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


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

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 external support as barriers to success.

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Supporting information
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).
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, Nature

Figure 1.

Factors influencing the academic entrepreneur

Sources: Reprinted with Permission from Krueger (2009). Copyright Springer
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
<table>
<thead>
<tr>
<th>Characteristics (Q1)</th>
<th>Enablers (Q2)</th>
<th>Barriers (Q3)</th>
<th>Behaviours (Q4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perseverance and resilience</td>
<td>Networks and collaborators</td>
<td>Lack of appreciation for the work of the science-leader</td>
<td>Communicate effectively</td>
</tr>
<tr>
<td>Displays professional confidence</td>
<td>Reduced bureaucracy</td>
<td>Financial sustainability of Entities</td>
<td>Manage teams effectively</td>
</tr>
<tr>
<td>Building collaborative relationships</td>
<td>Organisation brand</td>
<td>Limited funding opportunities or low success rate</td>
<td>Be determined and tenacious</td>
</tr>
<tr>
<td>Calculated chance-taker</td>
<td>Wide and varied funding options</td>
<td>Bureaucracy</td>
<td>Demonstrate leadership ability</td>
</tr>
<tr>
<td>Curious and intellectually adventurous</td>
<td>Research infrastructure</td>
<td>Inefficiencies when both the Consortium and Wits are involved as parties to the contract</td>
<td>Manage projects with discipline</td>
</tr>
<tr>
<td>Creates and innovates</td>
<td>Seed funding</td>
<td>Shortage of discretionary funds for ongoing unfunded activities</td>
<td>Publish to develop reputation</td>
</tr>
<tr>
<td>Research competence</td>
<td>Association with a prestigious university</td>
<td>Non-responsive shared services support</td>
<td>Take risks mindfully</td>
</tr>
<tr>
<td>Acts ethically, applies ethical judgement, displays honesty and personal integrity</td>
<td>Manageable balance between research, clinical, administration and teaching obligations</td>
<td>Innovation not valued or prioritised internally</td>
<td>Acts with courage</td>
</tr>
<tr>
<td>Drive for results (includes ambition)</td>
<td>Available and willing experienced mentors</td>
<td>Finding and employing talented staff</td>
<td>Identify, choose and master academic niche area</td>
</tr>
<tr>
<td>Networking and connecting</td>
<td>Values intellectual independence and freedom</td>
<td>Inefficient research regulatory environment</td>
<td>Work hard and consistently</td>
</tr>
</tbody>
</table>

Source: Authors' own work

Table 1. Unranked top ten characteristics, enablers (11), barriers and behaviours of academic entrepreneur influencing the consortium entity
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
“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

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

Source: Authors’ own work

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

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


Factors influencing the academic entrepreneur


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
Factors influencing the academic entrepreneur
Supplementary material
Supplementary material for this article can be found online.

Corresponding author
Alfred Austin Farrell can be contacted at: lhlongwane@witshealth.co.za