

Technology Development and Economic Transformation of Academic Entrepreneurs in Ghana

Afia Nyarko Boakye

Ghana Communication Technology University, Accra, Ghana

Email: aboakye@gctu.edu.gh

Esther Asiedu

Ghana Communication Technology University, Accra, Ghana

Email: esaiedu011@gctu.edu.gh

George Kofi Amoako

Ghana Communication Technology University, Accra, Ghana

gamoako@gctu.edu.gh

Ebenezer Malcalm

Ghana Communication Technology University, Accra, Ghana

emalcalm@gctu.edu.gh

Abstract

Today, the goal of any society is to alter its economic system. Technology has improved a number of economic sectors, including education. New forms of economic change as a result, such as the knowledge-based economy, have emerged. In order to alter themselves, business processes, industries, people, markets, communities, and economies, university professors must now make use of their competencies. There is a stronger chance of boosting established living standards in universities that use technology and teach career-related skills. The aim of this study is to ascertain how academic entrepreneurs' economic transformation is influenced by university lecturers' ability to progress through technology. Twenty-Four academic members from the Ghana Communication Technology University in Accra were purposefully chosen for face-to-face interviews. NVIVO 11 was used to categorise the data into themes and sub-themes. According to the report, faculty members are progressively starting to ascertain the advantages of using technology to share their research, create novel ideas, and promote their academic careers. Technology has increased faculty visibility on a global scale, and they predict that technology will be the future of research.

Keywords: Technology Development, Academic Entrepreneur, Economic Transformation

Introduction

Technology's quick development has increased innovation levels across a variety of worldwide businesses, including education. The knowledge-based economy is one of the newer forms of economic transformation that it has brought. The new economic transition was also referred to as an entrepreneurial mode of production by academics. In order to create jobs, faculty members must be transformational. To do this, they must have the skills and resources to change business practices, industries, markets, and economies (Baena-Luna, 2022; Kuratko et al., 2022; Liu & Dong, 2021). According to studies, the development of technology has the potential to significantly alter the economic status of the academic entrepreneur in a number of ways that were not first anticipated (Cao et al., 2020; Ye et al., 2021; Osborne, 2017). Professors with an entrepreneurial attitude and skill set have better prospects of economically changing themselves and most conditions than those without the necessary training (Sculac, 2021). Most people now view academics as essential drivers of economic development and progress because they provide the means by which the economy might change to become economically viable. In today's society, it is crucially important to cultivate entrepreneurial attitudes through acting and practicing entrepreneurship, such as through completing actual market-oriented initiatives in teams or cooperatives.

Researchers (Cardella, et al., 2021; Haseeb et al., 2020) recognise the contribution of technology to improving most economies. Thus, universities currently are the vehicles for cultivating sources of creative activities in that, they are industry dynamics, and have a significant potential for job production. Technology on the other hand has a variety of comparative advantages that increase the faculty's competitiveness globally. Numerous sub-strands of literature on entrepreneurship and economic growth employ diverse metrics of entrepreneurial activity. For instance, while one line of empirical research measures entrepreneurship in terms of the relative share of economic activity accounted for by small firms, other research uses information on self-employment, the number of

competitors in a market, or firm start-ups as an indicator of entrepreneurial activities (Midak et al., 2020; Sh, 2021). According to Zahra and Si (2022), academic entrepreneurs in developing countries can play crucial roles in reforming these economies due to their capacity to employ a sizable portion of the unemployed population and their propensity for nurturing.

The value of technological innovation and entrepreneurship for spurring prosperity and transforming nations has received relatively little attention, despite the many benefits of the academic entrepreneur. The use of newly acquired information to spur economic growth is severely flawed. Policymakers see university education as a private investment rather than a public good, and developments in the political economics of higher education have also contributed to this view (Sili & Dürr, 2022; Urbaniec et al., 2022). From a national viewpoint, it is vital to improving the faculty's use of technology in order to increase the visibility of our universities on a global scale. In terms of benefits to the economy and population, scientific research is gradually increasing from a national perspective. Ghana as a nation has not yet achieved this. Thus, it is now essential for university staff to look for new sources of income in addition to their insufficient wages and live better lives both now and when they are retired in order to balance their budgets. According to Stark et al. (2022), university lecturers are now presenting their work using technologies like social media, LinkedIn, Twitter, and Facebook in an effort to partner with outside stakeholders and monetize their research results. Despite this, there is little documentation regarding the realities and implications of commercialising academic products (Kollmann et al., 2022). As a result, little is known about how academia affects the development and application of technology. Additionally, it is challenging to comprehend the dynamics at the local, national, and international levels due to the paucity of empirical and theoretical studies on AE and economic transformation in relation to technology improvements in the nation. As a result, unsuitable policy frameworks are created. In light of this, the study seeks to comprehend the influence of technological advancement on academic entrepreneurs

This research is aimed at understanding the technology development of academic entrepreneurs, which in turn translates to the economic transformation of selected faculty members of Ghana Communication Technology University. Specifically, the objectives sought to:

- *Ascertain if technology is providing academic entrepreneurs.*
- *Explore the ways faculty members utilize technology to create visibility and economic opportunities.*
- *Examine how public-private partnerships influence the economic transformation of academics.*
- *Explore the future for the faculty with the upsurge of technologies in research.*

Theoretical Literature Review

Theoretically, experts in industrialised nations acknowledge that technology has a significant role in advancing the entrepreneurial economy. These technologies have a variety of dependent edges, increasing the academic entrepreneur's competitiveness on a worldwide scale. Things that nag academics draw their attention toward them because they are drawn to them internally. The push and pull idea has been used to explain why certain items act as incentives and pull us in the

direction of obtaining them. According to this, entrepreneurial activity among academics requires both push and pull elements. According to the pull perspective (Han, et al., 2022; Kekezi, et al., 2022) faculty is drawn to the field for reasons such as market opportunity recognition, the desire to try something new, and the need to put theory into practice. The faculty is motivated to change by a variety of academic contextual push factors that are emerging. For instance, universities are forced to raise tuition prices due to declining government funding, and faculties are similarly pushed to look for income outside of their university, some of which can be attained through procurement of grants (Roy et al., 2022), in writing. Academics who work full-time are now encouraged to be academic productive by adopting an entrepreneurial mindset. From the standpoint of creating businesses, people do not do so by mistake (Villanueva-Flores, 2022). As a result, they are either forced or drawn to become entrepreneurs, just as in colleges.

Maslow's Theory of Hierarchy

One person's pull factor could be another person's push factor (Aurretsch & Belitski, 2022). The desire for achievement according to Maslow's hierarchy is that before any person experience self-actualization, that person must first satisfy their four basic needs of physiology, safety and security, social/belonging, and self-esteem. This idea places human needs in an ascending sequence and contends that everyone tries to meet their basic requirements before being motivated to meet higher-level demands (Dutil, 2022).

Empirical Literature Review

In terms of the **academic entrepreneur** and the university, this means that they are significant players in the process of producing and commercializing research output. On the basis of this notion, it is observed that business owners make endeavours to meet their own demands, which can vary from one business owner to the next. As a result, some entrepreneurs start enterprises to meet their basic wants, including the need to buy food and pay rent, as well as the belief that doing so will boost their self-esteem and enable them to meet more complex requirements (Fasi, 2022). This is how the academic entrepreneur sees it. Due to its connections to a number of well-established fields, including sociology, psychology, management, and economics, entrepreneurship is a multidisciplinary term. According to Cardella et al. (2021), entrepreneurship is expanding quickly and is defined operationally as the willingness of individuals, either alone or in groups, to create new economic opportunities. Additionally, their research shows how entrepreneurship spans a wide range of industries, including but not limited to those in education, technology, marketing, public policy, community development, and many more. As a result, it is fundamentally a personality trait.

Similar to this, it has been noted that AE is a multifaceted phenomenon influenced by a range of circumstances (Sculac, 2021; Eriksson, 2021; Karpinskaia, 2022). According to the experts, universities are today an ideal source of concepts and fundamental technologies that support entrepreneurial ventures. An AE is described in this study as a lecturer or faculty who uses their academic expertise to produce information that is applicable to academia, industry, and society, creating value and money for themselves in the process. While still employed by the university, these faculties must be able to use technology to their advantage by publicly promoting their

institution and themselves. By doing this, they can expand their network of business contacts. According to other research (Eriksson, 2021; Bigliardi, 2022; Hrivnák, 2022; Monge-Agüero, 2022), there is very little difference between opportunity identification and opportunity exploitation.

There is a dearth of knowledge regarding the elements that contribute to the growth of entrepreneurial abilities among academics and the transformation of the economy. We are considering knowledge, objects, and theoretical and practical abilities from a technological perspective in order to facilitate the production of goods and services. Technology, according to Ye et al. (2021), is embedded in objects, people, cognitive and physical processes, tools, machines, and infrastructure. Universities now need to focus especially on entrepreneurial research and technology transfer. The ability to discover how wealth can be made through technology is essential. Currently, it is estimated that top online tutors earn \$17million per annum (Regmi, 2021). New academics need to be taught and supervised in opportunity recognition, and their research ideas must be tailored to the global market. However, high levels of inferred knowledge that spur commercial ideas that are the result of study frequently call for the early conception of such novel insights (Zhai, et al., 2022).

Understanding how university information is immediately transferred into a workable business is important (Gabrielsson, 2022; Landström, 2022). Due to their direct involvement, faculty members are the main carriers of research commercialisation in its early stages. The multiple people involved in the transfer of information and research output from the majority of universities to the industry are university professors and their peers. The academic hierarchy, according to ((Moortel, et al., 2022; Bigliardi, 2022), places faculty in a position to expand their influence beyond their universities through activities like research and teaching ((Kulp, et al., 2022) and the commercialisation of technological innovation. This is in addition to having a network of contacts and being proficient in their fields. This will facilitate strong collaboration between academic institutions and businesses to produce fresh concepts for ongoing research (Wood, 2022).

Methods

Materials and Methods

In this study, a qualitative research methodology was used. This approach concentrates on topics that are pertinent and popular but lack in-depth and thorough explanations. Different methods in which these ideas and modifications can take place to demonstrate our familiarity with and understanding of them (Yarm et al., 2022). In this study, the phenomenological pattern was used to explore the idea of AE and ET in the evolution of technology. It aims to improve understanding of the relationship. The data collection method was by Interview. Semi structured interview guide was used as instrument to gathered information from ten academics from GCTU in the Greater Accra Region were. The respondents were interviewed one on one. NVIVO 11 software was used to analyse the data for the results.

Research Design

In ascertaining the technology development and economic transformation of academic entrepreneurs in Ghana. This research adopted exploratory research design.

Sampling and Sample Procedure

The study employed a purposive sampling approach to select 24 academics from the Ghana Communication Technology University. The faculty members have at least eight (8) years of experience with the university due to their depth of knowledge. . The "information power" idea was reportedly utilised to choose the sample size, according to Malterud, Siersma, and Guassora (2015, 2). They recommend using this concept as a guideline for deciding on the proper sample sizes for qualitative analysis.

Data Collection

The study largely used primary data, by conducting one on one to gather information from the respondents. As a result, using themes taken from the literature, an interview guide was created for this aim. Participants were given the opportunity to discuss the research articles that they had produced for financial advantage in the first section. The university's activities and how they contributed to its visibility abroad. In the second section of the interview guide, respondents had the opportunity to explain in their own words the various tools and how they support the visibility strategy of their university as well as public-private partnership influence on the economic transformation of academics. Once more, transcribed interviews were provided to a subset of chosen respondents afterward to ensure that what they had stated had been appropriately recorded in the transcription. Recording, transcription, and coding of the data were done in that order.

Ethical Consideration

Due to the ethical nature of the research processes, all participants' consent was sought before the study began. The study's purposes and goals were explained to the participants. Additionally, participants were made aware that taking part in the study was entirely up to them and that they had the freedom to stop at any time if they so desired. After then, participants were given the assurance that the researchers would respect their privacy and regard all of the information they had submitted as confidential. De-identification with codes or Pseudonyms was done with the data obtained. Access to files on laptop computers and the recordings of interviews were password-protected, and data was carefully secured. After being contacted, respondents were asked what time and day would work best for them. Then it was decided to have a meeting. The secrecy of their answers was guaranteed, and the interview location was left up to the respondent's preference.

Results and Discussions

The analysis produced five themes after transcription. Table 1 summarises the key themes identified from the data. This is followed by the description of the themes and illustrative quotations. Pseudonyms were used to preserve anonymity.

Table 1: Summary of key points identified

Theme	Summary of key points identified
Exploring technology to become an academic entrepreneur.	Opportunity to be an academic entrepreneur through research.
Technology creates visibility and economic opportunities.	Technology is essentially making academic researchers internationally visible
Access tools for international visibility	I use international visibility tools for publication
Academics and industry collaboration for social-economic development	Public-Private partnership a catalyst for academic socio-economic development
Understanding the use of technology, and the future of research.	Technology has an influence on future academic academic work

Technology Development: Exploring technology for academic entrepreneurs.

All the participants reported that they have been using technology and have seen its usefulness in making them academic entrepreneurs. Illustrative examples appear below.

Kwaku Mensah 1: *“I saw an opportunity to commercialize some findings from my ongoing Ph.D. dissertation. I currently own a company that coaches people to become entrepreneurs through research (Personal Communication. 15th June 2023)”*

Yaa Amponsah 2: *“I use technology to provide quality teaching to keep my job. However, since my salary is not enough and therefore cannot do much to sustain me economically, I vigorously pursue research that has the potential to generate new products/services for commercialisation, and for sale of the research findings in the form of articles and books. I also consult to the service economy out of my research findings and academic/industry experiences through which I can earn more money. (Personal Communication. 15th June 2023)”*

Yaw Manu 3: *“Technology helps me to commercialise my research findings. The number of academic publications will aid in my academic promotion and hence sustain my economic future.*

The application for grants will also help in my economic sustainability. (Personal Communication. 15th June 2023”

Sam Jones 4: *“Technology ensures speed in research and teaching and has been useful in providing consultancy services to industries. (Personal Communication. 15th June 2023”*

Abena Asante 5: *“Academics are interested in deriving personal pay-offs from the commercialization of their knowledge and technologies (Personal Communication. 15th June 2023”.*

Kwabena Botchway 6: *“Good academic productivity will lead to good visibility and good visibility will improve your chance of obtaining research grants, getting lucrative consultancy contacts, etc., which can open doors to a brighter economic future. (Personal Communication. 15th June 2023”*

Johnson Brown 7: *“The practice of consulting may be another tool for interactive knowledge transfer between academics and decision-makers, one that is particularly effective at promoting the enlightenment and interactive models of knowledge use, which to most academic researchers may be less familiar than instrumental models (Personal Communication. 15th June 2023”.*

One participant however, reported that there could be no tremendous economic change, but at least some economic gains are associated with promotions.

Technology creates visibility and economic opportunities:

In their accounts, most participants highlighted how technology has improved their visibility and economic opportunities.

Abena Asante 5: *“My ability to continuously do scientific research and make it more accessible means publication in scholarly journals, books, and so on (Personal Communication. 15th June 2023”.*

Kwabena Botchway 6: *“Technology has greatly improved academic output in terms of research and publication as well as improving the visibility of published research. It enhances my ability as an academic to cooperate, thereby creating better opportunities for academics across the world to work together, improving the quality of research. (Personal Communication. 15th June 2023”*

Johnson Brown 7: *“Engaging in consultancy enhances my value and gives me the opportunity to have an impact on society and be relevant as an academic entrepreneur (Personal Communication. 15th June 2023”.*

Sam Ampadu 8: *“My publications have won me a research grant by collaborating with others within and out of the country. (Personal Communication. 15th June 2023”*

Owusu Asante 9: *“My academic productivity has opened doors for international projects and consultancies increasing my visibility for financial gains and knowledge dissemination (Personal Communication 15th June 2023”*

From above assertions, it was evident that the participants highlighted how technology has improved their visibility and economic opportunities.

International visibility Tools

Almost all participants claimed to have used various platforms to increase their visibility on a global scale for financial advantage. Publications, preprints, conference papers and posters, presentations, research data, videos, and code document research activities. By making these materials publicly available, researchers can raise awareness of their work, preserve their results, and make them accessible for use in the future.

When submitting their manuscripts and data, the respondents indicated using individual author identification. When it comes to their research output, some researchers are inextricably bound to their authors. Some people have made and used an impactStory, a web CV, a google scholar citation profile, or an updated online profile. Some participate in online groups for social networking, including LinkedIn, Research Gate, and Academia.edu. Tweet, Research Blogging, and ORCID are further resources.

Kwaku Mensah 1: *“I utilize ORCID, Research Gate, GoogleScholar, Linkedin, Research blogging and many others (Personal Communication. 15th June 2023”.*

Yaa Amponsah 2: *“ORCID, ImpactStory and Research Gate, Linkedin (Personal Communication. 15th June 2023”*

Yaw Manu 3: *“Google Scholar, Academia.edu, ORCID (Personal Communication. 15th June 2023”.*

Johnson Brown 7: *“Many academics and researchers looking for cooperation find ResearchGate to be the ideal research tool. I read updates from peers who share my interests or from professionals. I receive notifications when others read or quote my articles, and I also receive notifications when people I follow publish new studies. I can write to other members and ask for the full text of any articles they have mentioned. ResearchGate based on my profile and publications also generates an RG score. This is distinct from the citation score provided by journals or the H-score calculated by Google Scholar. Overall, ResearchGate is a great research tool if you want to monitor your colleagues' work and work with various institutions (Personal Communication. 15th June 2023”.*

Academics and industry collaboration for social-economic development:

The third theme is how university lecturers can team with industry players to research using technology to improve social-economic development.

Participants noted more understanding of collaboration for social-economic development.

Sam Ampadu 8: *“I believe academics need to collaborate with the industry for economic and social development (Personal Communication. 15th June 2023)”.*

Owusu Asante 9: *“This is not only necessary but also essential. The industry does not benefit from our research outputs if we do not consult with them unless our research works have no alignment with the needs of the industry. There is a need for more application-based research so that we are able to be more answerable to the needs of the industry. Consulting with the industry is one of the surest ways to be informed about what is happening in the industry in terms of their human resource needs and the problems they face so as to guide our teachings and training of our students for industry.”*

Jane Kwame 10: *“Academia is a knowledge hub that can benefit industries. They produce the human capital that is engaged in the industries (Personal Communication. 15th June 2023)”.*

Kwaku Mensah 1: *“This will help to bridge the gap between the academic and industry and impact on the course content of the academic programmes (Personal Communication. 15th June 2023)”*

Yaa Amponsah 2: *“Industry will see commercial value in research output and will seek to commercialise them (Personal Communication. 16th June 2023)”.*

Yaw Manu 3: *“This will help to bridge the gap between the academic and industry and influence the course content of the academic programmes. (Personal Communication. 16th June 2023)”*

Sam Jones 4: *“Engaging in consultancy enhances my value and gives me the opportunity to have an impact on society and be relevant as an academic entrepreneur (Personal Communication 16th June 2023)”*

Understanding the use of technology and the future of research.

All the participants believe technology is the future of research.

Johnson Brown 7: *“Technology will simplify my academic productivity. I do not have to travel to collect data. Time spent on writing articles will reduce drastically. There are a lot more tools available for data analysis now than it is used today. (Personal Communication. 16th June 2023)”*

Sam Ampadu 8: *“It will be a catalyst to engage in more research ((Personal Communication 16th June 2023)”*

Discussions

The Ghana Communication Technology faculty was used as a case study in the study, which ascertain the technological progress of AE that later led to the ET of the faculty in Ghana. The responses confirm that academic entrepreneurs use technology to brand themselves as faculty members. This corroborates the study's finding (Sculac, 2021; Eriksson, 2021; Karpinskaia, 2022) that academic entrepreneurship is a multifaceted phenomenon influenced by a number of variables

and that it serves as a prime source of concepts and essential technologies for initiatives to promote entrepreneurship in universities. However, there was one opposing viewpoint that there is no tremendous economic change, but at least some economic gains are associated with promotions. All the participants reported that technology through their research publications has made them internationally visible in high-index journals.

The importance of research promotion initiatives is growing in researchers' daily activities. Making your research visible and approachable increases the likelihood that it will be found, utilized, and have an impact, enhancing your reputation and chances of academic success. To promote their work, communicate with other researchers, and participate in academic discussion, researchers are embracing a variety of activities and methods. More and more, researchers engage in marketing-related activities at every level of the research process, from discovery through analysis and writing to publishing, outreach, and assessment. Respondents offered a thorough map of how technology-enhanced research has made them visible through the use of both older and more modern research methods. There were accounts of heightened visibility and a resultant effect on business opportunities. Many people have been able to use technology to their advantage by using it to promote themselves and their institution overtly, boosting their business relationships in the process. According to the report, many individuals use a variety of strategies to make themselves known to potential employers.

Initiatives for promoting research are becoming increasingly important to researchers' daily tasks. The reputation and chances of academic success will improve if one makes your research accessible and visible so that it may be found, used, and have an impact. Researchers are embracing a variety of activities and strategies to publicise their work, connect with other researchers, and take part in academic conversations. At every stage of the research process, from discovery through analysis and writing to publishing, outreach, and assessment, academics are becoming more and more involved in marketing-related activities. Using both traditional and cutting-edge research techniques, respondents provided a complete map of how technology-enhanced research has made them visible. There have been reports of increased visibility having an impact on commercial opportunities.

Many people have been able to take advantage of technology by aggressively promoting themselves and their institution through it, to solidify their professional relationships. According to the report, faculty is to introduce themselves to potential employers and frequently use a variety of strategies. High-quality research must be simple to find in order to receive the attention it merits. There is evidence that the aforementioned actions boost discoverability and citations. In conferences and, where applicable, at international congresses, presenting research findings. The opportunity to network and form new partnerships is another benefit of attending such events. Participants advertise their study on social media and through networks to a larger audience. Twitter, Academia.edu, and Linked-in are a few examples.

Using citation data, researchers can compare journals that are indexed in the Web of Science using Journal Citation Reports (JCR). JCR displays the journals with the most effect on the subject.

Additionally, a free Scopus-based database called SCImago Journal and Country Rank (SJR) is available. Based on the caliber and standing of journals, it offers a prestige metric (SJR). It appears in Scopus Journal Metric (PDF). Impact scores using Scopus 'compare sources' feature can sort journal titles in a subject area. According to them to locate high-impact journals in the Scopus database has been supportive. With the help of this tool, academics can compare journals based on reported CiteScore, SJR, or SNIP scores. A reader's comprehension of the research's substance is improved by the careful use of keywords in both the abstract and the full text. This might also make researchers more visible in search results. The authors you cite might work with you again in the future and cite you.

The study found out that collaborative research with industry has the potential for cross-disciplinary idea exchange, the acquisition of new skills, access to money, improved outcomes, radical advantages, and individual elements like fun and pleasure. An interdisciplinary team of researchers can frequently resolve the majority of the most pressing scientific problems or cutting-edge technology. The cooperation between academics, institutions, companies, and/or communities might enable the attaining of great aims through the combining of different fields. This could help to develop unique expertise. Consortia, federation, affiliation, and merger can happen at five distinct levels even if collaboration is voluntary. They fall under disciplinary, interdisciplinary, trans-, multi-, or multi-disciplinary categories, or they are national versus international. However, research that is conducted in partnership introduces fresh knowledge and concepts from different fields, produces high-quality results despite individual considerations like enjoyment, and has easier access to funding. Participants asserted that:

1. Through collaboration, open lines of communication are established, and participants are urged to seize possibilities for the renewal of antiquated systems;
2. Invoking all teammates and others to participate in self-reflection and offer criticism.
3. In order to better understand cause and effect, stakeholders who can act as a feedback loop should be identified.
4. Working together clarifies roles and duties.
5. To create a professional workplace and respect various organisational cultures.

The following were also identified as different kinds of collaboration such as intradisciplinary (team of researchers within the same department). Interdisciplinary (team of researcher of different departments but different background), multidisciplinary (team of researcher of different background), or transdisciplinary (involvement of people from outside academia into the research process) and everyone aspires for common demands such as making operational plans, communication between different research groups, sharing of credit and money, holding frequent meetings, and encouraging open communications.

Conclusion

Finally, yet importantly, it is clear how technology will be used in future research, and participants didn't hesitate to respond, suggesting that it is in fact a catalyst for academic entrepreneurs. Faculty members are gradually becoming aware of the value of utilising technology to disseminate their research, develop novel ideas, and advance the field of study while also gaining financial independence. All of a faculty's entrepreneurial aspirations are tapped into through technology, making scholars more accessible and helpful.

Research practical implications

The twenty-four-sample size for this study is quite small and the effects of covid-19 have made respondents reluctant to participate in face-to-face interviews.

According to Kekezi et al. (2022) and Han et al. (2022), faculty are attracted by things like the desire to apply theory in the real world, the desire to attempt something new, and the recognition of commercial opportunities. The faculty is motivated to change by a variety of academic environmental push factors that come from the push perspective. Universities, for instance, are forced to raise tuition fees due to declining government financing, and faculty are similarly pushed to look for income outside of their organisations. Academics who work full-time are being urged to think entrepreneurially. From the standpoint of venture formation, people do not only get engaged (Villanueva-Flores, 2022). As a result, they are either encouraged or pressured to start their own business, exactly like universities. This data supports the push-pull theory and suggests that faculty members are currently striving very hard to become AE because of the rapid advancement of technology and changes in the economy. Our research supports the need for accomplishment theory, which states that before moving on to the highest degree of demands in the hierarchy, faculty members start businesses to meet their particular wants (Fasi, 2022). This is from the standpoint of a potential academic entrepreneur.

Therefore, universities must foster a supportive environment while enhancing their technology support so that lecturers can project their research, develop industrial partnerships, and thereby eventually promote their institutions locally and internationally.

Social implications

The study thus suggests that Ghana Communication Technology University's technology infrastructure be improved, and it encourages faculty to work more closely with industry to gain a deeper understanding of how it operates and how it is practiced. By doing this, it will also provide opportunities for the majority of staff to start their own academic businesses. In practice, this will increase the set living standards for academics both now and in the future and make them more economically viable.

Funding: There was no external support for this research

Acknowledgments: The research had no external funding but all the authors contributed to producing this paper.

Conflict of Interest: The authors declare no conflict of interest.

References:

- Audretsch, D.B. and Belitski, M., 2022. A strategic alignment framework for the entrepreneurial university. *Industry and Innovation*, 29(2), pp.285-309.
- Baena-Luna, P., Martínez-Román, J.A. and Liñán, F., 2022. Corporate Entrepreneurship Strategy and Internationalization: A Literature Review. *Strategic Entrepreneurship*, pp.143-160.
- Bigliardi, B., Filippelli, S., Passaro, R. and Quinto, I., 2022. Introducing the implementation of open innovation approaches by academic entrepreneurship as a viable solution to tackle the lack of resources. *Int. J. Technology Management*, 88(1), p.1.
- Cao, Y., Wan, N., Zhang, H., Zhang, H., Zhou, Q., 2020. Linking environmental regulation and economic growth through technological innovation and resource consumption: Analysis of spatial interaction patterns of urban agglomerations. *Ecol. Indic.* 112, 106062.
- Cardella, G.M., Hernández-Sánchez, B.R., Monteiro, A.A. and Sánchez-García, J.C., 2021. Social entrepreneurship research: Intellectual structures and future perspectives. *Sustainability*, 13(14), p.7532.
- Dutil, P., 2022. What Do People Want from Politics? Rediscovering and Repurposing the “Maslow Hierarchy” to Teach Political Needs. *Journal of Political Science Education*, 18(1), pp.138-149.
- Eriksson, P., Hytti, U., Komulainen, K., Montonen, T. and Siivonen, P., 2021. Introduction: from diversity of interpretations to sustainability of institutions. In *New Movements in Academic Entrepreneurship* (pp. 1-17). Edward Elgar Publishing.

- Fasi, M.A., 2022. An Overview on patenting trends and technology commercialization practices in the university Technology Transfer Offices in USA and China. *World Patent Information*, 68, p.102097.
- Gabrielsson, M., Raatikainen, M. and Julkunen, S., 2022. Accelerated Internationalization Among Inexperienced Digital Entrepreneurs: Toward a Holistic Entrepreneurial Decision-Making Model. *Management International Review*, pp.1-32.
- Han, X., Chen, S. and Chen, B., 2022. From employee engagement to customer engagement: A multilevel dual-path model of engagement spillover effects in service ecosystems. *Journal of Retailing and Consumer Services*, 64, p.102815.
- Haseeb, K., Ud Din, I., Almogren, A. and Islam, N., 2020. An energy efficient and secure IoT-based WSN framework: An application to smart agriculture. *Sensors*, 20(7), p.2081.
- Hrivnák, M., Chreneková, M. and Jarábková, J., 2022. Evolutionary models of academic spin-offs establishment-comparison of Catalonia and South-Moravian region. *Knowledge Management Research & Practice*, pp.1-12.
- Karpinskaia, E., 2022. Make me act rapidly: identity perspective to the dynamics of start-up creation process. *Journal of Entrepreneurship in Emerging Economies*, (ahead-of-print).
- Kekezi, O., Dall'erba, S. and Kang, D., 2022. The role of interregional and inter-sectoral knowledge spillovers on regional knowledge creation across US metropolitan counties. *Spatial Economic Analysis*, pp.1-20.
- Kollmann, T., Kleine-Stegemann, L., de Cruppe, K. and Then-Bergh, C., 2022. Eras of digital entrepreneurship. *Business & Information Systems Engineering*, 64(1), pp.15-31.

Kulp, A.M., Pascale, A.B. and Wolf-Wendel, L., 2022. Clear as Mud: Promotion Clarity by Gender and

BIPOC Status Across the Associate Professor Lifespan. *Innovative Higher Education*, 47(1),

pp.73-94.

Kuratko, D.F., Burnell, D., Stevenson, R., Neubert, E. and Fisher, G., 2022. Enacting entrepreneurial

hustle. *Business Horizons*.

Landström, H., Gabrielsson, J., Politis, D. and Sørheim, R., 2022. What's interesting in entrepreneurial

education research? Identifying conversants sharing common interests in the field. *International*

Journal of Entrepreneurial Behavior & Research, 28(9), pp.104-131.

Liu, Y., Dong, F., 2021. How technological innovation impacts urban green economy efficiency in

emerging economies: A case study of 278 Chinese cities. *Resour. Conserv. Recy.* 169, 105534.

Malterud, K., V. D. Siersma, and A. D. Guassora. 2016. "Sample Size in Qualitative Interview

Studies: Guided by Information Power." *Qualitative Health Research* 26 (13): 1753–60.

<https://doi.org/10.1177/1049732315617444>.

Midak, L.Y., Kravets, I.V., Kuzyshyn, O.V., Pahomov, J.D. and Lutsyshyn, V.M., 2020, February.

Augmented reality technology within studying natural subjects in primary school. published

on CEUR Workshop Proceedings (CEUR-WS. org).

Monge-Agüero, M., Baena-Luna, P. and García-Río, E., 2022. The relevant motivator elements to be an

academic entrepreneur. *Journal of Social Studies Education Research*, 13(2), pp.1-23.

Moortel, K.D., Crispeels, T., Xie, J. and Jing, Q., 2022. International Academic Mobility and

Entrepreneurial Opportunity Identification: A Resource-Based View. In *University-Industry Knowledge Interactions* (pp. 201-216). Springer, Cham.

Regmi, K., 2021. New Evidence on Teacher Pay. *ILR Review*, p.00197939211072538.

Roy, S.C., Wassef, D.W., Nasser, W.A., Farber, N.I., Fang, C.H., Baredes, S., Gray, S.T. and Eloy, J.A.,

2022. Landscape of centralized otolaryngology research efforts grant recipients over the past decade. *Otolaryngology–Head and Neck Surgery*, 166(2), pp.289-296.

Sculac, M., 2021. *Success Factors of Early-Stage University Spinoffs for Receiving Funding* (Bachelor's

Thesis, University of Twente).

Sh, R.A., 2021. Practical training in mathematics for students of social sciences and humanities. *Science*

and education. scientific journal, 2(9), pp.283-292.

Sili, M. and Dürr, J., 2022. Bioeconomic entrepreneurship and key factors of development: Lessons from

argentina. *SustaiArgentina* 14(4), p.2447.

Stark, S., Biber-Freudenberger, L., Dietz, T., Escobar, N., Förster, J.J., Henderson, J., Laibach, N. and

Börner, J., 2022. Sustainability implications of transformation pathways for the bioeconomy. *Sustainable Production and Consumption*, 29, pp.215-227.

Urbaniec, M., Sołtysik, M., Prusak, A., Kułakowski, K. and Wojnarowska, M., 2022. Fostering sustainable entrepreneurship by business strategies: An explorative approach in the bioeconomy. *Business Strategy and the Environment*, 31(1), pp.251-267.

Villanueva-Flores, M., Hernández-Roque, D., Fernández-Alles, M. and Díaz-Fernandez, M., 2022.

The international orientation of academic entrepreneurship: the role of relational, human and

psychological capital. *Journal of Intellectual Capital*.

Wood, M.S. and Fisher, G., 2022. A collective-evolutionary alternative for appraising entrepreneurship

theory. *Strategic Organization*, p.14761270221089959.

Yarım, M.A., Yildirim, İ. and Akan, D., 2022. Motivation Factors Of Candidates Teachers For Their

Professions. *GIST–Education and Learning Research Journal*, 24, pp.43-63.

Ye, F., Quan, Y., He, Y., Lin, X., 2021. The impact of government preferences and environmental

regulations on green development of China's marine economy. *Environ. Impact Assess.* 87,

106522.

Ye, Q., Wang, D. and Zeng, K., 2021. Opening the black box of employee entrepreneurship decision-

making. *International Journal of Entrepreneurial Behavior & Research*.

Zahra, S.A., Liu, W. and Si, S., 2022. How digital technology promotes entrepreneurship in

ecosystems. *Technovation*, p.102457.

Zhai, Y., Yang, K., Chen, L., Lin, H., Yu, M. and Jin, R., 2022. Digital entrepreneurship: global maps and

trends of research. *Journal of Business & Industrial Marketing*, (ah