scientific-economic' framework", *Technological Forecasting and Social Change*, Vol. 73 No. 2, pp. 199-213, doi: [10.1016/j.techfore.2004.10.004](https://doi.org/10.1016/j.techfore.2004.10.004).
- Clayton, M.J. (1997), "Delphi: a technique to harness expert opinion for critical decision-making tasks in education", *Educational Psychology*, Vol. 17 No. 4, pp. 373-386, doi: [10.1080/0144341970170401](https://doi.org/10.1080/0144341970170401).
- Dalmarco, G., Hulsink, W. and Blois, G.V. (2018), "Creating entrepreneurial universities in an emerging economy: evidence from Brazil", *Technological Forecasting and Social Change*, Vol. 135, pp. 99-111, doi: [10.1016/j.techfore.2018.04.015](https://doi.org/10.1016/j.techfore.2018.04.015).
- Davey, T., Rossano, S. and van der Sijde, P. (2016), "Does context matter in academic entrepreneurship? The role of barriers and drivers in the regional and national context", *The Journal of Technology Transfer*, Vol. 41 No. 6, pp. 1457-1482, doi: [10.1007/s10961-015-9450-7](https://doi.org/10.1007/s10961-015-9450-7).
- Etzkowitz, H. (1983), "Entrepreneurial scientists and entrepreneurial universities in American academic science", *Minerva*, Vol. 21 Nos 2/3, pp. 198-233, doi: [10.1007/BF01097964](https://doi.org/10.1007/BF01097964).
- Etzkowitz, H. (2004), "The evolution of the entrepreneurial university", *International Journal of Technology and Globalisation*, Vol. 1 No. 1, p. 64, doi: [10.1504/IJTG.2004.004551](https://doi.org/10.1504/IJTG.2004.004551).
- Etzkowitz, H. (2013), "Anatomy of the entrepreneurial university", *Social Science Information*, Vol. 52 No. 3, pp. 486-511, doi: [10.1177/0539018413485832](https://doi.org/10.1177/0539018413485832).
- Etzkowitz, H., Webster, A., Gebhardt, C. and Terra, B.R.C. (2000), "The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm", *Research Policy*, Vol. 29 No. 2, pp. 313-330, doi: [10.1016/S0048-7333\(99\)00069-4](https://doi.org/10.1016/S0048-7333(99)00069-4).
- Evaluation Briefs (2018), "Gaining consensus among stakeholders through the nominal group technique. No. 7", Updated August 2018, available at: www.cdc.gov/healthyyouth/evaluation/pdf/brief7.pdf (accessed 19 December 2021).
- Farrell, A., Mapanga, W., Chitha, N., Ashton, J. and Joffe, M. (2022), "Characteristics, enablers and barriers affecting entrepreneurial behaviour for academics in low- and middle-income countries: a scoping review", *Development Southern Africa*, Vol. 39 No. 4, pp. 589-603, doi: [10.1080/0376835X.2022.2027230](https://doi.org/10.1080/0376835X.2022.2027230).
- Fernet, C., Torrès, O., Austin, S. and St-Pierre, J. (2016), "The psychological costs of owning and managing an SME: linking job stressors, occupational loneliness, entrepreneurial orientation, and burnout", *Burnout Research*, Vol. 3 No. 2, pp. 45-53, doi: [10.1016/j.burn.2016.03.002](https://doi.org/10.1016/j.burn.2016.03.002).

- Fischer, B.B., Moraes, G.H.S.M.D. and Schaeffer, P.R. (2019), "Universities' institutional settings and academic entrepreneurship: notes from a developing country", *Technological Forecasting and Social Change*, Vol. 147, pp. 243-252, doi: [10.1016/j.techfore.2019.07.009](https://doi.org/10.1016/j.techfore.2019.07.009).
- Garbutt, J., Antes, A., Mozersky, J., Pearson, J., Grailer, J., Toker, E. and DuBois, J. (2019), "Validating curricular competencies in innovation and entrepreneurship for biomedical research trainees: a modified Delphi approach", *Journal of Clinical and Translational Science*, Vol. 3 No. 4, pp. 165-183, doi: [10.1017/cts.2019.390](https://doi.org/10.1017/cts.2019.390).
- Goethner, M., Obschonka, M., Silbereisen, R.K. and Cantner, U. (2012), "Scientists' transition to academic entrepreneurship: economic and psychological determinants", *Journal of Economic Psychology*, Vol. 33 No. 3, pp. 628-641, doi: [10.1016/j.joep.2011.12.002](https://doi.org/10.1016/j.joep.2011.12.002).
- Greiner, L. (1998), "Evolution and revolution as organizations grow", *Harvard Business Review*, Vol. 76 No. 3, pp. 55-67.
- Grünhagen, M. and Volkmann, C.K. (2014), "Antecedents of academics' entrepreneurial intentions - developing a people-oriented model for university entrepreneurship", *International Journal of Entrepreneurial Venturing*, Vol. 6 No. 2, p. 179, doi: [10.1504/IJEV.2014.062751](https://doi.org/10.1504/IJEV.2014.062751).
- Guerrero, M. and Urbano, D. (2017), "The impact of triple helix agents on entrepreneurial innovations' performance: an inside look at enterprises located in an emerging economy", *Technological Forecasting and Social Change*, Vol. 119, pp. 294-309, doi: [10.1016/j.techfore.2016.06.015](https://doi.org/10.1016/j.techfore.2016.06.015).
- Guo, F., Restubog, S.L.D., Cui, L., Zou, B. and Choi, Y. (2019), "What determines the entrepreneurial success of academics? Navigating multiple social identities in the hybrid career of academic entrepreneurs", *Journal of Vocational Behavior*, Vol. 112, pp. 241-254, doi: [10.1016/j.jvb.2019.03.003](https://doi.org/10.1016/j.jvb.2019.03.003).
- Gür, U., Oylumlü, İ.S. and Kunday, Ö. (2017), "Critical assessment of entrepreneurial and innovative universities index of Turkey: future directions", *Technological Forecasting and Social Change*, Vol. 123, pp. 161-168, doi: [10.1016/j.techfore.2016.09.008](https://doi.org/10.1016/j.techfore.2016.09.008).
- Habib, A., Morrow, S. and Bentley, K. (2008), "Academic freedom, institutional autonomy and the corporatised university in contemporary South Africa 1", *Social Dynamics*, Vol. 34 No. 2, pp. 140-155, doi: [10.1080/02533950802280022](https://doi.org/10.1080/02533950802280022).
- Harris, P.A., Taylor, R., Minor, B.L., Elliott, V., Fernandez, M., O'Neal, L., McLeod, L., Delacqua, G., Delacqua, F., Kirby, J. and Duda, S.N. (2019), "The REDCap consortium: Building an international community of software platform partners", *Journal of Biomedical Informatics*, Vol. 95, p. 103208, doi: [10.1016/j.jbi.2019.103208](https://doi.org/10.1016/j.jbi.2019.103208).
- Heng, L.H., Rasli, A.M. and Senin, A.A. (2012), "Knowledge determinant in university commercialization: a case study of Malaysia public university", *Procedia – Social and Behavioral Sciences*, Vol. 40, pp. 251-257, doi: [10.1016/j.sbspro.2012.03.187](https://doi.org/10.1016/j.sbspro.2012.03.187).
- Kafourous, M., Wang, C., Piperopoulos, P. and Zhang, M. (2015), "Academic collaborations and firm innovation performance in China: the role of region-specific institutions", *Research Policy*, Vol. 44 No. 3, pp. 803-817, doi: [10.1016/j.respol.2014.11.002](https://doi.org/10.1016/j.respol.2014.11.002).
- Kalar, B. and Antoncic, B. (2015), "The entrepreneurial university, academic activities and technology and knowledge transfer in four European countries", *Technovation*, Vols 36/37, pp. 1-11, doi: [10.1016/j.technovation.2014.11.002](https://doi.org/10.1016/j.technovation.2014.11.002).
- Kamunyor, S., Al-Bader, S., Sewankambo, N., Singer, P.A. and Daar, A.S. (2010), "Science-based health innovation in Uganda: creative strategies for applying research to development", *BMC International Health and Human Rights*, Vol. 10 No. S1, p. S5, doi: [10.1186/1472-698X-10-S1-S5](https://doi.org/10.1186/1472-698X-10-S1-S5).
- Kautonen, T., van Gelderen, M. and Tornikoski, E.T. (2013), "Predicting entrepreneurial behaviour: a test of the theory of planned behaviour", *Applied Economics*, Vol. 45 No. 6, pp. 697-707, doi: [10.1080/00036846.2011.610750](https://doi.org/10.1080/00036846.2011.610750).
- King, G. and Sen, M. (2013), "The troubled future of colleges and universities", *PS: Political Science and Politics*, Vol. 46 No. 1, pp. 83-89, doi: [10.1017/S1049096512001606](https://doi.org/10.1017/S1049096512001606).

- Kolvereid, L. (1996), "Prediction of employment status choice intentions", *Entrepreneurship Theory and Practice*, Vol. 21 No. 1, pp. 47-58, doi: [10.1177/104225879602100104](https://doi.org/10.1177/104225879602100104).
- Krueger, N.F. (2000), "The cognitive infrastructure of opportunity emergence", *Entrepreneurship Theory and Practice*, Vol. 24 No. 3, pp. 5-24, doi: [10.1177/104225870002400301](https://doi.org/10.1177/104225870002400301).
- Krueger, N.F. (2003), "The cognitive psychology of entrepreneurship", *Handbook of Entrepreneurship Research*, Springer US, Boston, MA, pp. 105-140, doi: [10.1007/0-387-24519-7_6](https://doi.org/10.1007/0-387-24519-7_6).
- Krueger, N. (2009), "Entrepreneurial intentions are dead: long live entrepreneurial intentions", *Understanding the Entrepreneurial Mind*, Springer, New York, NY, pp. 51-72, doi: [10.1007/978-1-4419-0443-0_4](https://doi.org/10.1007/978-1-4419-0443-0_4).
- Krueger, N.F. and Brazeal, D.V. (1994), "Entrepreneurial potential and potential entrepreneurs", *Entrepreneurship Theory and Practice*, Vol. 18 No. 3, pp. 91-104, doi: [10.1177/104225879401800307](https://doi.org/10.1177/104225879401800307).
- Krueger, N.F., Schulte, W.D. and Stamp, J. (2008), "Beyond intent: antecedents of resilience and precipitating events for social entrepreneurial intentions and ... action", *SSRN Electronic Journal*, doi: [10.2139/ssrn.1155264](https://doi.org/10.2139/ssrn.1155264).
- Levinsohn, D. (2015), "No entrepreneur is an island: an exploration of social entrepreneurial learning in accelerators", PhD dissertation, Jönköping University, Jönköping International Business School, available at: <http://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-26687>
- Lortie, J. and Castogiovanni, G. (2015), "The theory of planned behavior in entrepreneurship research: what we know and future directions", *International Entrepreneurship and Management Journal*, Vol. 11 No. 4, pp. 935-957, doi: [10.1007/s11365-015-0358-3](https://doi.org/10.1007/s11365-015-0358-3).
- Low, M.B. and MacMillan, I.C. (1988), "Entrepreneurship: past research and future challenges", *Journal of Management*, Vol. 14 No. 2, pp. 139-161, doi: [10.1177/014920638801400202](https://doi.org/10.1177/014920638801400202).
- Mapanga, W., Norris, S.A., Chen, W.C., Blanchard, C., Graham, A., Baldwin-Ragaven, L., Boyles, T., Donde, B., Greef, L., Huddle, K., Khumalo, B., Leepile, E., Lubuzo, B., Makhutle, R., Mayet, Y., Tsitsi, M., Mistri, P., Mmoledi, K., Ratshikana-Moloko, M., Morer, R., Pretorius, L., Punwasi, J., Richards, G.A., Ruff, P., Shabalala, D., Sibadela, M., Soma, N., Wong, M. and Joffe, M. (2021), "Consensus study on the health system and patient-related barriers for lung cancer management in South Africa", *Plos One*, Vol. 16 No. 2, p. e0246716, doi: [10.1371/journal.pone.0246716](https://doi.org/10.1371/journal.pone.0246716).
- Miller, K., Alexander, A., Cunningham, J.A. and Albats, E. (2018), "Entrepreneurial academics and academic entrepreneurs: a systematic literature review", *International Journal of Technology Management*, Vol. 77 Nos 1/2/3, p. 9, doi: [10.1504/IJTM.2018.091710](https://doi.org/10.1504/IJTM.2018.091710).
- Min, J. (2017), "Mergers in higher education: a case study of organizational culture, communication and conflict management strategies in the university system of Georgia", Doctor of International Conflict Dissertations, Vol. 11, available at: http://digitalcommons.kennesaw.edu/incmdoc_etd/11
- Mollas-Gallart, J., Salter, A., Patel, P., Scott, A. and Duran, X. (2002), "Measuring third stream activities, report to the Russell group universities", available at: www.researchgate.net/publication/246796517_Measuring_Third_Stream_Activities (accessed 12 December 2022).
- Moraes, G.H.S.M.D., Spers, E.E., Mendes, L. and Silva, H.M.R.D. (2023), "Corporate entrepreneurship at the university: the influence of managerial support, autonomy and reward on the innovative behavior of university professors", *Journal of Entrepreneurship in Emerging Economies*, Vol. 15 No. 2, pp. 404-424, doi: [10.1108/JEEE-07-2021-0287](https://doi.org/10.1108/JEEE-07-2021-0287).
- Okoli, C. and Pawlowski, S.D. (2004), "The Delphi method as a research tool: an example, design considerations and applications", *Information and Management*, Vol. 42 No. 1, pp. 15-29, doi: [10.1016/j.im.2003.11.002](https://doi.org/10.1016/j.im.2003.11.002).
- Peterson, D.B. (2011), "Executive coaching: a critical review and recommendations for advancing the practice", *APA Handbook of Industrial and Organizational Psychology: Selecting and Developing Members for the Organization*, American Psychological Association, Vol. 2, pp. 527-566, doi: [10.1037/12170-018](https://doi.org/10.1037/12170-018).

- Rowe, G. and Wright, G. (2001), "Expert opinions in forecasting: the role of the Delphi technique", in Armstrong, J.S. (Eds), *Principles of Forecasting. International Series in Operations Research and Management Science*, Springer, Boston, MA, Vol. 30, doi: [10.1007/978-0-306-47630-3_7](https://doi.org/10.1007/978-0-306-47630-3_7).
- Segal, G., Borgia, D. and Schoenfeld, J. (2005), "The motivation to become an entrepreneur", *International Journal of Entrepreneurial Behavior & Research*, Vol. 11, pp. 42-57, doi: [10.1108/13552550510580834](https://doi.org/10.1108/13552550510580834).
- Shapero, A. and Sokol, L. (1982), "Social dimensions of entrepreneurship", in Kent, C., Sexton, D. and Vesper, K. (Eds), *The Encyclopedia of Entrepreneurship*, Prentice-Hall, Englewood Cliffs, NJ, pp. 72-90.
- Slaughter, S. and Leslie, L.L. (2001), "Expanding and elaborating the concept of academic capitalism", *Organization*, Vol. 8 No. 2, pp. 154-161, doi: [10.1177/1350508401082003](https://doi.org/10.1177/1350508401082003).
- Sormani, E., Baaken, T. and van der Sijde, P. (2022), "What sparks academic engagement with society? A comparison of incentives appealing to motives", *Industry and Higher Education*, Vol. 36 No. 1, pp. 19-36, doi: [10.1177/095042221994062](https://doi.org/10.1177/095042221994062).
- Stevenson, H. (1983), *A Perspective on Entrepreneurship*, Harvard Business School Background Note 384-131, October 1983. (Revised April 2006).
- Stevenson, H.H. and Jarillo, J.C. (2007), "A paradigm of entrepreneurship: Entrepreneurial management", *Entrepreneurship*, Springer, Berlin Heidelberg, pp. 155-170, doi: [10.1007/978-3-540-48543-8_7](https://doi.org/10.1007/978-3-540-48543-8_7).
- Thomas, E. and Pugh, R. (2020), "From 'entrepreneurial' to 'engaged' universities: social innovation for regional development in the global South", *Regional Studies*, Vol. 54 No. 12, pp. 1631-1643, doi: [10.1080/00343404.2020.1749586](https://doi.org/10.1080/00343404.2020.1749586).
- Ukil, M.I. (2022), "Entrepreneurial anxiety: an empirical investigation in Bangladesh", *Journal of Entrepreneurship in Emerging Economies*, Vol. ahead-of-print No. ahead-of-print, doi: [10.1108/JEEE-05-2022-0143](https://doi.org/10.1108/JEEE-05-2022-0143).
- Van de Ven, A.H. and Delbecq, A.L. (1974), "The effectiveness of nominal, Delphi, and interacting group decision making processes", *Academy of Management Journal*, Vol. 17 No. 4, pp. 605-621, doi: [10.2307/255641](https://doi.org/10.2307/255641).
- Van Niekerk, L., Mathanga, D.P., Juban, N., Castro-Arroyave, D.M. and Balabanova, D. (2020), "Universities as catalysts of social innovation in health systems in low-and middle-income countries: a multi-country case study", *Infectious Diseases of Poverty*, Vol. 9 No. 1, p. 90, doi: [10.1186/s40249-020-00684-5](https://doi.org/10.1186/s40249-020-00684-5).
- Winkler, J. and Moser, R. (2016), "Biases in future-oriented Delphi studies: a cognitive perspective", *Technological Forecasting and Social Change*, Vol. 105, pp. 63-76, doi: [10.1016/j.techfore.2016.01.021](https://doi.org/10.1016/j.techfore.2016.01.021).
- Wits Health Consortium Annual Report (2020), "Wits health consortium reports", available at: www.witshealth.co.za/Stakeholders/Reports
- Woodcock, T., Adeleke, Y., Goeschel, C., Pronovost, P. and Dixon-Woods, M. (2020), "A modified Delphi study to identify the features of high quality measurement plans for healthcare improvement projects", *BMC Medical Research Methodology*, Vol. 20 No. 1, p. 8, doi: [10.1186/s12874-019-0886-6](https://doi.org/10.1186/s12874-019-0886-6).

Author affiliations

Alfred Austin Farrell, GLF Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa; SAMRC/Wits Developmental Pathways to Health Research Unit, Department of Paediatrics, Faculty of the Health Sciences, University of the Witwatersrand, Johannesburg, South Africa and Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa

James Ashton, GLF Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa and SAMRC/Wits Developmental Pathways to Health Research Unit, Department of Paediatrics, Faculty of the Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Witness Mapanga, Noncommunicable Diseases Research Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa; SAMRC/Wits Developmental Pathways to Health Research Unit, Department of Paediatrics, Faculty of the Health Sciences, University of the Witwatersrand, Johannesburg, South Africa and Division of Medical Oncology, Department of Medicine, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Maureen Joffe, GLF Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa; Noncommunicable Diseases Research Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa; SAMRC/Wits Developmental Pathways to Health Research Unit, Department of Paediatrics, Faculty of the Health Sciences, University of the Witwatersrand, Johannesburg, South Africa and Strengthening Oncology Services Research Unit, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Nombulelo Chitha, GLF Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa and Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa

Mags Beksinska, Match Research Unit (MRU), Department of Obstetrics and Gynaecology, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Wezile Chitha, Health Systems Enablement and Innovation Unit, School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Ashraf Coovadia, Department of Paediatrics, Faculty of the Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Clare L. Cutland, African Leadership in Vaccinology Expertise (ALIVE), Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Robin L. Drennan, Research and Innovation, University of the Witwatersrand, Johannesburg, South Africa

Kathleen Kahn, MRC/Wits Rural Public Health and Health Transitions Research Unit (Agincourt), School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Lizette L. Koekemoer, Wits Research Institute for Malaria, School of Pathology, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Lisa K. Micklesfield, SAMRC/Wits Developmental Pathways to Health Research Unit, Department of Paediatrics, Faculty of the Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Jacqui Miot, Health Economics and Epidemiology Research Office (HE²RO), Wits Health Consortium, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Julian Naidoo, WDED Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa

Maria Papathanasopoulos, HIV Pathogenesis Research Unit, Department of Molecular Medicine and Haematology, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Warrick Sive, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Jenni Smit, Match Research Unit (MRU), Department of Obstetrics and Gynaecology, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Stephen M. Tollman, MRC/Wits Rural Public Health and Health Transitions Research Unit (Agincourt), School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Martin G. Veller, Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa

Lisa J. Ware, Noncommunicable Diseases Research Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa; SAMRC/Wits Developmental Pathways to Health Research Unit, Department of Paediatrics, Faculty of the Health Sciences, University of the Witwatersrand, Johannesburg, South Africa and DSI-NRF Centre of Excellence in Human Development, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Jeffrey Wing and , Equivalent Equity Investment Program (EEIP), Department of Trade and Industry and Department of Health, Johannesburg, South Africa

Shane A. Norris, GLF Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa; Noncommunicable Diseases Research Division of the Wits Health Consortium, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa; SAMRC/Wits Developmental Pathways to Health Research Unit, Department of Paediatrics, Faculty of the Health Sciences, University of the Witwatersrand, Johannesburg, South Africa and Global Health Research Institute, School of Human Development and Health, University of Southampton, Southampton, UK

Supplementary material

Supplementary material for this article can be found online.

Corresponding author

Alfred Austin Farrell can be contacted at: llongwane@witshealth.co.za

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