Academic Entrepreneurship in Bangladesh

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CANDIDATE DECLARATION

I hereby declare that:

1. I have not been enrolled for another award of the University, or other academic or professional organisation, whilst undertaking my research degree.
2. None of the material contained in the thesis has been used in any other submission for an academic award.
3. I am aware of and understand the University's policy on plagiarism and certify that this thesis is my own work. The use of all published or other sources of material consulted has been properly and fully acknowledged.
4. The work undertaken towards the thesis has been conducted in accordance with the SHU Principles of Integrity in Research and the SHU Research Ethics Policy.
5. The word count of the thesis is 78,925.

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ABSTRACT

Research commercialisation is a multi-level process, and the interactions of these different actors help support and predict academic entrepreneurship (AE). However, only a few studies have considered the impact of multilevel actors on AE. Even very few of the previous studies considered individual perspectives. Hence, this study aims to advance the understanding of why academics engage in AE and investigate how different levels of actors interact to influence academics' engagement in AE.

Incorporating the Bayh-Dole type Act in different countries allowed universities to commercialise their research. As a result, universities are emphasising the formal contribution to economic development by commercialising their research rather than relying solely on informal ties. This indicates the importance of identifying other sources of funds that help universities, in other words, to become entrepreneurial. Bangladesh has been selected as the context due to universities' interest in entrepreneurship and the increased number of universities and students in higher education in the last decade. The institutional theory is used as the theoretical lens in understanding the influence of government's rules and regulations, universities' norms and practices and academic mindset and cognition on the academics' engagement in AE.

This study adopted a qualitative research approach premised on a Neo-empiricist theoretical perspective. Twenty six semi-structured interviews were conducted from four universities, along with an analysis of key policy documents. The study adopted thematic analysis to analyse the data collected and identified three themes: Government Role, University Norms and Practices, and Human Perceptions and Motivations. This study makes three key contributions to AE literature. First, it improves our understanding of implementing the multi-level AE framework. Second, it develops a holistic framework for AE from a developing country perspective. This model includes the individual perceptions and motivations in the AE ecosystem. Finally, it explores the antecedent factors that shape individual behaviours to engage in AE. Overall, this thesis illustrates that although the government influences the universities, it does not directly affect academic AE engagement. However, the university norms and practices sometimes facilitate and inhibit academic AE involvement. The perceptions and motivations of the academic have a dominant effect on the academic's entrepreneurial commitment.

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LIST OF ABBREVIATIONS

AE	Academic Entrepreneurship
BOT	Board Of Trustees
BRTC	Bureau of Research, Testing and Consultation
FAE	Formal Academic Entrepreneurship
GDP	Gross Domestic Product
HASS	Humanities, Arts, & Social Sciences
HEQEP	Higher Education Quality Enhancement Project
IAE	Informal Academic Entrepreneurship
ICE	Innovation and Entrepreneurship Centre
ICT	Information and Communication Technology
IDEA	Innovation Design and Entrepreneurship Academy
IP	Intellectual Property
IPR	Intellectual Property Rights
IT	Information Technology
LMIC	Low- & Medium-Income Countries
PRO-VC	Pro Vice-Chancellor
R&D	Research & Development
RBV	Resource Based View
REPITA	Research, Ecosystem, People, Intellectual Property, Transfer, and Alignment
RISE	Research and Innovation Centre for Science and Engineering
SPHE	Strategic Plan for Higher Education
STEM	Science, Technology, Engineering & Mathematics
THM	Triple Helix Model
TT	Technology Transfer
TTO	Technology Transfer Offices
UA	University Academic
UCEE	University Centred Entrepreneurial Ecosystems
UGC	University Grants Commission
UK	United Kingdom
UM	University Managers
USA	United States of America
USCM	University Support Centre Managers
VAT	Value Added Tax
VC	Vice Chancellor
WIPO	World Intellectual Property Organisation

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CHAPTER ONE: INTRODUCTION

1 INTRODUCTION

1.1 Introduction

This thesis explores the interactions between the multiple stakeholders within the AE processes of four universities. This phenomenon is explored through the lens of institutional theory (Scott, 1995). Institutional theory aids the exploration of the AE process and interactions of actors within these four universities. This chapter introduces the study and the context within which the research was carried out. Next, the research area and research gap are identified, followed by the justification for the study. Contributions that this research has made to theory and practice are also outlined. Finally, the chapter presents a description of the chapters that shape the overall structure of the thesis.

1.2 Background of the study:

Academic Entrepreneurship (*henceforth AE*) has gained significant attention in recent years as a proposed means to promote innovation, economic growth, and job creation (Audretsch et al., 2019; Etzkowitz et al., 2000; Grimaldi et al., 2011; Philpott et al., 2011; Rasmussen & Borch, 2010; Wright, 2018). This trend stems from the decentralisation of funding and recent policy shifts, prioritising funding allocation to universities based on their economic impact (Abreu & Grinevich, 2013; Uslu et al., 2019). Hence, universities emphasise formally contributing to economic development by commercialising their research rather than relying solely on informal ties (Cunningham & Link, 2016; Etzkowitz, 2016; Rasmussen & Wright, 2015). This underscores the importance of universities adopting entrepreneurial strategies to secure additional funding sources. Consequently, entrepreneurial universities adopt a ‘third mission’ alongside their traditional research and teaching roles (Etzkowitz et al., 2000, p. 313), namely, entrepreneurship (Audretsch, 2014; Guerrero et al., 2015).

The transition from research-focused to entrepreneurial universities is characterised by cultural shifts, including the integration of institutional mechanisms such as incubators/accelerators, science/technology/research parks and technology transfer offices (TTOs) to promote commercialisation and entrepreneurial activities (Guerrero et al., 2015; Rothaermel et al., 2007; Siegel & Wright, 2015; Wood, 2011). However, entrepreneurial universities are consistently associated with AE through patenting, licencing, spin-off creation, and university-industry collaboration (Grimaldi et al., 2011; Mascarenhas et al., 2017). According to Rothaermel et al. (2007), AE refers to the activities, assets, and processes of commercialising research outcomes and innovations generated within an entrepreneurial university to implement the third mission of the university, for instance, technology transfer, licencing, science parks, incubators, spinoffs. Recently, Abreu and Grinevich (2013) extended the concept of AE by incorporating informal activities (e.g. contract research and consulting). Although not all universities adopted this entrepreneurship mission, this university entrepreneurship is context-dependent and embedded in local innovation networks (Rothaermel et al., 2007). Given the significant variations in organisational designs among universities and the lack of international comparability in university systems, they are developing economies' universities are unlikely to exhibit similar entrepreneurial patterns or dynamics to those observed in developed countries (Li & Tan, 2020; Rothaermel et al., 2007).

Intriguingly, this commercialising of research outcomes and innovation is often seen as linear (Martínez & Sterzi, 2021). This perception of technology transfer as a linear model is inadequate or irrelevant (Bradley et al., 2013). Overemphasising formal AE (FAE), such as patents, licencing, and spin-offs, as the primary outputs in the technology transfer process overlooks other mechanisms for commercialisation. Abreu and Grinevich (2013) denoted these mechanisms as informal AE (IAE), which includes activities such as contract research, consulting or job placement of the students. Moreover, universities transfer knowledge and technology to industry more through IAE than FAE (Abreu & Grinevich, 2013). Although these informal activities are not new, their current unfolding presents novel aspects (Abreu & Grinevich, 2013). A wide range of knowledge from the university to industry is transferred through contract research, consulting and sitting on advisory boards compared to FAE activities such as spinoffs and patents (Abreu & Grinevich, 2013). Although IAE is essential, FAE is predominantly studied in previous studies (Backs et al., 2019; Cunningham, Lehmann, et al., 2019; Fernández-Alles et al., 2015; Fini et al., 2017). This narrow focus on the AE often overlooks many entrepreneurial activities universities are involved in and ignores different aspects of universities' contribution to economic development (Cunningham, Menter, et al., 2019; Schaeffer et al., 2020; Wright, 2018). As a result, there has been a recent call to reassess AE due to the recognition of its various forms and the growing research interest in commercialising research and protecting intellectual property (IP) through business ventures (Grimaldi et al., 2011; Siegel & Wright, 2015; Wright, 2018). It is also essential to extend the understanding of the different contexts of entrepreneurship, actors and mechanisms that facilitate the wide range of AE (Marzocchi et al., 2019; Siegel & Wright, 2015). Thus, to ensure the implementation of AE, there is a need to understand the interactions of these actors and develop a multi-level AE framework (Farrell et al., 2022).

1.3 Research Gap

Research commercialisation is a multi-level process (Belitski et al., 2019), and understanding these multi-level dynamics will help support and predict AE (Fini et al., 2017) while developing an entrepreneurial ecosystem for universities (Audretsch et al., 2019; Cunningham & O'Reilly, 2018; Wright et al., 2017). The entrepreneurial ecosystem is a complex and interconnected network of actors, organisations, institutions, and processes. It collaboratively functions to foster and enhance the performance of the local entrepreneurial environment (Isenberg, 2010; Spigel, 2017). Existing literature has identified different levels of actors that influence AE, such as academics, government, university, and industry (Belitski et al., 2019; Rippa & Secundo, 2019; Simeone et al., 2017).

However, only a few studies (Fini et al., 2017; Klingbeil et al., 2019) have considered the impact of multilevel actors on AE. Although these studies reveal the importance of the actors involved in the AE ecosystem and how they complement and shape each other in framing the university's research agenda and projects, they focus only on the FAE. They do not consider the individual (academics) perspective and how this interaction of different levels shapes academics' behaviour to engage in AE. Studies focusing solely on the effects of meso-level factors tend to disregard the macro-level roots from which those effects may originate (Hitt et al., 2007). Conversely, Kim et al. (2016) have pointed out that research that solely focuses on the influences of macro-level factors may fail to recognise the meso-level pathways through which their impact is transmitted to the individual level. Moreover, focusing only on one level gives a limited understanding of how these factors complement each other and shape AE (Fini et al., 2017). Therefore, it is necessary to look into different levels of factors in unison and how these shape academic engagement in AE (Cunningham & O'Reilly, 2018; Hossinger et al., 2020). The need for this multilevel perspective is also emphasised in recent studies (e.g., Abreu et al., 2016; Audretsch et al., 2019; Belitski et al., 2019; Fini et al., 2017). For instance, Belitski et al. (2019, p. 613) suggest the 'implementation of the multi-level academic entrepreneurship ecosystem framework in future research could answer how various entrepreneurial ecosystem actors could better facilitate research commercialisation'. Therefore, this thesis raises an intriguing question, '*how do the different levels interact to influence AE?*' Considering these factors, this study contributes to the existing literature by conducting a multilevel analysis of the actors and how they facilitate AE.

One of the multilevel actors identified in the existing literature within the AE ecosystem is the government (e.g., Cunningham, Lehmann, et al., 2019; Gan et al., 2021; Hooi & Wang, 2020;

Kirby & El Hadidi, 2019; O'Kane et al., 2020). Governments formulate various rules, regulations, policies, and programmes to promote entrepreneurial endeavours in their countries and foster connections between academia and industry. However, these policies often provide incentives primarily for the growth of industries (Mascarenhas et al., 2017). Due to governments' narrow focus on funding major technological innovations, they often fail to engage a broader range of entrepreneurs in the entrepreneurship and innovation process (Wright, 2014). For example, Cunningham, Lehmann, et al. (2019) examined the effect of legislative change in Intellectual Property Rights (IPR) on the regional entrepreneurial and innovative outcomes achieved by scientists. They argue that while the initial impact of these legislative changes is positive for universities, startups, and patents, this effect diminishes over time. In a recent study, Gan et al. (2021) use regional aggregated data to demonstrate the impact of government policy mix on university commercialisation performance in China. Their results indicate that the implementation of these policies depends on the capabilities of the countries and highlight the need to consider contextual factors when replicating the legislative and policy initiatives from different countries. Thus, this study frames the question, 'What *macro-level factors influence academics' AE engagement?*' Applying national policies in other countries will enhance our understanding of the relevance of these policies (Cunningham, Lehmann, et al., 2019; Kolb & Wagner, 2018) and their effectiveness on universities and, consequently, academics and researchers (Gan et al., 2021).

Another critical actor is the university, where academics are primarily embedded (Fini et al., 2017). Generally, the university administration is responsible for establishing general norms and policies. They manage finances and human resources, maintain physical infrastructures, oversee information systems, handle admissions and registration, ensure student welfare and services, and implement university-wide teaching policies (Bernasconi, 2005). Additionally, universities develop policies such as IPR and technology transfer to foster entrepreneurial activities (Cunningham, Lehmann, et al., 2019; Giuri et al., 2020). These university policies can account for the variations in entrepreneurial activity levels among universities (Guerrero et al., 2015). Although different university policies and strategies can encourage and enhance the creation of university spinoffs and patents, they can also impede the entrepreneurial engagement of academics (Alessandrini et al., 2013; Cunningham, Lehmann, et al., 2019; Muscio et al., 2016). Fini et al. (2020) argue that it remains equivocal when and under what circumstances these university policy interventions effectively foster AE. Therefore, given the diverse findings in the literature, it is crucial to identify the effectiveness of specific policies in supporting AE's development (Centobelli et al., 2019; Fini et al., 2020).

While universities often prioritise teaching, publications and research grant income in promotion and tenure decisions (Wright, 2014), the extent to which incentives are provided for academics to engage in entrepreneurial activities yields mixed results (Hayter et al., 2018; Markman et al., 2004; Thursby & Thursby, 2002; Urban & Chantson, 2019). Understanding the impact of reward and incentive systems in different cultural, organisational, and country settings, including developing countries, will enhance the relevance of research on incentives and rewards for the AE and technology transfer (D'Este et al., 2012; Mendoza et al., 2020). Based on the above discussion, this thesis formulates the question: *what university-level factors influence academics' engagement in AE?*

In the AE process, academics play a central role and undertake entrepreneurial activities, contrasting with the university's emphasis on teaching (Galati et al., 2020). Previous studies have examined factors such as academic position, career stage, and prior entrepreneurial experience influencing academics' AE engagement (Abreu & Grinevich, 2013; Belitski et al., 2019; Hmieleski & Powell, 2018). However, inconclusive results regarding academics' position, age, rank, research output and quality are found. These factors influence academics' propensity towards universities' third mission or entrepreneurial outcome (Belitski et al., 2019; Freel et al., 2019). While these studies confirm a relationship with entrepreneurial outcomes, they fail to provide evidence regarding the antecedent factors that shape academics' perspectives and behaviours to engage in FAE and IAE. As highlighted by Cunningham and O'Reilly (2018, p. 552), there is a need to 'examine more of the antecedent factors that shape individual perspectives and behaviours before engaging with a technology transfer process'. Thus, this thesis addresses the question: *what individual-level forces influence academics to engage in AE?* Understanding these behaviours and motivators is essential, as they influence academics' engagement in AE and their contributions to the university's entrepreneurship mission (Cunningham et al., 2018; Cunningham & O'Reilly, 2018; Wright, 2018).

1.4 Research Context

As Hossinger et al. (2020) indicated, Asian countries are under-researched but rapidly developing. They need more exploration to identify the factors and drivers of AE so that the distinct features of context can be incorporated into the existing literature. Bangladesh, a developing country in Asia, has been selected for this study for several reasons. Firstly, due to its recent emphasis on innovation, entrepreneurship, and economic growth (The World Bank, 2021). Secondly, it is argued that institutions in developing countries affect academic entrepreneurial intentions differently than those in developed countries (Urban and Chantson, 2019). Thirdly, Bangladesh is moving towards a knowledge economy (The World Bank, 2021). There has been an increased number of universities and students in higher education in Bangladesh in the last decade (Table 1.1). The government incentivises university graduates to engage in entrepreneurship (The World Bank, 2021).

Table 1.1: Evolution of Universities in Bangladesh 2009-2020

Year	Number of universities		Number of students	
2009	Private	51	Private	200,939
	Public	31	Public	1,382,216
2017	Private	95	Private	354,333
	Public	37	Public	3,606,137
2020	Private	105	Private	-
	Public	46	Public	

Source: Bangladesh University Grants Commission (2018a, 2019a, 2021)

The University of Dhaka and the Bangladesh University of Engineering and Technology have recently signed an agreement with the University Grants Commission (UGC) to establish a TTO to promote university-level invention and innovation (TheIndependentbd.com, 2016). This indicates the incorporation of entrepreneurial missions in Bangladeshi universities with an extended focus on education, entrepreneurship, and innovation (Bangladesh University Grants Commission, 2018b). A recent literature review by Farrell *et al.* (2022) illustrates AE's characteristics, attributes, behaviours, enablers, and barriers in Higher Education Institutions in low- and middle-income countries. They emphasise that hunger for success, independence, innovation, creativity, futuristic thinking, and self-esteem drive academics to engage in AE. They also highlight the need to develop an appropriate model for AE from low- and middle-income countries and recognise the differences in entrepreneurial objectives and activities academics face in resource-constrained environments, particularly in developing countries where academics are heavily involved in undergraduate teaching and training (Fischer et al., 2018). This thesis aims to contribute to the AE literature by examining the interactions between the government, universities, and academics in Bangladesh, a developing country and by developing a framework for AE (Farrell et al., 2022).

1.5 Research Objectives and Questions

Considering the gaps in research and understanding discussed above, this thesis aims to understand why academics engage in AE and how different levels of actors interact to influence academics' engagement in AE. The objectives of this study are as follows:

- To explore key stakeholders' roles and interactions in AE.
- To identify the facilitators and inhibitors of AE.
- To understand what motivates academics to engage in AE and
- To develop a framework for AE.

Additionally, to achieve these objectives, this thesis aims to address the following questions:

- What macro-level factors influence academics' AE engagement?
- What are the university-level factors that influence academics' AE engagement?
- What individual-level forces influence academics to engage in AE?
- How do these different levels interact to influence AE?

1.6 Significance of this Study

Traditionally, universities have been perceived as producers and disseminators of knowledge rather than actively applying such knowledge (Etzkowitz et al., 2000). However, nowadays, universities are expected to take a proactive role in innovation and regional development through their engagement in entrepreneurial activities and the transfer of technology from academia to industry (Guerrero et al., 2015; Urbano & Guerrero, 2013). Currently, most universities in developed countries are increasingly considered entrepreneurial (Guerrero, Urbano, Fayolle, et al., 2016; Guerrero & Urbano, 2012), and this trend is also becoming prevalent in emerging and developing countries (Belitski et al., 2019; Cantu-Ortiz et al., 2017; Dalmarco et al., 2018). This leads the government and universities to formulate and implement policies and programmes to support the university becoming more entrepreneurial (Siegel & Wright, 2015). However, the entrepreneurial ecosystem in developing countries differs from that in developed countries. Therefore, '*it is important that appropriate models are developed (or existing models refined) that better fit the low- and middle-income countries (LMIC) environment and recognise the differences in entrepreneurial objectives and activities in resource-poor settings, as well as the resource constraints LMIC academics face'* (Farrell et al., 2022, p. 601).

1.7 Contribution of this Study

This study contributes significantly to the literature on academic entrepreneurship and institutional theory. It advances knowledge by developing an AE framework (Farrell et al., 2022), examining multi-level stakeholder interactions in the AE process (Belitski et al., 2019; Guindalini et al., 2021), and integrating individual cognitive and perception aspects into institutional theory (Zhai & Su, 2019), among other contributions.

Through the lens of institutional theory (Scott, 1995), this thesis reveals that normative dimensions sometimes influence the behaviour of academics in the university setting (Etzkowitz, 2003b; Link et al., 2007; Mosey et al., 2012), leading them to pursue teaching-based AE activities such as guest lectures and training, as well as research-based AE activities like consultancy, contract research, and patents (De Silva, 2016). At times, academics may diverge from these norms by engaging in spinoffs and startups. Their motivations, including success, independence, innovation, creativity, futuristic thinking, and self-esteem (Farrell et al., 2022), also play a crucial role in driving AE engagement. Hence, academic behaviour in AE is influenced not only by university norms but also by personal motivations and perceptions. Chapter eight presents the framework, providing a comprehensive understanding of the phenomenon under investigation. As detailed in chapter eight, sections 8.3 and 8.4, this research introduces new insights and advances knowledge in AE and institutional theory.

Furthermore, this study has practical and policy implications. The government of Bangladesh is advocating a five-helix approach and the Bayh-Dole Act to stimulate innovation and technology (Bangladesh Planning Commission, 2020; Bangladesh University Grants Commission, 2018c). Consequently, within the context of Bangladesh, the findings of this study hold implications for the country's technology transfer and research commercialisation policy. Policymakers should consider contextual and cultural differences, including the needs and expectations of the stakeholders and the acceptance of academic engagement in AE when adapting policies from elsewhere. Additionally, university managers should prioritise raising awareness of the significance of entrepreneurial activity within the university system. The university should recognise and support AE engagement, while management should work on increasing awareness of this core activity. Further implications of this research are presented in chapter eight, sections 8.5 and 8.6.

1.8 Outline of this Study

The thesis structure is as follows: The first chapter introduces the research background, the research gap, objectives and questions, and the significance of the research. The chapter also explains the contributions of the study. The second chapter reviews the literature, focusing on the importance of AE and different types of AE, and explores multilevel factors that influence academics' entrepreneurial engagement by reviewing previous studies. It then describes different AE models and frameworks and explores the institutional theory and AE. The third chapter describes the research methodologies used in this study. It begins with the research paradigm, i.e., ontology, epistemology and research methods and discusses the appropriateness of these methods. Next, the methods used to collect data are presented. Following this, the ethical considerations of this study are discussed. Chapter four discusses the data analysis and sample, which explains the tools and techniques used in this study. The fifth, sixth, seventh and eighth chapters summarise and discuss the results and findings. Finally, the last chapter concludes this study with a discussion of the contribution to knowledge, managerial and policy implications, and the study's limitations, and it makes suggestions for future research.

CHAPTER TWO: LITERATURE REVIEW

2 LITERATURE REVIEW

2.1 Introduction

This study explores why academics engage in AE and investigate how different levels of actors interact to influence academics' engagement in AE through an institutional theory lens. This chapter presents a comprehensive review of relevant literature pertinent to this study. Moreover, it identifies the current knowledge gaps and issues that justify the need for this research. The chapter begins by defining the entrepreneurial university and academic entrepreneurship (AE), followed by discussing the importance of AE. It then explores the literature on the factors affecting AE and different AE models and frameworks. Finally, it examines the AE literature in line with institutional theory.

2.2 Entrepreneurial University

Universities worldwide have evolved from the Humboldtian ivory tower, which is concerned with limited connection with the external world but ensures the advancement of fundamental knowledge (Newman, 1992), to becoming one of the driving forces of innovation and entrepreneurship, contributing to the economy and society (Audretsch, 2014). University research has become integral to business innovation policy (Rasmussen & Wright, 2015). This importance of knowledge in innovation systems has led to the emergence of entrepreneurial universities (Lehmann & Menter, 2016). This shift began in the 1980s and 1990s when governments and universities became interested in technology transfer activities (Dalmarco et al., 2018). This shift has been engendered by establishing institutional instruments such as the technology transfer offices (TTOs) (Siegel & Wright, 2015). However, it is challenging for universities to adopt technology transfer and commercialisation as integral parts of their activities (Kolb & Wagner, 2015). Not all universities adopt this entrepreneurship mission (Audretsch, 2014).

Etzkowitz (1983) pioneered the entrepreneurial university concept by introducing the triple helix model, which indicates the relationship between university, industry and government, wherein universities play an essential role in technological development and innovation through their entrepreneurial activities (Etzkowitz, 2013). In addition to education and research activities, universities accommodate entrepreneurship missions to become entrepreneurial universities (Audretsch, 2014; Guerrero et al., 2015). Philpott et al. (2011, p. 162) defined "a university that embraces its role within the triple helix model and adopts the mission of contributing to regional/national development is referred to as an entrepreneurial university". As a result, the entrepreneurial university adopts the third mission (Abreu et al., 2016;

Compagnucci & Spigarelli, 2020; Secundo et al., 2017). Universities actively engaged in third mission activities have become powerful catalysts for social, economic and cultural development in their regions. By facilitating knowledge and cutting-edge technology transfer to industries and society, they play a pivotal role in fostering progress and growth (Compagnucci & Spigarelli, 2020). These universities are designed to foster entrepreneurship by establishing TTOs, managing relationships with stakeholders, providing training to private companies, managing incubators and science parks, and paying more attention to regional and national economic development (Dalmarco et al., 2018).

2.3 Academic Entrepreneurship (AE)

Over time, entrepreneurial universities have evolved into a more focused concept called academic entrepreneurship (AE). AE is not universally agreed upon, but it generally refers to how universities, colleges, and other educational institutions foster and promote entrepreneurship among their students, faculty, and staff. AE involves commercialising university research by forming new companies (Cantu-Ortiz et al., 2017). However, this commercialisation of research is often limitedly denoted through spin-out and patenting, representing a narrow interpretation. Abreu and Grinevich (2013, p. 408) defined AE as

> *...any activity that occurs beyond the traditional academic roles of teaching and research is innovative, carries an element of risk, and leads to financial rewards for the individual academic or his/her institution.*

Similarly, Karlsdottir et al. (2023) argued that AE ensures the generation, use, application, and exploitation of knowledge and other university capabilities, actively engaging with external stakeholders and contributing to economic, social, and cultural development beyond the confines of academia. This entrepreneurial engagement of academics or universities is often measured by, for instance, *'the number of patents, number of spinoffs, contract research, industry training courses, consulting, obtaining grants from external sources, number of graduates, or creating knowledge parks in the case of universities'* (Zalewska-Kurek et al., 2018, p. 140). Due to the shift to multifaceted channels and mechanisms of knowledge exchange, it is essential to broaden the AE landscape to include informal activities such as consultancy and contract research as AE, alongside formal activities such as patents and spinoffs (e.g., Abreu et al., 2016; Wright, 2018).

Researchers have classified AE into three groups of activity: (1) research-related entrepreneurial activities, such as contract research with industry, government or non-government bodies, consultancies, and joint research with non-academic partners; (2)

commercialisation via patenting, licencing and spin-out creation based on own research, and (3) teaching-related entrepreneurial activities such as delivering executive education and training, and placing student trainees in industry (e.g., De Silva, 2016; Klofsten & Jones-Evans, 2000; Moray & Clarysse, 2005; Perkmann et al., 2013, 2021). At the same time, Philpott *et al.* (2011) stated that universities have the potential to contribute to social and economic development, also known as the third mission (Etzkowitz, 1983), through a range of entrepreneurial activities, from hard to soft (Karlsdottir et al., 2023). The hard activities, such as creating spin-offs, establishing technology parks, and patenting and licencing, align more with the commercialisation or entrepreneurial paradigm. Soft activities like external teaching, community activities, and training are closer to traditional teaching paradigms.

However, researchers have differentiated these activities into formal AE (FAE) and informal AE (IAE) based on property rights, legality, visibility, ease of quantifiability and economic impact (Abreu & Grinevich, 2013; Alexander & Childe, 2013; Link et al., 2007). Most research has focused on FAE, exploring spinoffs, licences, patents, and startups (Abreu & Grinevich, 2013; Grimaldi et al., 2011). These activities occur via commercial transactions and are centred around technological inventions via formal IP (Abreu & Grinevich, 2013). On the other hand, IAE includes consultancy, contract research, joint/collaborative research, shared facilities, secondments, training and continued professional development, student placements and student projects (Miller, Alexander, et al., 2018). These activities also have commercial aspects but are more knowledge-centred and cannot be protected via formal IP (Abreu & Grinevich, 2013). However, these activities can contribute to society and the economy but tend to occur 'under the radar' (Abreu & Grinevich, 2013, p. 409).

Networking	Student placements	Secondment	Training & Development	Collaborative research	Invention disclosure	Consultancy	Contract research	Shared facilities	Research Joint venture	Patent & Licences	Spin-off & Start-ups
Informal					Degree of formality						Formal

Figure 2.1: Forms of Academics Entrepreneurial Engagement (c.f. Alexander & Childe, 2013)

This study views AE as a spectrum (Figure 2.1) because of the interlinked nature of these activities. The outcome of IAE often leads to FAE (Abreu & Grinevich, 2013; Wadhwani et al., 2017). Moreover, involvement in IAE transcends the universities' internal knowledge and leads to FAE engagement (Wadhwani et al., 2017). For example, consultancy and contract research results give academics specific societal requirements, leading to more contractual or formalised activities such as spinoffs (Abreu & Grinevich, 2013). Often, knowledge from the university is transferred to industries through consulting and informal communication rather than formal activities (Cohen et al., 2002). It is argued that academics interact with industries to promote their research rather than market their knowledge (D'Este & Perkmann, 2011). In other words, FAE is exclusively influenced by the motive of commercialisation, while IAE is shaped by research goals (Mascarenhas et al., 2017). This reinforces the importance of IAE, which is often overlooked in the extant literature; hence, along with FAE, why academics engage in IAE requires investigation (Wright, 2018).

2.4 Importance of AE

Universities promote social and economic development by engaging in entrepreneurial activities and establishing innovative connections between teaching and research (Philpott et al., 2011). The impact of AE on innovation and economic development has been widely studied in the literature, and the results suggest that AE has a positive effect on innovation and economic growth, evidenced by academic spinoffs and technology transfer activities. Furthermore, AE is believed to positively impact regional and national economies by fostering the creation of new firms and facilitating the transfer of knowledge and technology to existing firms. Through collaborative research and development projects, universities can work with industry partners to address real-world problems and develop new products and services. All these activities serve as a source of revenue for universities and academics. Consequently, universities face competition from other institutions based on their entrepreneurial activities (Schaeffer & Matt, 2016). This pressure leads universities to turn their proprietary technology into attractive opportunities and drive their strategic direction for academics to engage in various entrepreneurial activities (Markman et al., 2004; Schaeffer & Matt, 2016). FAE directly contributes to economic development by fostering the creation of new businesses through spinoffs or licencing patents to industry partners. For example, in their study in the US, Aldridge and Audretsch (2011) found that one in four academic scientists engaged in entrepreneurial activity by starting a new firm. On the other hand, IAE contributes indirectly to economic growth. For instance, contracted research can assist companies in addressing practical problems, training courses can improve competitiveness, and academic research and scholarships can bolster the university's reputation and attract external companies to the area.

Although some scholars view these AE activities as divergent (e.g., Ding & Choi, 2011), others see IAE as the stepping stone for setting up firms (Abreu & Grinevich, 2013; Balven et al., 2018). There have been opposing perspectives suggesting that IAE might yield even higher revenue. Proponents of this view (Abreu & Grinevich, 2013; Balven et al., 2018) cite two primary reasons. Firstly, they argue that informal processes, such as collaborating with private equity and venture capital firms, are more efficient. Consequently, patenting, licencing, and the establishment of start-ups occur at a faster pace, increasing the likelihood of success. Secondly, the belief that the informal route presents a greater chance of success leads to a higher possibility of inventors accumulating wealth and donating to the university (Balven et al., 2018). In addition, AE can provide opportunities for students and faculty to gain valuable experience in entrepreneurship and business development. Students can learn essential skills such as leadership, creativity, and problem-solving by working on entrepreneurial projects. At the same time, faculty members can gain insights into industry needs and trends that can inform their research and teaching. AE also facilitates a culture of innovation and entrepreneurship within universities. By encouraging and supporting entrepreneurial activity, universities can create a dynamic environment that fosters creativity, risk-taking, and collaboration and attracts talented students and faculty interested in entrepreneurship and innovation.

However, the extant literature emphasises FAE as the primary output in the technology transfer process, overlooking other mechanisms for commercialisation, such as contract research, consulting, or job placement of the students, to name a few (Abreu & Grinevich, 2013). This is a narrow focus. Besides, knowledge and technology transfer from universities to industry primarily occurs through IAE rather than FAE (Abreu & Grinevich, 2013; D'Este & Perkmann, 2011). Although these informal activities are not new, their current unfolding represents a novel development. For example, university expertise is shared with industry through contract research, consulting and advisory board participation, which differ from more formal mechanisms such as spinoffs and patents (Abreu & Grinevich, 2013). However, previous research has predominantly focused on FAE (Aydemir et al., 2022; Backs et al., 2019; Cunningham, Lehmann, et al., 2019; Fini et al., 2017). This limited scope fails to recognise the diverse ways in which universities contribute to economic development (Cunningham, Menter, et al., 2019; Schaeffer et al., 2020; Wright, 2018). Scholars have emphasised the need to reconsider AE by acknowledging the existence of different forms of AE and investigating the commercialisation of research and intellectual property (IP) protection through business ventures (Grimaldi et al., 2011; Siegel & Wright, 2015; Wright, 2018). Furthermore, it is essential to enhance our understanding of the various contexts of entrepreneurship, the actors involved and the mechanisms that facilitate the vast array of AE activities (Karlsdottir et al., 2023; Marzocchi et al., 2019; Siegel & Wright, 2015).

2.5 Factors Affecting AE

The literature on AE has grown significantly over the past two decades, covering a wide range of topics, including the motivations and barriers to AE, the impact of AE on innovation and economic development, and the role of institutions and policies in fostering AE (e.g., Alessandrini et al., 2013; Cunningham & O'Reilly, 2018). Scholars have developed three frameworks, macro, meso, and micro domains, to conceptualise the evolution of economic activity (Dopfer et al., 2004). This approach highlights the interconnections among different systems, individuals, structures, and practices and recognises the dynamic interplay between the existing social conditions and the construction of society. Embracing this pluralistic perspective entails adopting a flexible outlook on social and individual relationships, rejecting narrow and inflexible viewpoints. In this context, 'micro' refers to the individuals who uphold rules and organise systems, while 'macro' encompasses the population structure of meso systems. The 'micro' structure exists within the elements of the meso, while the macro structure operates between these meso elements (Dopfer et al., 2004).

Extant literature has identified different actors, such as academics, government, universities, and industry (Belitski et al., 2019; Rippa & Secundo, 2019; Simeone et al., 2017), that facilitate or inhibit AE (Appendix 1). In the AE literature, academics are the individuals who carry the rules and regulations set by the university and government. University is the institution in which academics are originally embedded with structure, efficiency, efficacy, and change. The industry also connects through industry-academia collaboration. Notably, the government sets the frameworks for the overall architecture of the AE ecosystem. These factors are associated with the multilevel aspects of the AE. They can be grouped into macro, meso and micro-level factors to represent the institutional, organisational, and individual levels, respectively (Table 2.1). However, most studies have considered the impact of only a single level on AE. Although Klingbeil et al. (2019) have considered the impact of multi-level institutional logic on entrepreneurial intentions, they did not focus on the interactions of these different levels on AE.

In a recent literature review, Guindalini et al. (2021) emphasise the importance of identifying the multilevel success drivers and barriers of the innovation commercialisation process. They also argued that understanding these factors is essential to implementing policies to support and foster entrepreneurship. This multilevel analysis and interaction will advance the field of AE (Fini et al., 2017) and develop an entrepreneurial ecosystem[1] for universities (Audretsch et al., 2019; Cunningham & O'Reilly, 2018; Wright et al., 2017). Moreover, this will help policymakers enhance their decision-making and provide evidence to the recipient of technology transfer (Cunningham & O'Reilly, 2018). Accordingly, the following sections discuss how these factors facilitate and inhibit AE activities.

2.5.1 Macro Level: The Role of Government

The role of institutions and policies in fostering academic entrepreneurship has been widely studied in the literature (e.g., Alessandrini et al., 2013; Cunningham & O'Reilly, 2018; Guerrero & Urbano, 2019). The results of these studies suggest that academic institutions and policies play a critical role in promoting and supporting AE. This includes providing funding, training, and support for commercialisation activities and creating an enabling environment for academic entrepreneurship through supportive regulations and policies. National and regional level factors can significantly impact the level of AE and the success of AE initiatives. Governments worldwide have implemented several policy frameworks and instruments that foster entrepreneurship. These instruments can be categorised into supply-side, demand-side, and connectivity-enhancing measures that have contributed to developing entrepreneurial innovations (Guerrero & Urbano, 2019). They indicated that direct funding for research and development (R&D) firms, fiscal measures, debt schemes, and technology services had played a crucial role on the supply side. Innovation procurement schemes have been implemented on the demand side, and connectivity measures, such as establishing clusters, also contribute to developing entrepreneurial innovations.

The government formulates different rules and regulations, policies, and programmes to promote countries' entrepreneurial endeavours, intending to connect academia with industry. However, these policies often focus on providing incentives for the industries to grow (Mascarenhas et al., 2017). Given this narrow focus on funding the major innovation technology, these policies often fail to engage more entrepreneurs in the entrepreneurship and innovation process (Wright, 2014). Incorporating change in national policies such as tax

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[1] Entrepreneurial ecosystem consists of a set of actors including local culture, social networks, investment capital, universities, and active economic policies that combine in a complex way.

incentives (Civera, Lehmann, et al., 2020) and patent protection (Guerrero & Urbano, 2019), Bayh Dole type Act (Grimaldi et al., 2011) has a positive impact on the AE in the USA. The Bayh Dole Act allowed universities to acquire ownership rights (patents) that needed to be commercialised (Mowery & Sampat, 2004).

The effect of these regulations can change over time. Cunningham et al. (2019) illustrated that changing policies and legislation at the national level may increase the number of AE activities but reported limited growth potential and limited impact on the economy, which questions the applicability of similar policies in different contexts; hence various scholars advocated the need to consider the local context while replicating policy and legislative instruments from other contexts (Cunningham, Lehmann, et al., 2019; Grimaldi et al., 2011; Kolb & Wagner, 2018). Most previous studies reported the impact of national policy to foster FAE, such as patents, licencing agreements, startups, and spinoffs (Gosens et al., 2018; Grimaldi et al., 2011; Hayter et al., 2018) and often overlook the influence of these policies on IAE (Meoli et al., 2018). Not all academics will engage in AE, as many academics prefer their day-to-day academic role to teach and research (Wood, 2011). Incorporating FAE and IAE in national policies will influence academics to engage in knowledge transfer and entrepreneurial activities (Cunningham, Lehmann, et al., 2019; Good et al., 2019; Meoli et al., 2018). In addition to recognising different types of AE, the government must recognise the differences between the universities in terms of their background and strength while incorporating any policy change.

Table 2.1 Overview of Multilevel Nature of the Factors Influencing AE.

Levels	Definition	Instruments/measures	Some examples
Macro	Government Strategies to advance national technology transfer, innovation, and entrepreneurship	Government funding, support centres, intellectual property rights, policy instruments (technology transfer, tax incentives (Incubators, technology parks, coordination between the public and private sector, Market opportunities through creating the demand, bureaucracy, and inefficiencies	(Civera, Lehmann, et al., 2020; Criaco et al., 2014; Cunningham, Lehmann, et al., 2019; Feola et al., 2019; Guerrero & Urbano, 2019; O'Kane et al., 2020)
Meso	Programmes and practices of universities and industry within the country	University culture & tradition, teaching vs research focus, commercialisation capability, discipline, entrepreneurial orientation, reward and incentive systems, department's entrepreneurial orientation, funding, TTOs, entrepreneurship centres, Top management support, university regulations and governance structure, University size, type, and reputation, research capacity Industry funding, R&D spending, Mutual commitment, Proximity, Knowledge focus	(Balasubramanian et al., 2020; Bolzani et al., 2021; Dhewanto & Sohal, 2015; Fini et al., 2017, 2020; Fischer et al., 2018; Li & Tan, 2020; Meoli et al., 2019; Muscio et al., 2016; Sandström et al., 2018) (Al-Tabbaa & Ankrah, 2016; Belitski et al., 2019; Lauvås & Steinmo, 2021; Link & Sarala, 2019)

Micro	Characteristics, attitudes, and behaviours of academics	Academics’ entrepreneurial orientation, entrepreneurial mindset, entrepreneurial intentions, entrepreneurial education and training, gender, social network, independence, and freedom, intention to contribute to science and knowledge, contribute to society, teamwork, work-life balance, self-efficacy, and ambidexterity	(Abreu et al., 2016; Backs et al., 2019; Balven et al., 2018; Centobelli et al., 2019; Clarysse, Wright, et al., 2011; D’Este et al., 2012; Galati et al., 2020; García-Hurtado et al., 2022; Hahn et al., 2019; Munshaw et al., 2019; Siegel & Wright, 2015; Zhang et al., 2022)

Source: Author

Some unfavourable policies and regulations act as barriers to AE, such as strict regulations on intellectual property or the use of research funding. These policies can limit the ability of academics to commercialise their work (Alessandrini et al., 2013). Furthermore, the development and implementation of technology transfer policies often fail to adequately consider institutional actors’ capacity, capabilities, and constraints, such as universities. Relying solely on a single policy to increase the innovation and knowledge transfer of universities (Cunningham, Lehmann, et al., 2019), along with the bureaucracy and inefficiencies of the government (Feola et al., 2019), can further hinder progress. Additionally, laws governing the formation and operation of spinoffs and startups can also impact the ease with which academics can start and grow their own companies. Therefore, an in-depth investigation is necessary to understand how national policies can influence academics’ engagement in entrepreneurial activities (Kolb & Wagner, 2018) from different contexts (Cunningham, Lehmann, et al., 2019).

Government funding availability can impact AE (Benneworth & Jongbloed, 2010). The funding contributes to the quality and quantity of publications and patents, cooperation in R&D, and commercialisation of licences or patents or entrepreneurship by creating a spinoff (Davey et al., 2016; Hooi & Wang, 2020). It has been documented as the driver that encourages academics to engage in such activities. However, lacking it can often hinder academic AE engagement (Davey et al., 2016). The country’s economic status frequently influences this government funding as the developed countries spend more on universities as a percentage of GDP than the developing countries (De Silva, 2016). Due to reduced public investment, government funding to universities is heavily affected (Seguí-Mas et al., 2018). Moreover, research organisations and universities compete against each other to get an increased share of government funding (Derrick & Bryant, 2013; Hooi & Wang, 2020). This funding also depends on disciplines, problem or focus areas, or types of research (Hooi & Wang, 2020). Although this illustrates the importance of government funding for the universities, specifically for the AE landscape, it also demonstrates the contextual and sporadic nature of government funding.

The government also provides the infrastructure and physical facilities to foster entrepreneurship through incubators, technology parks and venture capital (which may also be supplied by the private sector) and improve coordination between the public and private sectors (Criaco et al., 2014).

Overall, government policies and regulations play a crucial role in shaping the environment for AE by providing support and resources for commercialising academic research while also addressing potential barriers and promoting a favourable legal and regulatory framework for academic entrepreneurs through providing appropriate policies and regulations, availability of funding, infrastructure and technology, and competition and market opportunities, can significantly impact the level of AE and the success of AE initiatives.

2.5.2 Meso Level: The Role of Universities

Whilst governments formulate policies to foster AE, most of the process is carried out within the university (Bienkowska et al., 2016; Fini & Toschi, 2016). Depending on the needs of national policy and research funding, student market, societal needs and universities' organisational characteristics, universities formulate their strategy to combine different sets of resources and capabilities to fulfil their objective of teaching, research and commercialisation of research (Siegel & Wright, 2015). University (meso) level factors are critical in fostering AE and determining the success of AE initiatives. Some of the university-level factors that influence AE are technology transfer policies and regulations (e.g., D'Este & Perkmann, 2011; Giuri et al., 2020; Rasmussen & Wright, 2015; Sandström et al., 2018), reward and incentive policies (Fini et al., 2020), funding (Cunningham & Link, 2014; Hooi & Wang, 2020), entrepreneurial orientation (Balasubramanian et al., 2020), entrepreneurial culture (Dolan et al., 2019; Freel et al., 2019), and top management support (Alessandrini et al., 2013; Civera, Lehmann, et al., 2020).

Universities that support academic entrepreneurs are more likely to become entrepreneurial. However, failing to provide this support increases the impediments to AE (Alessandrini et al., 2013). University-level policies are often directed towards spinoffs and patents and overlook other mechanisms, such as consultancy and contract research (Cunningham, Lehmann, et al., 2019). For instance, the ownership structure and choice to retain a proportion of profits from patents has increased universities' AE engagement (Giuri et al., 2020; Muscio et al., 2016). However, Belitski et al. (2019) found that university ownership is unrelated to research commercialisation income at the organisational level. Some studies indicate that university policies and programmes have no or limited effect on the AE (Abreu et al., 2016; Sandström et al., 2018). This is why it is essential to investigate how university policies are reflected in the FAE and IAE outcomes (Cunningham, Lehmann, et al., 2019).

This entrepreneurship policy adoption depends on the universities' entrepreneurial orientation (Balasubramanian et al., 2020) and entrepreneurial culture (Dolan et al., 2019; Freel et al., 2019). The university's entrepreneurial orientation and culture help leverage existing resources and capabilities for entrepreneurship engagement (Goethner & Wyrwich, 2019). Universities have different support activities to help academics commercialise their research, such as TTOs, entrepreneurship centres, incubators and accelerators[2] (Guerrero, Urbano, Fayolle, et al., 2016; Siegel & Wright, 2015). There are mixed results regarding university support programmes such as TTOs' role in research commercialisation (Horner et al., 2019). These mixed results reflect, on the one hand, the university's priorities to generate revenue rather than supporting entrepreneurial activity (Hayter et al., 2018). On the other hand, this knowledge commercialisation is individually driven (Halilem et al., 2017), and academics use these support activities when they find it compatible with their cause (Guerrero et al., 2018). Some academics do not use university support as they perceive these support mechanisms as inadequate (Urban & Chantson, 2019). Moreover, some academic entrepreneurs commercialise their research by engaging in university-industry partnerships or setting up their own ventures (Grimaldi et al., 2011; Miller, Alexander, et al., 2018). This is sometimes reflected in the university's lack of orientation towards entrepreneurship. Hence, the effectiveness of the university's entrepreneurial orientation, university support, and AE performance are examined (Kalar, 2020; O'Kane et al., 2020).

Universities are bureaucratic organisations primarily focusing on advancing teaching and research missions (Dodgson & Staggs, 2012). The universities' culture heavily influences the incorporation of entrepreneurship mission along with these missions about how this entrepreneurship engagement is perceived within the university, for instance, in incentive and

[2] different support initiatives to commercialise academic research: incubators, university venture funds, proof of concept centres, science parks, accelerators, and technology transfer offices (TTOs) (Guerrero & Urbano, 2012; Hayter, 2016). Other than TTOs, these support initiatives act as a rich platform for researchers and students to experiment before setting up new ventures (spin-offs) but often fail to transfer university-owned technology to establish a successful venture (Boh et al., 2016). Macho-Stadler et al. (2007) defined TTOs as a unit accumulating university-wide inventions from different research labs and transferring this knowledge to industry. In other words, TTOs are separate entities created within universities to manage the technology transfer processes from academia to industry (Lafuente & Berbegal-Mirabent, 2017).

reward policy, teaching and research focus, workload policy (e.g., Bernasconi, 2005; Sandström et al., 2018). Currently, universities tend to emphasise teaching, publications and research grant income in promotion and tenure decisions (Wright, 2014) and rarely consider entrepreneurial outcomes such as consulting, contract research, patent, setting spin-offs, and training, in the university incentive structure (Grimm & Jaenicke, 2012; Sandström et al., 2018). Although many universities in developed countries explicitly reward entrepreneurial activities in the promotion and tenure decisions (Siegel & Wright, 2015), there is a mixed effect of providing incentives for academics to engage in entrepreneurial activities (Hayter et al., 2018; Markman et al., 2004; Thursby & Thursby, 2002; Urban & Chantson, 2019). Horner et al. (2019) further argued that providing incentives in the form of royalty shares has a mixed effect on transferring technology to academics. Thus, whilst several studies have seen the impact of university incentive policy on AE, it appears valuable to look at how university incentive policies influence FAE and IAE outcomes (Yu et al., 2023).

There is still a debate about whether such policies and programmes can enable academics to become entrepreneurial because academics would prefer publishing in a highly acclaimed journal because of the 'publish or perish' culture and the promotion and reward structure (Moosa, 2018) rather than commercialising their research findings (Cunningham, Menter, et al., 2019). Czarnitzki *et al.* (2015) and Belitski, Aginskaja and Marozau (2019) raise further concerns. For instance, universities often maintain the legal ownership of the inventions stemming from the university. This university-ownership model decreases entrepreneurial engagement by academics (Czarnitzki et al., 2015). A study in transition economies argues that implementing inventor ownership over university ownership would increase the likelihood of academics engaging in FAE and IAE and are a conduit for knowledge transfer (Belitski et al., 2019).

Academics and supporting policies and programmes need resources and legitimacy to engage in entrepreneurial activities (Shane & Venkataraman, 2000). However, AE-related resource acquisition and legitimacy rely on the university board of trustees or equivalent governing body (Siegel & Wright, 2015), which may facilitate or constrain academic action. The complexity of the university systems leads the members of the academic communities, individually or collectively, to identify the opportunity and act as agents of institutional change (Wadhwani et al., 2017). Sometimes, when university leaders constrain academics in their engagement in entrepreneurial activities, they envision an alternative to entrepreneurship (Seguí-Mas et al., 2018). Often, this alternative is involvement in informal AE where university support would be minimal (Miller, Alexander, et al., 2018; Wadhwani et al., 2017).

The university's decision to pursue entrepreneurship often relies heavily on members of the university governing body and the executive, typically appointed by the governing body (Kwiek, 2009). This governing body ensures the recognition of the university's activities at the national level and serves as a bridge between academic endeavours and the commercialisation of academic work (Good et al., 2020). This balance between academic and commercialisation activities is important because often these lead to a conflict within academics and act as a barrier to their decision to engage in entrepreneurial activities (Goel & Göktepe-Hultén, 2018; Klingbeil et al., 2019; Sandström et al., 2018). Moreover, when the board members have previous entrepreneurial experience, the chance for academics and universities to engage in entrepreneurship is high (Meoli et al., 2019). Thus, it appears necessary to understand how the university leaders have differing relevance for the academics to engage in FAE and IAE (Horner et al., 2019).

The university's size and type influence the university's tradition of adopting the entrepreneurship mission (Fischer et al., 2019; Horner et al., 2019). Often, public universities are larger and more reputed in the sector than private universities (Horner et al., 2019). This scale and reputation of the university impact commercialisation and academic engagement. It also suggests that engagement differences exist between public and private universities. This finding is unsurprising as private higher education institutions have limited budgets and are more likely to focus on teaching to ensure quick profits. In the Brazilian context, Fischer et al. (2019) found that public universities have a strong research focus, which negatively affects the AE. However, Berbegal-Mirabent and Sabate (2015) argued that private universities in Spain are more active and efficient in commercialisation and technology transfer than public universities. This illustrates that the research commercialisation of private and public universities may vary by country. For example, the UK has a small number of private universities compared to the US. Notably, public universities in developing countries have closer ties with business due to the university's reputation, but in developed countries, private universities are more commercially oriented and have closer ties with industry (Algieri et al., 2013). Consequently, some universities can implement this entrepreneurship mission better than others, and one size is unlikely to fit all (Freel et al., 2019). This illustrates the importance of the university type as the factor affecting AE, which needs exploration (Kuchumova et al., 2023).

In conclusion, university-level factors, such as institutional support, entrepreneurial culture and orientation, reward and incentive policies, knowledge transfer policies, and access to funding, can significantly impact the success of AE initiatives. The university must collaborate with the firms to access the resources and capabilities to increase AE engagement.

2.5.3 Meso Level: The Role of Industry

Universities often form academic collaborations with industry to transfer knowledge through different mechanisms such as contract research, joint R&D, consultancy and sitting on advisory boards (Abreu & Grinevich, 2013) and provide firms with the expertise to train and teach their existing or potential employees (Davey et al., 2016). Also, practitioners are often called into the business school to co-teach entrepreneurship courses with regular academics (Etzkowitz, 2017). Moreover, firms fund universities to gain innovation and technology (Fischer et al., 2018). Even the government is pushing universities to maintain cooperation considering industry needs (Guerrero et al., 2018). This academic-industry cooperation allows universities to access external funding while learning, networking, and entrepreneurial opportunities are available to academics (Fischer et al., 2018). However, universities and industry have differing motives. For example, universities are interested in disseminating knowledge through publications, whereas industry is interested in acquiring ownership of knowledge and keeping the findings secret (Davey et al., 2016). As a result, trust is crucial in academia-industry collaboration (Darabi et al., 2020). This difference in motives influences the nature of collaboration.

A recent paper found that industrial funding significantly affects the level of commercialisation income of universities (Belitski et al., 2019). Gan et al. (2021) argued that industrial funding is more effective and conducive than government funding on innovation output. Similarly, in the Singaporean context, Hooi and Wang (2020) found that industry funding significantly influences patent licencing, consultancy, and service on advisory boards where the research direction is government-led. Industry only funds those projects that are commercially viable, whereas government funds ensure societal benefits. However, this funding is not significant for a spinoff. One of the reasons could be that the research was not sufficiently influential and lacked commercial potential (Kirby & El Hadidi, 2019). Although this illustrates the industry's commercial motive, at the same time, it indicates the essence of firm-level capabilities that help them identify the prospective benefits from the investment in knowledge and technology. Conversely, Feola et al. (2019) found that industrial funding does not shape academics' entrepreneurial behaviour. They argue that the less-developed regions are characterised by weak industry-academia ties and consistent reduction in public financing for new ventures, which do not foster the entrepreneurial behaviour of the researchers.

The use of knowledge from the university depends on firm-level factors such as absorptive capacity (Miller, McAdam, et al., 2018), dynamic capabilities of sensing and seizing, and the age of the founders (Link & Sarala, 2019). These capabilities and knowledge determine the success of entrepreneurial firms. Indeed, the presence of local firms operating in the same or related industries, proximity and mutual commitment can facilitate the exchange of information and knowledge (Lauvås & Steinmo, 2021). Firms collaborate with universities to complement their knowledge, and the productivity of R&D increases when they collaborate with universities (Cunningham & Link, 2014). However, industry and academia often conflict over knowledge creation and exploitation as they have different priorities and IP management time horizons for research projects. Hewitt-Dundas et al. (2019) argued that although firms can increase their R&D productivity, this paradox leaves firms to rate universities' contribution to their innovation poorly. These industry-academia ties are even weaker and less formalised in developing countries where industry tends to source new knowledge and technology from other developed countries and does not prefer to invest in a university research project that will take years to yield results (Kirby & El Hadidi, 2019). Hence, often, the industry-academia collaboration is university or individual-driven.

2.5.4 Micro Level: The Role of Academics

Although universities' relationship with industry establishes the path for research commercialisation, academics carry out all the activities. Hence, it is essential to consider the academics' intentions, perceptions, and behaviours towards entrepreneurial engagement. Academics carry out entrepreneurship activities, and their academic duty is to teach and research (Belitski et al., 2019). Therefore, how they perceive the policies and programmes provided by the government and university carries a profound importance in universities' entrepreneurship mission (Audretsch et al., 2015; Bienkowska et al., 2016; Fitzgerald & Cunningham, 2016). Although universities formulate policies to foster entrepreneurial activities, academics and universities often have differing motivations (Abreu et al., 2016). Universities might allocate resources in commercialising the mode that they prefer, such as licencing, start-ups, sponsored research and consulting, whereas academics might engage in those forms of AE where they have the autonomy and opportunity to maximise their rewards and contribution to society (Abreu et al., 2016; Siegel & Wright, 2015). Academics feel obligated to work towards university goals when they perceive that universities formulate favourable policies for them, and at the same time, their contributions are appreciated (Rhoades & Eisenberger, 2002). This indicates that university policies and programmes set the platform for academics to perform academic research and entrepreneurial activities and transfer university technology to industry and broader society (Qian et al., 2018).

Individual factors are critical in shaping academics' entrepreneurial engagement and AE success. Some of the key individual level factors identified in the extant literature that influences AE are academics' entrepreneurial mindset, entrepreneurial intentions and attitudes (Feola et al., 2019; Fernández-Pérez et al., 2015), education and training (Bourelos et al., 2012; Criaco et al., 2014), self-efficacy (Fernández-Pérez et al., 2015; Hahn et al., 2019), knowledge management (Dolan et al., 2019), entrepreneurial capacity (Clarysse, Wright, et al., 2011), having a PhD (Bercovitz & Feldman, 2008; Lai & Vonortas, 2020), previous entrepreneurial and industry experiences (D'Este et al., 2012; Munshaw et al., 2019), social capital (Al-Tabbaa & Ankrah, 2019; Guo et al., 2019), entrepreneurial orientation (Kalar, 2020), extrinsic and intrinsic motivation (Balven et al., 2018; D'Este & Perkmann, 2011; Orazbayeva et al., 2020), gender, and age (Aldridge et al., 2014; Clarysse, Tartari, et al., 2011), access to resources (De Silva, 2016), tenure, and academic rank (Allen et al., 2007; Alshumaimri et al., 2012), teamwork, and work-life balance (Backs et al., 2019).

It is argued that opportunity recognition is crucial for any entrepreneurial activity (Shane & Venkataraman, 2000), and this is also applicable in AE (Aydemir et al., 2022). This opportunity recognition is a cognitive process that allows entrepreneurs to connect unrelated events based on their experience and knowledge and identify the entrepreneurial opportunity (Baron, 2006; Macpherson et al., 2022). Although for FAE and IAE, this opportunity recognition is different, it is the social networks, personal experiences, and knowledge that help academics identify the AE opportunities (Aydemir et al., 2022). Two types of knowledge, innovative and entrepreneurial, are required for AE (Marzocchi et al., 2019). Innovative knowledge provides the understanding of a particular technology and serves as the basis for commercial opportunities, while entrepreneurial knowledge provides an understanding of the entrepreneurial processes. Although academics have innovative knowledge, they often need more skills and commercial knowledge to take their innovation to industry (Davey et al., 2016). To overcome this innovative and commercial knowledge gap, TTOs can play a significant role (Gan et al., 2021). However, academics' previous entrepreneurial and industry experience and social capital enable commercial knowledge (D'Este & Perkmann, 2011; De Silva, 2016). Hence, academics with previous entrepreneurial and industry experiences will likely recognise entrepreneurial opportunities. This is because prior entrepreneurial experience helps academics build relationships with industry actors and engage in entrepreneurial activities (Hmieleski & Powell, 2018).

In addition to opportunity recognition, another essential entrepreneurial capability at the individual level is exploiting opportunities. This capability to explore new opportunities and use the resources available, which is often termed ambidexterity (Centobelli et al., 2019; García-Hurtado et al., 2022), enables entrepreneurs with this aptitude to create and capitalise on entrepreneurial opportunities (Clauss et al., 2020). Previous entrepreneurial and industry experiences and social capital aids academics in accessing the resources such as financial, human and knowledge and link the barriers to drivers to overcome the perceived obstacles and exploit the AE opportunities (Davey et al., 2016; De Silva, 2016). This is why academics with individual ambidexterity (doing both exploration and exploitation) are more likely to establish new ventures (Yeganegi et al., 2019). A recent study found that academics with experience outside of academia are more likely to be engaged in applied contract research and commercial activities than community activities, science communication and external teaching and training (Karlsdottir et al., 2023).

Academics' orientation towards this research and entrepreneurship also determines their entrepreneurial engagement (Feola et al., 2019; Yu et al., 2023). In this vein, Kalar (2020) suggests that academics need to be confident in their ability to innovate to improve the entrepreneurial performance of the university. Ding and Choi (2011) found that academics' long-term research orientation significantly affects IAE but not FAE. Academics' research orientation towards industry and social needs leads them to engage more in consultancy projects, give public lectures and encourage students to be involved in the industry (Yu et al., 2023). The entrepreneurial orientation comprises three dimensions: innovativeness, proactiveness and risk-taking (Diánez-González & Camelo-Ordaz, 2019). Academic entrepreneurs demonstrate these features when engaging in FAE and IAE. For instance, in a Chinese context, Yu et al. (2023) found that academics who perceive their research has commercial and social value are more likely to convert their research into innovations to benefit society. This illustrates academics' proactive and innovative nature. Moreover, academics are proactive when they bring innovation to the industry through patenting or spinoffs before anyone exploits this opportunity (Davey et al., 2016). Academics also take risks when they start a new venture or spinoff from their research (Del Giudice et al., 2017). However, this risk is lower when academics engage in IAE, such as consulting and contract research, as these are often funded by industry (Holley & Watson, 2017). The risk of starting a new venture is due to uncertainty, so academics frequently prefer IAE over FAE (Balven et al., 2018).

The extant literature has pointed to individual attitudes, behaviours and motivations as determining factors for academics' entrepreneurial engagement (Del Giudice et al., 2017; Hahn et al., 2019; Perkmann et al., 2021). Entrepreneurial intentions have been widely studied as outcome variables in different contexts and are considered the single best predictor of entrepreneurial behaviour (Huyghe & Knockaert, 2015). This intention is important because people with significant potential will refrain from transforming into entrepreneurs if they lack this intention (Miranda et al., 2017). Due to universities' adoption of an entrepreneurial mission and embracing open science norms, academic conflicts arise regarding their involvement in publishing or entrepreneurial activities. On the one hand, FAE, such as patent, licence, and spinoff, which ensures IP protection, challenges open science norms. On the other hand, the public disclosure of academic publications or dissertations reduces the patentability of an invention (Aydemir et al., 2022). However, academics who attach value to monetary measures are more likely to apply for patents (Backs et al., 2019) compared to those who used to publish and tend to disclose (Bercovitz & Feldman, 2008). This illustrates that not all but certain academics are cognitively prepared to engage in entrepreneurial activities. Academic self-efficacy also determines their entrepreneurial engagement (Carroll & Mosakowski, 1987; Pérez-López et al., 2019; Van Gelderen et al., 2015). Self-efficacy refers to one's self-belief in one's capabilities and ability to launch entrepreneurial endeavours (Mcgee et al., 2009). This self-belief is essential because academics with low entrepreneurial self-efficacy tend to be cautious about participating in entrepreneurial activities. In contrast, those with high entrepreneurial self-efficacy are more likely to overcome the financial, technical, and legal uncertainties associated with research commercialisation (Fini & Toschi, 2016).

One study found that early career academics are more productive and focused on establishing a reputation in their discipline. In contrast, academics at the later stages seek to appropriate their intellectual rights by establishing new firms (Bercovitz & Feldmann, 2006). This suggests that academics are more likely to become entrepreneurs later in their careers (Aldridge & Audretsch, 2011). However, academics not involved in entrepreneurial activities early in their career are less likely to engage in such activities later on, and senior academics are less likely to start a new company (Hayter et al., 2018). Belitski et al. (2019) argued that academic positions have limited or no impact on research commercialisation. Abreu and Grinevich (2013) found that a senior academic can be involved in all types of entrepreneurial activities yet prefers to engage in IAE, for example, consultancy, contract research, informal advice, and public lectures (Abreu & Grinevich, 2013; Etzkowitz, 2013). On the other hand, young academics are more inclined to engage in licencing (Abreu & Grinevich, 2013). This entrepreneurial orientation of the academics is also determined by the gender of the academics (Abreu et al., 2016) and the discipline (D'Este & Perkmann, 2011; Freel et al., 2019).

The nature of the research determines the degree of industry collaborations (D'Este & Perkmann, 2011; Fini et al., 2020). Researchers in applied research fields (such as engineering and biomedical) are likely to engage in FAE, such as patent and spinoff (D'Este & Perkmann, 2011; Fini et al., 2020). On the other hand, researchers from the social sciences tend to engage in IAE, such as consulting and contract research, where the resource requirements are less (Perkmann et al., 2011). However, this industry collaboration is not only about the resources or disciplines but also depends on the cognition and perception of the academics. A recent study found that the faculty members of Humanities, Art and Social Sciences (HASS) are least attached to the university's third mission. They place more importance on academic freedom and research and feel that universities can go too far collaborating with industry, which they perceive as detrimental to teaching and research. On the other hand, the Science, Technology, Engineering and Mathematics (STEM) faculty members support the university's third mission more. They prioritise competitiveness and the labour market and believe universities contribute too little to economic development (e.g., Freel et al., 2019). This highlights a difference in perception among the academics based on their disciplinary affiliation.

This AE involvement of academics is influenced by the level of motivation, both intrinsic[3] and extrinsic (Balven et al., 2018; Derrick & Bryant, 2013; Freel et al., 2019; Hmieleski & Powell, 2018; Hossinger et al., 2023; Orazbayeva et al., 2020). This extrinsic motivation complements intrinsic motivation when the academics perceive that the rewards align with their choices and values, further enhancing their drive and commitment (Derrick & Bryant, 2013). Even though extrinsic rewards will not change intrinsic motivations, this extrinsic reward is essential. Scholars have identified several extrinsic motivations for AE, such as collaboration with industry and commercialise research outcomes (D'Este et al., 2012), desire to contribute to social and economic development (Davey et al., 2016; Etzkowitz et al., 2000), access to funding and resources (D'Este & Perkmann, 2011), and desire for financial rewards (Hmieleski

[3] Intrinsic motivation refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation is doing something because it leads to a separable outcome (Ryan & Deci, 2000).

& Powell, 2018) and several other intrinsic motivations such as learning motivations (D'Este & Perkmann, 2011), academic recognition (Freel et al., 2019), increased self-esteem and confidence and self-realisation (Derrick & Bryant, 2013; Hossinger et al., 2023), skills and capacity improvement (D'Este et al., 2012), gaining market, legal, managerial and administrative knowledge and experience, and applying innovative and entrepreneurial knowledge (Galati et al., 2020). This learning motivation is often associated with joint research, contract research and consultancy, whereas commercialisation is mainly associated with spinoffs and patenting (D'Este & Perkmann, 2011). They also found that academics engage more in joint research, contract research and consulting to access funding. However, access to resources negatively influences academics' engagement in contract research, consulting, spinoffs, and patenting and has no significant impact on joint research (D'Este & Perkmann, 2011). Similarly, De Silva (2016) found that spinoff provides academics with resources, funding, networking, knowledge, and skills. Hence, due to the motivational differences, academic engagement in AE varies.

However, this AE engagement can conflict with their academic pursuit (De Silva, 2016; Li & Tan, 2020). This is because involvement in AE increases the workload of the academics to their teaching and research responsibilities, and the likelihood of an academic taking an entrepreneurial identity is influenced heavily by the balance they find in work-life and role (Balven et al., 2018; Giunti & Duberley, 2023). This entrepreneurial role brings a new identity, and academics face challenges while micro-transitioning to an entrepreneurial identity (Guo et al., 2019; Mäkinen & Esko, 2022). They further argued that these two spheres have different norms and acts, and academics must adapt to these norms. Therefore, the inability to adopt an entrepreneurial identity in addition to their academic identity creates conflict. Along this line, it was found that academics driven by the work-life balance motive complete fewer spinoffs (Hossinger et al., 2023). On the other hand, academics who accepted the entrepreneurial identity demonstrate low role conflict (Zou et al., 2019). This acceptance comes with the awareness of the complementary nature of entrepreneurial activities with their teaching and research activities (Bourelos et al., 2012; Grimpe & Hussinger, 2013; Schaeffer et al., 2020). These scholars argued that experience from AE can be reflected in teaching and research, and research findings can be transcended and applied through industry collaboration. In this line of thought, Rosenlund and Legrand (2021) found no role conflict between the academic and entrepreneurial domains. However, Backs et al. (2019) found that reducing the teaching load increases patent applications. Thus, although it may not create conflict while academics engage in entrepreneurial activities due to the complement of teaching and research, it is essential to understand how AE, in terms of workload, may affect the work-life balance of academics (Giunti & Duberley, 2023).

This role conflict and work-life balance are also influenced by the gender of the academics (Ahsan & Cullen, 2022; Lendák-Kabók, 2022). Although work-life issues affect male and female academics, how female academics respond to this challenge is unique (Toffoletti & Starr, 2016). In a developing country, female academics are seen as responsible for looking after the family, teaching, and research responsibilities (Ahsan and Cullen, 2022). However, this is also evident in developed countries (Toffoletti & Starr, 2016). Many female academics take on the role of mother, academic, researcher and entrepreneur and engage in AE. Although the work-life role conflict poses a barrier for female academics to engage in AE, their entrepreneurial intention and mindset can help them engage in AE (Ahsan & Cullen, 2022). The extant literature is equivocal in terms of the effect of gender on the likelihood of involving in AE (Aldridge et al., 2014; Aldridge & Audretsch, 2011; Holley & Watson, 2017). For example, Freel et al. (2019) found that female academics are more likely to adopt the third mission, whereas some scholars found that gender and the likelihood of becoming an entrepreneur are not related (Abreu et al., 2016; Aldridge & Audretsch, 2011; Alshumaimri et al., 2012). However, some authors found that male academics are more entrepreneurial and have a greater propensity to start a new venture (Aldridge et al., 2014; Clarysse, Tartari, et al., 2011), and female scientists are less likely than male scientists to become either founders or advisors (Ding & Choi, 2011). Academics' motive and perception determine their entrepreneurial intention and orientation towards AE. Male scholars tend to have more entrepreneurial experience and social capital than female academics, which explains the male-dominated AE engagement (Ahsan & Cullen, 2022). However, female academics are growing in their intention to engage in AE, which is also reflected in recent studies (Giuri et al., 2020).

In conclusion, individual-level factors, such as entrepreneurial orientation and intention, education and training, social capital and collaborations, prior entrepreneurial experience, personal motivations, and access to resources, play a significant role in shaping academics' AE engagement and their success in commercialising their academic research. Thus, whilst several studies have identified the difference in academic engagement in different forms of AE, it seems essential to understand the antecedent factors that shape academics' perception and behaviours to engage in AE and the technology transfer process (Aydemir et al., 2022; Cunningham & O'Reilly, 2018; Davey et al., 2016).

2.6 AE: System Model or Process Model

Recent research has emphasised the significance of ecosystem perspectives in understanding entrepreneurial development. These perspectives encompass various institutional and regional elements, highlighting their interconnectedness and collective capacity to offer vital information and resources (Acs et al., 2017; Hayter et al., 2022; Spigel, 2017). AE ecosystem is characterised by a high degree of interconnectivity, with multiple factors moderating the impact of each other, which operate in a complex and dynamic manner (Guindalini et al., 2021). Hence, a comprehensive and integrative perspective is necessary to implement AE successfully (Belitski et al., 2019; Guindalini et al., 2021), which leads this study to explore the key actors and their interactions in the AE process. The extant literature has evidenced different types of AE models (see Table 2.2). For instance, the multi-stage process models, resource- and capability-based frameworks, and system-based models are prominent.

Table 2.2 Summary of Selected Studies of AE Model

Authors	Focus & Context	Implications	Future research direction
Fini and Grimaldi (2017)	Process (spinoff) Twelve countries & three continents	• AE is unstructured and emergent approach. • Emphasises the non-intentional nature of entrepreneurial behaviours. • Entrepreneurs create their success by taking incremental steps. • Processes include three phases: evaluation of a business idea, implementation of entrepreneurial opportunity and strategies for entrepreneurial growth	• Highlighted the importance of adopting a multi-level perspective, including institutional, organisational, and individual domains. • Investing in the unstructured aspects of AE through which university knowledge is transferred to industry
Wood (2011)	Process (spinoff) Literature Review	• Clarifies each stage's activities, potential stakeholder roles, and critical success factors. • Processes include four phases: innovation disclosure and intellectual property protection, awareness and securing industry partnerships, commercialisation mechanism selection, and commercialisation.	• Stress the importance of developing an improved model of AE
Simmons and Hornsby (2014)	Process (spinoff) Conceptual paper	• Inclusion of moderating and mediating relationships that drive AE. • Academic entrepreneurs have different motivations than other economic actors. • Processes include five phases: Motivation, governance, mode selection, composition, and performance	• Investigating the effect of university promotion and tenure policies for AE • Stress the importance of better connectedness between faculty, universities, and industry partners
Samo and Huda (2019)	THM (spinoff) Pakistan	• Included the individual entrepreneurial intentions in THM. • Government and university significantly influence academics' entrepreneurial intentions, while the industry has an insignificant relationship. • Government and academia need to work together to identify the policy level measure and implementation strategy for developing entrepreneurial ecosystem at the university level	• Highlighted the need to apply the same model in other developing countries

Feola et al. (2019)	THM (spinoff) Italy	• Inclusion of the Theory of Planned Behaviour (attitude, subjective norms, and perceived behavioural control) in THM leads to entrepreneurial intentions. • Illustrates the interaction between endogenous and exogenous factors in fostering academic entrepreneurial intentions (AEI)	• An in-depth analysis of how different types of support have been realised and how they influence AEI is needed. • Need a replication of the same model in other contexts.
Rasmussen and Borch (2010)	Capability-based framework Spinoff Norway	• Academic spin-offs encompass three critical capabilities: creating new avenues for action, balancing academic and commercial interests, and integrating fresh resources. • Universities need to balance the capabilities enabling the creation of spinoffs carefully	• How these capabilities are created and developed warrants further study
Shanker (2017)	Resource-based framework (spinoff) India	• Different resources are essential for AE. • Individual talent and zeal are more critical than the financial and infrastructure	• Introduced the need to develop a framework to integrate AE into the national innovation system
Cantu-Ortiz et al. (2017)	System (spinoff) Mexico	• Prescribe six actions: research, ecosystem, people, intellectual property, transfer, and alignment. • Along with the importance of resources, highlighted the importance of the interactions and alignment of the stakeholders	• Showed the need to explore the connection between REPITA and a new AE framework that considers the nature of university support in response to the demands of its spinoffs

Source: Author

2.6.1 Multi-Stage Process Model

Some scholars have developed a multi-stage process model for AE (Fini & Grimaldi, 2017; Simmons & Hornsby, 2014; Wood, 2011). These models represent that innovation is disclosed once the business idea is accepted and through the evaluation and implementation process (commercialisation). This refers to a product-market fit before bringing the product into the market. This appears to be a linear process and corresponds to the classical approach of entrepreneurship that requires academics to identify or recognise the opportunity, exploitation, and execution of entrepreneurial opportunities (Shane, 2004). Although the classical view of entrepreneurship sees it as context-dependent, where the creation of a new firm is the result of a dynamic interaction between the individual and environment (Shane & Venkataraman, 2000), the interaction of academic entrepreneurs in the AE process is different as they are primarily embedded within the university (Fini et al., 2017). Hence, these models illustrated the importance of building industry-academia partnerships to bring the discovery into the market. While academics typically need more commercial knowledge, the TTO or other dedicated centres usually handle the commercialisation process. On the other hand, general entrepreneurs identify and accumulate resources required from the external environment. These models also suggest the challenging task of transferring the innovation to the TTO or industry partner, while the commercialisation process is portrayed as straightforward and uncomplicated. Although one of the proposed models aims to investigate the motivation of the stakeholders (Simmons & Hornsby, 2014), scholars have also emphasised the importance of interactions between institutional, organisational, and individual perspectives and how they mutually influence each other (Fini & Grimaldi, 2017).

2.6.2 Resource and Capability-Based Framework

Research has found that resource and capability-based frameworks can be applied to AE (Rasmussen & Borch, 2010; Shanker, 2017). These frameworks underscore the importance of resources and capabilities in determining universities' entrepreneurial characteristics and opportunities. The resource-based framework consists of four resource categories – human, institutional, financial, and commercial resources – which help transfer innovations from university to industry (Shanker, 2017). Although they identified the importance of human capital among these resources, how the motivations of the humans vary was not captured in these models. Moreover, the capability-based framework for academic spin-offs encompasses three critical capabilities: creating new avenues for action, balancing academic and commercial interests, and integrating fresh resources. By leveraging these capabilities, academic institutions can cultivate a fertile ground for entrepreneurial ventures, effectively bridging the gap between academia and the market and fostering the successful development of spinoffs (Rasmussen & Borch, 2010). These frameworks considered academics as the resources; their perceptions and entrepreneurial behaviours are not included in the model. These models imply that there is goal congruence between academics and universities.

2.6.3 System-Based Framework

The system-based framework is another idea applied to AE (Cantu-Ortiz et al., 2017; Feola et al., 2019; Samo & Huda, 2019). This framework emphasises a combination of factors rather than processes, resources or capabilities. One system-based framework is the Triple Helix Model (THM), adopted to explain innovation and entrepreneurial activities (Etzkowitz et al., 2000). They argued that the interaction of university, industry, and government plays a vital and distinct role in promoting entrepreneurship, and their collaborative efforts lead to a synergistic effect towards this goal and often leave the individual perspective (Feola et al., 2019). A recent literature review of THM (Cai & Etzkowitz, 2020) emphasised the importance of integrating social capital into their framework. This social network is often an individual-level phenomenon (Al-Tabbaa & Ankrah, 2019), and inclusion of the individual level into the THM model enables the academic entrepreneurs to interact with the other spheres and accumulate different resources using their networks, especially if they have industry connections (Cantu-Ortiz et al., 2017).

This THM is embraced in understanding the AE and technology commercialisation (e.g., Feola et al., 2019; Samo & Huda, 2019). These authors included academics' entrepreneurial intentions in their model. However, they only consider entrepreneurial intentions as the outcome. Although one of the studies integrates THM with the theory of planned behaviour (attitude, subjective norms, and perceived behavioural controls), it used PhD students as the sample (Feola et al., 2019). Young researchers (such as PhD students) demonstrate behaviour that is different from academics (Bienkowska et al., 2016). Moreover, the entrepreneurship literature suggests that entrepreneurial intentions differ from entrepreneurial behaviours (Krueger et al., 2000). They define entrepreneurial behaviour as individuals' behaviours and activities when creating new organisations. It is found that universities want to maximise their teaching and research activities, but academics wish to ensure career growth and prosperity and illustrate a goal difference (Feola et al., 2021).

Another system-based framework called REPITA has identified six actions: Research, Ecosystem, People, Intellectual Property, Transfer, and Alignment (Cantu-Ortiz et al., 2017). It is the extension of the resource and capability-based framework of AE. These authors argued that REPITA elements help university managers identify the resources available and what those resources can achieve. Like THM, this model also emphasises the interactions of the government, companies, universities, and other support agents, such as TTOs and incubators, to play their respective roles in the entrepreneurship ecosystem. They added the inventors' shares of royalty revenue, attracting highly specialised academics in the spinoff process. Although academics attach value to these financial benefits, this is not the only motivation for their entrepreneurial engagement. Hence, it is essential to understand their motivations and perceptions to attract skilled people and increase the likelihood of academics engaging in AE. This investigation of these different spheres' interactions with individual or micro-level behaviours and perceptions will increase our understanding of the dynamics and interactions between these actors to improve academic engagement in AE.

To summarise, these models are proposed based on patent-based innovations (patent, licence, and spinoffs) and imply that only the innovation is to be commercialised. This narrow focus fails to capture the complexities of other modes of knowledge transfer from university to industry, such as consultancy and contract research, as patent-based inventions do not cover this (Siegel & Wright, 2015). Moreover, these models must acknowledge the informal mechanisms (such as social capital) of technology transfer. These models do not consider the university's organisational culture and reward system, which facilitates or impedes the academic's AE engagement. Although some of these AE models considered the institutional, organisational, and individual aspects (Feola et al., 2019), further studies are required to explore these domains' interactions (Fini & Grimaldi, 2017). Notably, the literature on AE is not cohesive, and studies typically focus on different aspects of the commercialisation process (e.g., Kirby & El Hadidi, 2019; Libaers, 2012; McAdam et al., 2018). As a result, gaining a comprehensive understanding of AE becomes challenging. Due to the fragmented approach, the essential activities, stakeholders, and success factors remain ambiguous, emphasising the need to explore AE holistically (Belitski et al., 2019). In a recent literature review of AE models, Guindalini et al. (2021) emphasised the importance of evaluating the AE process from a systemic perspective and considering the multilevel influences.

2.6.4 Is AE Context-Specific?

Entrepreneurial and innovation ecosystems are created in specific locations with assets and attributes. This signifies a departure from traditional economic thinking focused only on firms and markets and a shift to a new economic approach incorporating diverse agents in society, markets, and organisations (Audretsch, 2009). An ecosystem's success arises from a unique set of pre-existing circumstances and subsequent conditions. This context can limit and prevent knowledge transfer and application in any entrepreneurial process (Belitski et al., 2019). For instance, an entrepreneurial innovation ecosystem is characterised by certain pillars such as accessible markets, skilled human capital, access to funding sources, supportive structures, regulatory frameworks, and cultural support (Isenberg, 2010). However, these optimal conditions are not present in every type of economy. This illustrates the essence of context in determining entrepreneurial opportunities and innovation. In other words, these entrepreneurial opportunities depend on external environmental conditions (Davey et al., 2016). Significantly, how these factors evolve and influence entrepreneurial engagement depends on the context (Philpott et al., 2011). This importance of context is equally applicable to the AE research (e.g. Abreu et al., 2016; Crow et al., 2019; Cunningham, Lehmann, et al., 2019; Davey et al., 2016). This is evident in more academic spinoffs in innovative regions (Civera, Donina, et al., 2020). In line with this, Dodgson and Staggs (2012) emphasise that the AE concept may lack clarity and effectiveness unless it is within a specific institutional and temporal context. Indeed, the AE context consists of micro-processes at the individual, relational, and organisational levels (Balven et al., 2018). For instance, Galati et al. (2020) illustrated that due to the risk aversion of Italian academics, they are less engaged in spinoffs than in other countries. This implies that the institutional, regional, university and individual contexts influence AE.

Extant literature has identified several factors that characterise contextual factors that influence AE, such as national and regional context (Davey et al., 2016), organisational context (Fini et al., 2011), institutional context (Fini et al., 2017), societal influence (Stuart & Ding, 2006), social network, social capital (Al-Tabbaa & Ankrah, 2019; Rossano-Rivero & Wakkee, 2018), university-industry collaboration (Abreu et al., 2016) academics entrepreneurial capacity and experience (Clarysse, Tartari, et al., 2011). While most universities in developed countries are in consensus about the importance of research commercialisation and diffusion of technology developed within the university, it is still questionable whether the factors that influence the AE are identical in developing countries (Abreu et al., 2016; Davey et al., 2016). Developing countries are often characterised by weak innovation ecosystems and a lack of institutional support (Athreye et al., 2023; Sengupta & Ray, 2017) and affect academics' entrepreneurial intentions and engagement differently than developed countries (Urban & Chantson, 2019). In a recent comparative study in Canada and China, Yu et al. (2023) found that the contexts of the higher-education systems in Canada and China shape academics' entrepreneurial and social involvement differently. Canada's system focuses on research-intensive universities as essential actors in regional development and emphasises the third mission of universities. In China, the focus is on knowledge transfer, innovation, and entrepreneurship, with the government implementing policies and initiatives to motivate academic engagement in these areas. Moreover, Athreye et al. (2023) argued that the institutional, organisational, and individual-level barriers make it difficult for academics to engage with industry. Hence, the need to explore how context influences the scientists sense-making and motivations and the university-industry collaboration are presented in the previous studies (Galati et al., 2020; Orazbayeva et al., 2020).

2.7 Summary of AE Literature

In the context of AE, existing literature highlights the importance of AE for promoting innovation and economic growth, as well as the necessity of institutions and policies to support AE activities. The literature suggests that AE has the potential to drive innovation and job creation, with academic institutions and policies playing a critical role in promoting and supporting AE. Various actors have different motives and incentives, which can either hinder or facilitate AE (see Table 2.3). In addition, academics play a crucial role as AE is individual-oriented. The literature also focuses on successful practices and models, universities and academic institutions adopt to foster and promote AE. However, further research is needed to explore the motivations, barriers, and best practices for AE (Aldawod, 2022; Athreye et al., 2023; Aydemir et al., 2022; Cunningham & O'Reilly, 2018) and to understand better the interplay of these factors and their impact on AE (Feola et al., 2019; Fini & Grimaldi, 2017; Guindalini et al., 2021).

Table 2.3 Characteristics and Motives of Different Actors in AE

Actors	Actions	Primary Motive(s)	Secondary Motive(s)	Organisational Culture
Academics	Discovery of new knowledge	Recognition within the scientific community	Financial gain and a desire to secure additional research funding	Scientific
University	Creation and dissemination of new knowledge	Provide teaching, engage in research, and produce high-quality graduates	Commercialise new technologies and innovations and financial gain through knowledge transfer	Bureaucratic/ Entrepreneurial
Industry	Commercialise new technologies	Financial gain	Maintain control over proprietary technologies	Entrepreneurial
Government	Promote innovation, entrepreneurship, and technology commercialisation	Ensure growth and create new job opportunities	Meet the return-on-investment target	Bureaucratic

Adapted from Siegel et al. (2003)

2.8 Institutional Theory and Academic Entrepreneurship

In the extant literature, different theories have been utilised to explain the AE phenomenon, such as the dynamic capabilities approach (Guerrero et al., 2019), the capability-based framework (Cantu-Ortiz et al., 2017), the resource-based view (RBV) (Berbegal-Mirabent et al., 2015; Davey et al., 2016), knowledge spillover theory of entrepreneurship (Casper, 2013; Civera, Meoli, et al., 2020), institutional logic (Albats et al., 2022; Fini & Toschi, 2016), institutional theory (Cunningham, Lehmann, et al., 2019; Lund Dean, 2018), theory of planned behaviour (Feola et al., 2019; Fernández-Pérez et al., 2015), micro-foundations (Galati et al., 2020), social identity theory (Guo et al., 2019). RBV, resource dependence theory (Diánez-González & Camelo-Ordaz, 2019) and dynamic capabilities approach consider the resources and capabilities of the universities to become entrepreneurial. Meanwhile, the theory of planned behaviour, micro-foundations, and social identity theory considers how academics develop the entrepreneurial attitude, behaviour, and identity to become an academic entrepreneur. In addition, the knowledge spillover theory of entrepreneurship and lifecycle theories of the firm focuses on knowledge transfer and other firm-level aspects. This study aims to understand why academics engage in AE and how different levels of actors interact to influence academics' AE engagement. It is evident from the literature that AE is a multi-level process where macro (government), meso (university and industry), and micro (academics) level factors influence AE, but focusing on only one of these factors would not explain AE holistically. One of the assumptions of institutional theory is that social forces shape entrepreneurial success more than economic efficiency. Hence, entrepreneurs should align their strategies with the norms and regulations of their host societies' institutions (Bruton et al., 2010). Moreover, institutional theory has been used as an established framework in examining and theorising the contextual drivers of entrepreneurship in academia, which are primarily determined by culture, tradition, history, legal environment and economic incentives (Bruton et al., 2010; Klingbeil et al., 2019; Su et al., 2017). Consequently, this study adopts institutional theory as the lens to explain the academics' entrepreneurial engagement in Bangladesh.

Institutions are understood as social structures encompassing regular and predictable patterns of social behaviour or mechanisms that create such patterns (North, 1990; Scott, 1995). These patterns or mechanisms provide stability and significance to how we live collectively. Institutional theory suggests that conforming to the rules of the game gains legitimacy in an institutionalised environment (North, 1991; Scott, 2004). The game's rules may be formal, informal, or taken-for-granted assumptions about the nature of the business environment. Institutions are social, economic, and political structures external to organisations that exert pressures that impact organisations' many characteristics. Institutions shape the environment by influencing the norms, creating possibilities and impossibilities, and limiting the freedom to act. Examples of institutions include laws and social and professional norms, customs, and cultures (North, 1991; Scott, 2004). Organisations' technical efficiency does not assure survival. However, they must conform to their institutional environment's rules, norms, and values to obtain the legitimacy and resources required for survival (Oliver, 1991). Institutional pressures operate at many levels, from international systems to organisational subsystems (Scott, 2008b). These levels can be viewed in a nested structure, where each institutional level influences human (entrepreneur) behaviour. Scott (1995) identified three pillars that intervene in human interactions: regulative, normative, and cognitive.

Regulatory pillars focus on formal rules, regulations, and laws established by government or regulatory agencies. These rules are enforced through sanctions and penalties for non-compliance, and they can shape the interaction of the individual and the behaviour of organisations through their legal obligations (Scott, 2008b). Normative structures evolved from social and professional values and focused on the unwritten social norms and values that shape the behaviour of organisations. These norms are created by professional organisations, industry associations, and other social actors, and they help to define what is considered appropriate and acceptable behaviour within a given industry. Cultural cognitive structures focus on the shared beliefs, values, and assumptions that shape how people think about and interpret the world around them. These cognitive structures influence organisations' decisions, interpret information, and respond to external pressures. The cognitive pillar contributes to understanding how shared beliefs and assumptions can shape organisational behaviour and decision-making and how organisations can change their cognitive structures to adapt to changing environments (Scott, 2008). Together, these wide-ranging pressures create fields that define boundaries of practice for organisations, often reflected through institutional logic (Friedland & Alford, 1991; Thornton & Ocasio, 2012). Thornton and Ocasio (1999, p. 804) defined institutional logic as '*the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organise time and space, and provide meaning to their social reality*'. This indicates that institutional logics shape the individual and organisational actors' actions. Although Scott's framework accommodates both top-down and bottom-up approaches to developing institutional contexts, entrepreneurship literature has been dominated by the top-down views of formal institutions (Narayanan & Shin, 2019).

Universities adopt the commercialisation logic in addition to the Mertonian logic of open science (Merton, 1942). Mertonian logic guides the researchers in openly disseminating their discoveries and research to the scientific communities (Stuart & Ding, 2006). Institutional rules, norms and practices have implications for AE in two ways. The regulations, standards and practices shape the perceptions of acceptable behaviours, and these rules and norms facilitate entrepreneurial behaviour by providing resources and incentives (Aydemir et al., 2022). These institutional activities are reflected as governments worldwide have introduced policies and programmes to promote research commercialisation (Fini et al., 2019; Rasmussen, 2008). Although universities in different country contexts are adopting this commercialisation logic in academia, it is unlikely that they will embrace this logic uniformly (Klingbeil et al., 2019). This entrepreneurial activity is influenced by the social context and institutional environment in which the academics are embedded, and a supporting environment will increase academics' propensity to engage in AE (Fini et al., 2017).

In the AE literature, numerous institutional factors that affect academics' AE engagement are identified, such as Intellectual property rights (IPR) and the establishment of TTO (Fini et al., 2017), the Bayh Dole Act in the US (Grimaldi et al., 2011), the Employees' Invention Act in Germany (Cunningham, Lehmann, et al., 2019), spinoff regulations, closeness to the industry, monetary incentives (Fini et al., 2020), university ownership and university level support mechanisms (Giuri et al., 2020), university's entrepreneurial orientation and leader's track record (Klingbeil et al., 2019), academics access to the network, university's research and entrepreneurship orientation (Fischer et al., 2019), social and cognitive proximity and mutual commitment between university and industry (Lauvås & Steinmo, 2021). These factors can be grouped into macro (government's support), meso (university and industry) and micro (academics) level factors. Most previous studies have considered the influence of government and university regulations on academics' entrepreneurial intentions and behaviours (Klingbeil et al., 2019; Fischer et al., 2019). The micro (academic) level context has received the least attention. For instance, how the academics perceive these rules, norms and practices, how these transcend and motivate them to engage in AE and how the micro-level factors influence their AE engagement receives less focus. The current assumption is that these regulations and practices will automatically ensure academic AE engagement. However, some studies have found that academics in weak institutions also engage in AE (Athreye et al., 2023; Fischer et al., 2019). Weak institutions are characterised by inadequate rule of law and excessive informality, which hinders effective monitoring and enforcement of contractual agreements (Athreye et al., 2023). This demonstrates the importance of understanding the micro-level context, such as why and how academics engage in AE. Moreover, how these different levels interact is equally essential, as it has received limited attention. Therefore, a theoretical framework is needed to understand the impact of multi-level context (Zhai & Su, 2019).

The institutional theory emphasises regulatory, normative, and cognitive influences rather than solely focusing on efficiency-seeking behaviour to ensure survival and legitimacy (Scott, 2008a). The primary characteristic of institutional theory is conformity, which establishes legitimacy (Scott, 2008a). Legitimacy is "a generalised perception or assumption that actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 574). It is crucial because it impacts firms' ability to attract resources and support from stakeholders and their survival (Scott, 2014). The regulative pillar provides guidelines for entrepreneurial organisations, leading to compliance with laws and regulations (Bruton et al., 2010). Although governments formulate rules and regulations (Scott, 2008b), they sometimes mimic regulations, especially in uncertain environments, to seek legitimacy (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). The successful institutionalisation of commercially oriented academia in the United States, such as the Bah-Dole Act (Grimaldi et al., 2011), has led several European and Asian countries to adopt similar legislation (Grimaldi et al., 2011), exemplifying the diffusion of formal structures (DiMaggio & Powell, 1983).

While many countries have adopted the US model of Academic Entrepreneurship (AE), essential differences in its understanding and practice exist, with instances of failure in some countries (Cunningham, Lehmann, et al., 2019; Dalmarco et al., 2018) and temporary success in others (Kang et al., 2021), selective industrial linkages (Giuliani & Arza, 2009), direction-setting by technocrats and development agencies (Ellerman, 2002; Liefner et al., 2016) and resource reinforcement (Hsu & Yuan, 2013) are cited as reasons behind differences in entrepreneurial activities across countries, despite the convergence of formal institutions. These factors may create supportive or unsupportive environments of expected changes, failing to integrate changes in academics' normative or cultural-cognitive motivations, conflicting goals, and work identities (Civera, Meoli, et al., 2020; Sandström et al., 2018). This underscores the importance of comprehending contextual needs and expectations when governments enact regulations.

Institutionalism offers theoretical insight into local variations of a typical formal structure. However, the diffusion of legitimated formal structures is accompanied by a decoupling of rules and practices at the local level. Attempts to control and coordinate activities in institutionalised organisations can lead to conflicts and loss of legitimacy, resulting in the decoupling of elements of structure from activities and each other (Meyer & Rowan, 1977). Although higher education organisations and leaders are pressured to conform to their institutional environment from the new institutional perspective, universities are described as loosely coupled systems (Meyer & Rowan, 1977; Orton & Weick, 1990). Universities exhibit either structural detachment of practices from other organisational elements or responses to external pressures in the form of loose coupling (Hallett & Ventresca, 2006). Organisations can decouple official structures and activities to resolve the conflict between ceremonial rules and efficiency (Meyer & Rowan, 1977). Even if the entrepreneurial practices are accepted, decoupling may occur in two distinct ways. First, intentional decoupling can happen if the participants have a low acceptance level and a passive approach to implementation, leading to the practice's ceremonial adoption. This would mean the organisation would label itself entrepreneurial without its members changing their behaviour. Second, unintentional decoupling can occur when participants have a high level of acceptance but are less involved in the process and less conscious of it. Thus, some existing practices may be unintentionally retained, preventing entrepreneurial actions from fully integrating into daily work (Gondo & Amis, 2013).

Organisational sociologists (e.g., Barley & Tolbert, 1997) have explored the micro-processes of decoupling, highlighting the flexible relationship between rules and practices, where practices may diverge from formal rules (Orton & Weick, 1990). Studies adopting a dialectical conceptualisation of loose coupling (Hallett, 2010; Hallett & Ventresca, 2006) examine how organisational members interpret and respond to institutional pressures, shaping coupling processes differently depending on internal characteristics and local context. Actors in organisations create linkages between formal rules and micro-practices, contributing to institutionalising new rules (Coburn, 2004; Hallett, 2010). Understanding these micro-level processes informs how academic entrepreneurs shape, maintain, and reproduce institutional norms and structures (Klingbeil et al., 2019; Marzocchi et al., 2019; Zhai & Su, 2019).

Institutional logics embed individuals' and organisations' interests, identities, values, and assumptions (Thornton & Ocasio, 2012). Creating legitimated formal rules and entities can lead to increased commitment or heightened expectations. However, it may also improve the likelihood of failure if activities are not mature or integrated into practical institutional activities (Pittaway & Hannon, 2008). Culture affects individuals' thinking and decision-making through normative and cognitive structures, influencing their perceptions, feelings, and actions. Fostering entrepreneurial engagement among academics may require universities to cultivate entrepreneurial cultures alongside tangible support structures (Huyghe & Knockaert, 2015). From a cultural-cognitive perspective, organisational change involves internalising and valuing desired actions by organisational members supported by cultural norms (Palthe, 2014). Normative and cognitive factors strongly influence entrepreneurial activities, with individuals acting as change agents in framing new institutional structures, sustaining collective identities, and aligning diverse group interests (Pacheco et al., 2010).

The above discussions and literature review show that most studies have taken a narrow perspective, primarily focusing on FAE while overlooking IAE (Wright, 2018). Moreover, along with this perspective, it is necessary to look into a multilevel lens to understand the AE process (Abreu et al., 2016; Belitski et al., 2019; Cunningham & O'Reilly, 2018), which includes exploring the individual perspective and behaviour of academics (Cunningham & O'Reilly, 2018; Davey et al., 2016). More specifically, this thesis addresses these research questions:

- What macro-level factors influence academics' AE engagement?
- What are the university-level factors that influence academic AE engagement?
- What individual-level forces influence academics to engage in AE?
- How do these different levels interact to influence AE?

To answer these questions, the research must address the philosophical underpinnings, research design and methods because these lead to a clear understanding of the investigated topic (P. Johnson & Clark, 2006b). The following section explains the underpinning philosophy, the research design and the methods used in this study.

CHAPTER THREE: METHODOLOGY

3 METHODOLOGY

3.1 Introduction

This thesis aims to understand why academics engage in AE and investigate how different levels of actors interact to influence academic AE engagement. The chapter presents the research methodology used to explore this. This study utilises a qualitative research approach, employing document analysis and multiple data collection instruments with various actors. The chapter discusses the philosophical assumptions, methodological approaches, and the chosen research position. Thomas (2006) highlighted that these assumptions of the researcher shape this study's findings. Next, the research design is presented, followed by a detailed description of the research process, including the data collection and analysis strategies.

3.2 Philosophical Underpinning

Research is not just about methods (Lee, 1992). These methods bring a great deal of philosophical baggage that is often unnoticed (Cunliffe, 2011; Guba & Lincoln, 1994; P. Johnson et al., 2006; P. Johnson & Clark, 2006a). These philosophical assumptions provide the guidelines to undertake the research, more specifically, figuring out the nature of reality and its meaning to humans and the nature and purpose of knowledge to inform an employable method (Burrell & Morgan, 1979; Cunliffe, 2011; McLachlan & Garcia, 2015). Guba (1990, p. 17) defines a research paradigm as "a basic set of beliefs that guides actions". Similarly, Faria, Besancenot and Novak (2011) define it as "a set of beliefs, theories, empirical methodologies, and communication practices shared by a scientific community, serving as a foundation for future scientific endeavours". Creswell (2013, p. 6) refers to the research paradigm as a "worldview" and describes it as "a general philosophical orientation about the world and the nature of research that a researcher brings to a study". Additionally, Guba and Lincoln (1994, p. 105) argue that the paradigm is of primary importance, asserting that "questions of the method are secondary to questions of paradigm", as it encompasses the investigator's fundamental ontological and epistemological beliefs, influencing not only method choices but also the overall research approach. To undertake a research project, the researcher needs to consider the three fundamental questions – ontology, epistemology, and methodology (Crotty, 1998; Guba & Lincoln, 1994).

Ontological assumptions are concerned with how reality exists – what is the form and nature of reality, and what can be known about it? (Guba and Lincoln, 1994, p. 108). The researcher must decide whether they consider the social world to be independent of individual cognition or whether the social world is constructed by the perceptions and consequent actions and interpreted by the social actors (Burrell & Morgan, 1979). From the positivist perspective, reality exists outside of what social actors do, say or think and is separate from the researcher (Fleetwood, 2005; Weber, 2004). On the other hand, from the interpretivist perspective, reality depends on human activity, and they give meaning to that reality (Fleetwood, 2005; Lee, 1992). However, there is a growing philosophical assumption that there is a real world with which we interact and refer to concepts and theories (Guba & Lincoln, 1994). Consequently, this thesis adopts the position that reality exists independent of human cognition, but at the same time, assumes that reality is socially constructed and meaning is given by the society, which takes the stance of neo-empiricism (P. Johnson et al., 2006; P. Johnson & Clark, 2006a). A comparison between the four approaches to management research can be found in Appendix 2. Neo-empiricism refers to a qualitative interpretive approach which relies upon empirical evidence to ensure the objective truth but at the same time rejects the ideal of discovering laws through 'hypothetico-deductive methods' (Alvesson & Deetz, 2000, p. 74). Neo-empiricists are those management researchers who collect unbiased and objective qualitative empirical data and simultaneously reject 'falsificationism' in favour of induction (Johnson et al., 2006, p. 138). However, it is human action that makes these two approaches different (Johnson et al., 2006) – based on *verstehen* (understanding) and *erklaren* (explaining) (Outhwaite, 1975). Positivism is attached to the *erklaren*, focuses on causality, and is often used in natural science (Crotty, 1998). Here, human behaviour is conceptualised and explained deterministically; frequently, the subjectivity of the actors is unobservable (P. Johnson et al., 2006). On the other hand, interpretivism, which relates to *verstehen*, focuses on understanding the actor's social reality (P. Johnson et al., 2006). This indicates that different kinds of reality require different investigation methods (Crotty, 1998). The *erklaren* approach enables the explanation of human behaviour through empirically observable and measurable antecedent conditions (Gill et al., 2010). However, this causal approach alone does not answer how and why academics engage in AE. Instead, to answer these questions, it is essential to get a deeper understanding (*verstehen* approach) of the subjective meaning of the academics that they attach to their experiences. In other words, the factors that affect academics' engagement in FAE and IAE can be better understood through academics' motivations and perceptions. However, multiple realities may exist simultaneously based on government policies and requirements, university norms and practices and academic perceptions.

Epistemology relates to the nature of knowledge and how it can be captured – what is the relationship between the knower and what can be known? (Guba & Lincoln, 1994, p. 108).

Similarly, Crotty (1998, p. 8) denoted epistemology 'is concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate' – epistemological concepts include objectivist, social constructionist, and subjectivist dimensions (Crotty, 1998). Objectivists view the existence of the social world as external and can measure its properties through objective rather than subjective methods like intuition or reflection (Easterby-Smith et al., 2015). Social constructionists believe people create knowledge through specific processes, and possible knowledge can be accessed by understanding those processes (Morgan & Smircich, 1980). There is no objective truth to be discovered. The subject and object emerge as partners in generating meaning; meaning is not discovered but constructed (Crotty, 1998). However, the subjectivist assigns meaning to the object, and there is no interplay between the subject and the object (Crotty, 1998). This study aims to identify why academics engage in AE and how different levels of actors interact to influence academics' AE engagement, which corresponds to exploratory research (as there is a lack of studies exploring the AE process in Bangladesh). This requires understanding academics' individual experiences, their reality construction process and their interpretation of the phenomenon instead of directly measuring the phenomena and events (Bryman, 2015). Consequently, this study takes *an interpretive* stance.

Many scholars argue that some interpretive researchers adopt the elements of neo-empiricism and align with positivist researchers in their commitment to an objective view of epistemology and theory-neutral language through the use of qualitative methodology (P. Johnson et al., 2006; P. Johnson & Duberley, 2000). They might misconstrue the subjectivity of their research as epistemological subjectivity rather than acknowledging the subjectivity of the social actors involved. The focus is on discovering and validating authoritative theories of social reality by considering the existence of an objectivist external reality (P. Johnson & Duberley, 2000). Hence, from an epistemological perspective, an objectivist approach is adopted for this thesis. This is because when the researcher looks for the commonalities and differences in the descriptions provided by the academics, then through applying logic, a truthful pattern emerges. This indicates truth in a coherent sense (Ridley-duff, 2005). However, Cunliffe (2011) raises the concern of context. This is because meanings, sense-making and knowledge are relative to a specific context, precisely time, place, and how they are constructed. Therefore, in this study, the academics of the universities in Bangladesh are considered the source of knowledge. Understanding their inter-subjectivity and meaning from an objective point of view gives the researcher a proper understanding of their socially constructed reality. Following these philosophical underpinnings, it is necessary to determine the research design and methods through which objective knowledge can be obtained (Gilbert & Stoneman, 2015; Patel, 2017)

3.3 Research Design and Approach

A mix of research designs has been adopted in previous studies, some adopt a quantitative approach (Abreu et al., 2016; Abreu & Grinevich, 2013; Cunningham, Lehmann, et al., 2019; Fini et al., 2017; Goel & Göktepe-Hultén, 2018) and some adopt qualitative approach (Cunningham et al., 2022; Good et al., 2019; Philpott et al., 2011) while others adopt a mixed approach (e.g. Belitski et al., 2019). The nature of the research questions determines the choice of this methodological approach, the background of the researcher and how the researcher will engage with the phenomenon being researched (Saunders et al., 2023). Positivist epistemology inspires quantitative methodology, whereas qualitative methods are inspired by interpretivist epistemology (Easterby-Smith et al., 2015). This thesis explores why academics engage in AE, which requires identifying the institutional and contextual dynamics that affect academics' engagement in AE. That requires more exploration of how the academics perceive these in becoming academic entrepreneurs.

Although qualitative research has been criticised for being too subjective, and it is argued that taking an interpretivist approach, the researched and researcher cannot be separated, often the researchers confuse this understanding of the participant’s subjectivity with subjective knowledge (P. Johnson et al., 2006; P. Johnson & Clark, 2006b). Here, the neo-empiricist approach helps the researchers tap into the actors’ inter-subjective meanings and concurrently recognise the influence of external causal variables upon their behaviour. This understanding enables the researchers to make sense of the phenomena by objectively exploring data (P. Johnson & Duberley, 2000). Moreover, the actors’ descriptions help the researchers identify a pattern and inductively generate a theory (P. Johnson et al., 2006; P. Johnson & Duberley, 2000). Qualitative research ensures rich and detailed descriptions of the individual meanings of a specific phenomenon (Alvesson & Deetz, 2000; Cassell et al., 2018). It is impossible to understand academics’ inter-subjectivity and socially constructed version(s) of reality using the frequently used positivist approach (P. Johnson & Duberley, 2000). Therefore, to achieve the research objectives and consider the interpretivist approach, qualitative research methods are deemed appropriate and adopted for this thesis.

In addition, researchers need to think about the relationship between theory and data in terms of deductive and inductive approaches (Saunders et al., 2023). The deductive approach involves the development of a hypothesis based on the existing theory that requires testing and is subjected to confirming or rejecting the hypothesis (Gilbert & Stoneman, 2015; Saunders et al., 2023). This approach helps the researcher to instantiate the concepts and make sure the clarification of the definition available in the literature and often deductive approach is linked with quantitative data (Saunders et al., 2023). On the other hand, the inductive approach takes empirical social phenomena as the starting point. Through research and analysis, it seeks to generate broader theories about social life. The idea is that studies should begin in an open-ended and exploratory fashion, becoming more focused on themes and perspectives as the research and analysis develop (Gilbert & Stoneman, 2015). The inductive approach will likely work with qualitative data (Bryman, 2015). Inductive research helps to propose the association between constructs and variables and demonstrates a weak form of causality in that it seeks to establish regularities rather than reasons behind them (Welch et al., 2011). Authors have highlighted more qualitative research to help aid theory development within the field of AE and institutional theory (e.g., Fini et al., 2017; Giuri et al., 2020) and emphasise the need to conduct further research from the developing country context (Athreye et al., 2023; Hossinger et al., 2023). This thesis adopts an inductive approach, considering the aim and objectives to explore an underdeveloped research area and help build a theory.

3.4 Data Sources, Sampling Approach, and Data Collection Method

This study adopts a qualitative interpretative approach and relies upon empirical evidence to ensure the objective truth but rejects the idea of discovering laws through 'hypothetico-deductive methods' (Alvesson & Deetz, 2000, p. 74). Here, the main focus is to collect unbiased and objective qualitative empirical data and simultaneously reject 'falsificationism' in favour of induction (P. Johnson et al., 2006, p. 138). This study purposively selects four leading (two public and two private) universities from Bangladesh. There are 45 public universities, 105 private universities, and three (3) international universities in Bangladesh (Bangladesh University Grants Commission, 2019c). The reasons for choosing these four universities are as follows: First, their organisational structure is representative of the universities evident in Bangladesh. Second, these universities are selected due to their early stage of the entrepreneurial trajectory (Bangladesh University Grants Commission, 2018c). Thirdly, due to their intellectual eminence (i.e., international university quality rankings 'QS Asia University Rankings 2020'), different legal statuses (public and private) and co-existence of other disciplines (science, arts and humanities). The evidence suggests that academics from these universities are involved in AE and selecting them enables this thesis to identify the factors that influence their engagement in AE. These universities are located in Dhaka, the capital of Bangladesh. The issues related to participants' selection, gaining access, data collection method and how this data will be transformed and analysed are vital to any research.

Data availability is a standard limitation of previous studies on entrepreneurial universities (Guerrero, Urbano, & Fayolle, 2016). As there is no complete list of academic entrepreneurs in Bangladesh, the researcher purposively contacted the department and faculty heads to get access and assistance in data collection. During the first stage, an email was sent to deans and heads of departments and faculties to distribute among their teaching and research staff, asking for their interest in participating in this study (Miranda et al., 2017). This initial communication was used to identify the desired participants and get their consent (Archibald et al., 2019). They were asked whether they had engaged in entrepreneurial activities in the last five years (De Silva, 2016). Moreover, as this study focuses on understanding the macro, meso, and micro-level actors in AE, in addition to academics, university managers and university support centre managers were contacted through email. However, data collection using positivist approaches such as experimental and survey methods may not allow the researchers to get in-depth knowledge of their social reality and subjective meanings (Alvesson & Deetz, 2000). Therefore, this study adopts the interview method to objectively examine academics' sensory experiences (P. Johnson & Duberley, 2003).

The second stage is to retrieve information on how the academics engage in AE, how and why they selected a specific mode of AE, what support they get from different actors in AE and what they expect from various levels of actors. This interview was conducted over Zoom instead of face-to-face due to the Covid-19 outbreak. Although face-to-face data collection enables the researchers to engage and understand the interviewees' reality, being flexible with the time, interview methods (Zoom with video or without video), and mode (synchronous or asynchronous) enable this thesis to collect in-depth information from the participants (CohenMiller et al., 2020). Some challenges persisted during data collection, which are discussed in Section 3.10. The interested participants were interviewed using a semi-structured interview guide (Baglieri et al., 2018). The reason to use Zoom (Archibald et al., 2019) instead of Skype (Janghorban et al., 2014) is because of its ease of connection, user-specific authentication, and stability, even for regional and remote users. Importantly, it also includes the option to record and store interview audio and video securely on online remote server networks (“the cloud”) or local drives without recourse to third-party software (Archibald et al., 2019).

Interviewing several respondents within each university helped minimise the retrospective bias and gave a holistic picture of how the universities and academics decided to engage in entrepreneurial activities (P. Johnson et al., 2006). In qualitative research, no exact number determines the ideal sample size compared to quantitative research (Nishishiba et al., 2014). Some scholars used 10-20 interviews (Anand & Watson, 2004), while some researchers proposed to use 25-35 interviews (Nishishiba et al., 2014) and 15-60 interviews (Saunders & Townsend, 2016). This leads to using saturation to decide the sample size (Schreier, 2018). This saturation indicates sufficient data to answer the research questions (Roulston & Choi, 2018). In this study, 26 interviews (Table 3.1) were conducted: eighteen (18) academics, four (4) university support centre managers and four (4) respondents from the university management where it reached the data saturation. In the interviews, respondents were asked how they engage in AE, how and why they selected a specific mode of AE, and what they expect from different levels of actors (Appendices 3, 4 and 5). The duration of these interviews varied from 60 to 240 minutes, depending on the academics’ interest and engagement. The whole conversation was recorded with the respondents’ permission. Another critical focus is the language used for data collection; Bengali and English are widely used in Bangladesh. Here, it is essential to know the translation's linguistic, cultural and methodological problems (Xian, 2008). Although the researcher is bilingual (Bengali and English) and the participants’ responses can be collected in either of these two languages where applicable (Resch & Enzenhofer, 2018), the participants shared their responses using English.

This thesis also used archival documents on entrepreneurship available on government websites, which include strategic plans, annual reports, policies, and guidelines (Easterby-Smith et al., 2015; Rapley & Rees, 2018; Yin, 2014). This data collection from multiple sources consists of techniques to reduce the bias of a single observation compared to various data, ensuring data triangulation (Simeone et al., 2017; Yin, 2014). This also improves data consistency to minimise the ‘subjectivity of the data presented (Lundqvist & Middleton, 2013, p. 606). Despite encountering challenges in accessing university documents, which were not available online, and encountering participants’ reservations in sharing their individual university records, this thesis successfully captures the essence of the practices and norms within these universities. This accomplishment was made possible through in-depth interviews conducted with academics and university managers closely affiliated with these institutions.

3.5 Reflexivity

Reflexivity involves critical attention to the personal, interpersonal, methodological and contextual factors that influence the researcher during a research project (Olmos-Vega et al., 2023). This reflexivity increases the integrity and trustworthiness of qualitative research (Finlay, 2002). In this section, I discuss my position as a researcher, how my subjectivity influences the data analysis, and the choice of Bangladesh as a context.

From the contextual perspective, one of the reasons for choosing Bangladesh as a research context was my indigenous insider position (Banks, 1998) and network with university academics. I was an academic in Bangladesh before starting my PhD. However, when I began collecting data during COVID-19, people's mobility was restricted, and people communicated through direct calls and emails. I expected to receive a flood of responses from the prospective participants. However, I realised that academics receive many emails from different people and are often reluctant to reply (Ahsan et al., 2022). It was very challenging to identify and recruit the participants who fit the criteria for being part of the study. Although I closely understand the context, I know only three participants personally. Therefore, I did not have privileged data that arose only because of the close interpersonal relationships (Collins & McNulty, 2020). Although most of the participants were identified using the snowballing sampling technique (Saunders et al., 2023), being a Bangladeshi helped me to contact and explain the objectives of this study directly to the prospective participants in the Bangla language. It gives them a sense of trust and relief to consider whether to participate in this study. I also recruited two participants by contacting them directly using LinkedIn. Here, explaining how I position myself as a researcher is essential because it determines how the participants view me.

It is also important to examine the power relationship that the participants and I, as a researcher, exercised before and during the interview. Being Bangladeshi gave the participants the sense that I am an insider and know the country's culture and customs (Collins & McNulty, 2020; Rahman, 2023). Although the researcher's positionality is understood as action and negotiation in fieldwork, I was always flexible in increasing the chance of getting data. I accepted the participants' rules, such as interviewing at night (when it is midnight in the UK), keeping the camera off, and sending the interview protocol before to reduce conflict, as this would give them a sense of trust and help me position myself as the researcher researching them. My narrative was, “You are the experts from whom I would like to learn” (Rashid, 2022, p. 3). I greeted them with an appropriate salutation, “Assalamualaikum” – an Arabic term that means “peace be upon you”. In the Bangladeshi culture, it is well accepted that the senior academics are called Sir/Madam. I did the same as most of the participants were older than me. Before the interview began, I asked how they were in Bangla. Then, the interview was conducted in English.

During COVID-19, it was challenging to recruit participants due to their busy schedules and disrupted mental health. Most interviews occurred during the participants’ evening time. It allowed the participants to relax and express their insights and perspectives. For instance, some participants were comfortable revealing negative information about their university as they perceived me as neutral and an outsider in the context of their organisations. On the other hand, some participants did not share any negative information due to their perception that I might share it publicly, which may create future problems. I report these objectively in the data analysis and denoted them as “Fear”. In this study, I attempted to maintain an objective distance from the phenomenon by bracketing, e.g. knowledge of pre-existing theories and personal views (Neubauer et al., 2019).

This raises the question of how my subjectivity informs the data analysis. The motivation to carry out this study comes from my experience as a student. I saw the academics engage in entrepreneurial activities. However, I needed clarification on why they engaged in these activities outside their university responsibilities. Meanwhile, as an academic, I have yet to have the opportunity to engage in any entrepreneurial activities in Bangladesh. Therefore, even though I was aware of the entrepreneurial engagement of the academics, I was unaware of why they engaged. During the data collection, I was more interested in comprehending participants’ viewpoints and perspectives than co-creating the knowledge as an insider. I used the interview protocol to navigate the discussion with the respondents. These protocols were adjusted based on the interviewee, e.g., academics, university managers and support centre managers (see Appendices 3, 4 and 5). This helped me focus on gaining a broader view of AE’s context and relationships. It is argued that it is important to take regular breaks to achieve critical distance (Collins & McNulty, 2020). Due to the long-standing effect of Covid-19, this break was inevitable. I was able to conduct 26 interviews in more than a year. It was serendipitous because it helped me to transcribe and orient with the data.

This study used the general inductive approach (Thomas, 2006) (see Chapter 4). Although data was analysed inductively, my positionality as a researcher did not affect the initial analysis stage. The raw data was coded using the exact phrases used by the respondents. Here, I focused on comprehending their meaning and experience instead of what I, as a researcher, understand from the data. Therefore, I was objective by adopting the interviewees' viewpoints (Lien et al., 2014) and reporting the interviewees' life experiences in the coding process. However, in the next stage, the patterns and themes were developed based on existing knowledge and theories regarding AE. Although I believed that academics became involved in AE to get recognition and financial benefits, during my data collection, I was surprised to see many factors influencing their decision to engage in such activities. This demonstrates that I was not biased with my experience and perspective. It helps me keep my researcher's role in analysing the data objectively (Collins & McNulty, 2020), as I do not have direct experience with AE.

It was a challenging journey because of COVID-19, especially the data collection. I sent invitations to most of the academics in the chosen universities. Although I am from the same context, finding individuals who wanted to participate and support my research was difficult, mainly as I conducted it remotely from the UK during COVID-19. I realised I would not receive sufficient prospective participants in return. Overall, this study taught me several lessons, including the importance of context-embedded, locally trusted connections, being entrepreneurial while researching the flexible, complex, and situation-specific field of entrepreneurship, and the value of patience and self-care to oneself as a researcher. Although it was challenging and took more than a year to collect qualitative data (e.g., identifying, recruiting and interviewing), my insider role gave me the path to find these participants.

CHAPTER FOUR: DATA ANALYSIS AND SAMPLE

4 DATA ANALYSIS AND SAMPLE

4.1 Introduction

The use of an inductive approach is common in several types of qualitative data analyses, especially grounded theory (e.g., Strauss & Corbin, 1998), narrative analysis (e.g., Leiblich, 1998), discourse analysis (e.g., Potter & Wetherell, 1994), and phenomenology (e.g., van Manen, 1990). However, this general inductive approach is widely used in many qualitative data analyses (Bryman & Burgess, 1994). Qualitative data analysis involves three broad tasks: data reduction, data display and conclusion drawing or verification (Miles & Huberman, 1994). Nevertheless, the general inductive approach differs from Miles and Huberman's analytic framework by providing more detailed procedures for analysing and reporting qualitative data than in their description (Thomas, 2006). The general inductive approach does not involve the causes, explanations, and relationships among people, commonly part of pattern coding (Miles & Huberman, 1994). Instead, the general inductive approach describes the procedures for creating meaning in data by developing summary themes or categories from the raw data (Thomas, 2006).

Although there are different approaches to analysing the data inductively, thematic analysis is chosen because of its flexibility and consistency to be applied across a range of theoretical and epistemological approaches (Braun & Clarke, 2006, 2020, 2021). This study took the inductive neo-empiricist (P. Johnson & Clark, 2006a) philosophical stance aligned with analysing qualitative interpretive data (P. Johnson & Duberley, 2000). Thematic analysis helps the researcher identify, analyse, and delineate data in detail (Braun & Clarke, 2021). It differs from other analytic methods, such as interpretative phenomenological analysis and grounded theory, as it is not theoretically bounded. Instead, thematic analysis is a method that 'works both to reflect reality and to unpick or unravel the surface of reality' (Braun & Clarke, 2006, p. 81). Hence, it helps the researcher to understand how the participants make meaning to their experience and, at the same time, report the experience, meanings, and reality of the participants (Eriksson & Kovalainen, 2011). Themes are the key patterns identified in the data where the researcher inductively reads the narratives repeatedly to find patterns from the data (Nishishiba et al., 2014). The initial code was assigned to these recurring patterns, and the specific theme was identified with an array of codes. Here, the number of occurrences of the patterns is not essential. Instead, those themes help to answer this study's research questions (Nishishiba et al., 2014). The aim of using thematic analysis is to identify the relevance of the data, group them into meaningful categories and report the findings. In this line of departure, this study employed thematic analysis to understand the interpretation of the participants' views while being compatible with the philosophical underpinnings.

While applying thematic analysis, the step-by-step guidelines of Thomas (2006) were followed to reduce the raw data in a more meaningful way by coding and categorising. This inductive coding led the researcher to understand the concepts emerging from the data. As Thomas (2006) indicated, 'the outcome of an inductive analysis is the development of categories into a model of framework that summarises the raw data and conveys key themes and processes' (p.240). The flow of the data analysis process can be found in Figure 4.1.

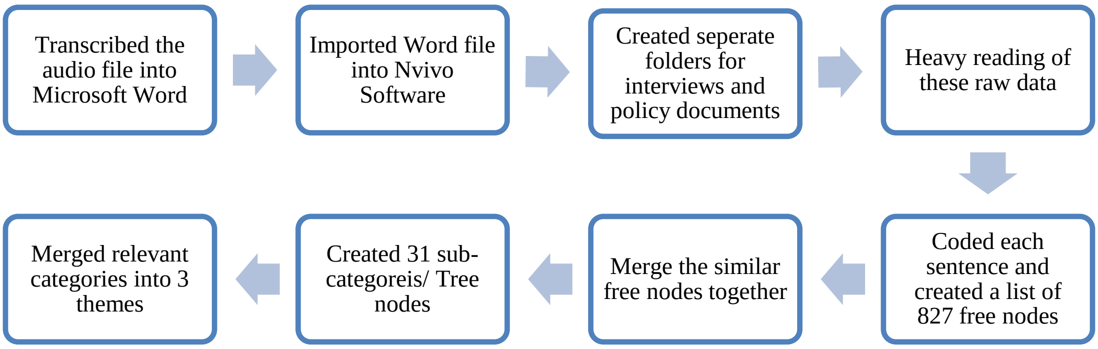


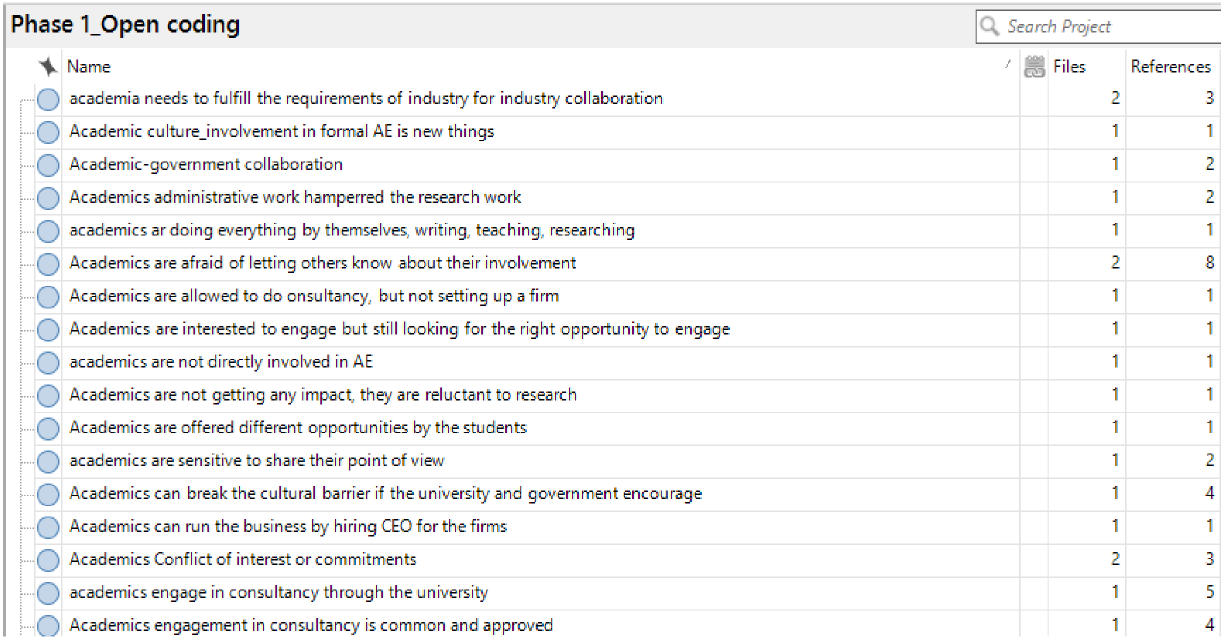
Figure 4.1 Data Analysis Procedure (adapted from Thomas, 2006)

4.2 Transcribing Interviews

This study conducted 26 interviews with academics, university managers and support centre managers. These interviews were recorded in audio files and transcribed verbatim. Transcribing involved an extended period, and the researcher did this manually. The critical aspect regarding data familiarity was accomplished with the researcher's intensive involvement with the data due to the verbatim transcription and interview process (Gehman et al., 2018). These multiple readings and heavy involvement with the raw data helped the researcher to identify the lower-order in-vivo coding (Thomas, 2006). The raw data files were initially formatted and saved in a Microsoft Word (doc) format. There were 26 interview transcripts with a word count of approximately 180,000.

4.3 Coding and Categorising

Once the raw data has been prepared, these are imported to NVivo (version 12), a specialist software, and kept under the interview folder. The related policy documents, for instance, Strategic Plan for Higher Education in Bangladesh 2018-2030 (Bangladesh University Grants Commission, 2018c), National Innovation and Intellectual Property Policy 2018 (Ministry of Industries Bangladesh, 2018) and other documents, were also imported and kept under the policy documents folder. NVivo was chosen because of its ability to manage a large amount of data gat and synthesise it into subcategories, categories, and themes from the data to prevent information overload and make more sense of the data (Miles & Huberman, 1994). The initial coding process involved the researcher documenting every code that emerged unfocused and open to identify codes that could have potential meaning and relevance. These are often the phrases the respondents use (Corbin, 2004). Using NVivo allows coding that corresponds to a specific issue of interest. The researcher initially identified 827 in-vivo coding (Figure 4.2) from the 26 interview transcripts and the policy documents.



Phase 1_Open coding

Search Project

Name	Files	References
academia needs to fulfill the requirements of industry for industry collaboration	2	3
Academic culture_involvement in formal AE is new things	1	1
Academic-government collaboration	1	2
Academics administrative work hamperred the research work	1	2
academics ar doing everything by themselves, writing, teaching, researching	1	1
Academics are afraid of letting others know about their involvement	2	8
Academics are allowed to do onsultancy, but not setting up a firm	1	1
Academics are interested to engage but still looking for the right opportunity to engage	1	1
academics are not directly involved in AE	1	1
Academics are not getting any impact, they are reluctant to research	1	1
Academics are offered different opportunities by the students	1	1
academics are sensitive to share their point of view	1	2
Academics can break the cultural barrier if the university and government encourage	1	4
Academics can run the business by hiring CEO for the firms	1	1
Academics Conflict of interest or commitments	2	3
academics engage in consultancy through the university	1	5
Academics engagement in consultancy is common and approved	1	4

Figure 4.2: In-Vivo Coding of the Raw Data

This voluminous data then posed the task of data reduction to achieve meaningful results and outcomes (Patton, 2015). This data reduction summarises and simplifies the data collected and selectively focuses on some parts of the data. This process transforms and condenses the data (Saunders et al., 2023). However, the data reduction process described by Thomas (2006) somewhat differs from the previous approach as it involves the 'development of summary themes or categories from the raw data' (Thomas, 2006, p. 239). In this study, the researcher adopted Thomas's approach. In other words, the researcher reduced these in-vivo codes into categories. These categories reflect the meanings, associations and perspectives associated with the categories. The researcher has identified 31 categories as tree nodes (see Figure 4.3).

Name	Files	References
Academic-Industry collaboration	20	61
Academics feel the importance of industry-academia relationship	5	7
Consultancy, an office works in between to disseminate work to academics	2	4
Example of industry-academia collaboration	3	4
How the academics can contribute so improve the quality of products of bus	1	1
increased importance of university-industry collaboration	1	5
Industry preparedness for academic collaboration	4	4
Industry-academia collaboration started and in near future it will increase	2	3
Industry-academia collaboration to prepare students	1	2
Industry-academia collaboration, industry is interested	1	1
industry-academia collaboration, industry is not interested	2	3
Industry-academia collaboration, numerous platform	1	2
Industry-academia collaboration, what needs to be done	1	1
Industry-academia collaboration, why important	1	2
narrowing of university-industry gap	2	2
Not that much of collaboration with organisations	1	1
PhD act as a way to industry-academia collaboration	1	1
PhD and foreign connections shape in learning	1	1
requirements from the industry	1	2
there is no money involve but always related to money	1	1
Universities are good place to conduct research for businesses	1	1

Figure 4.3: Examples of Tree Nodes or Categories

There are some overlaps among the categories. Hence, the categories linked or related to categories were merged into a hierarchical category and labelled with a larger heading. These links are super-ordinate, parallel and subordinate categories (Thomas, 2006). For instance, 'research culture' and 'teaching focus' emerged as the categories that fall under the main category of 'university culture' (Figure 4.4). Therefore, the research culture and teaching focus were merged into the university culture. However, to make these categories pertinent to the object study's objectives, the researcher needed to make decisions to keep the important ones and present and describe the most important categories (Thomas, 2006). This requires these categories to be converted into different themes.

Name	Files	References
University Culture	25	117
Everyone gets research fund in the salary irrespective of doing research that i	1	2
fall of ivory tower_Change of mindset and approach	1	1
incorporating industry practitioners in the courses	1	1
Informal recognition from the university	2	2
institutional attitude is not favorable	1	1
institutional preparedness	1	2
lack of research atmosphere	3	8
Mindset	1	1
participation of everyone in university mission adoption	1	2
Professional experience is not equitable to teaching experience	1	1
Professor in Practice idea consider professional experience equivalent to teac	1	1
Reasons for limited research by the universities	1	1
Recognition for extra work	4	5
Research Culture	21	49
Teaching Focus	11	24
universities may do these to recognise the academics involvement in AE	1	1
University is supportive of any activites academics are engaged in	1	3
University recognition of AE	5	6
university resources misused	1	2
University's commercialisation of certificate program, profit sharing with aca	1	2

Figure 4.4: Examples of Categories and Sub-Categories

For instance, while analysing the data, the researcher has merged the categories related to AE's enabling and inhibiting factors with the actors' roles. These actors influence, facilitate, and inhibit the AE engagement of academics. Therefore, the selected categories are merged to convey the core theme because some codes were irrelevant to the research objectives. Themes are often data-driven or theory-driven (Braun & Clarke, 2021). Because of the inductive interpretative nature of this study, themes are data-driven. Hence, three themes were identified: government role, university norms and practice, and human perceptions and motivations (Figure 4.5).

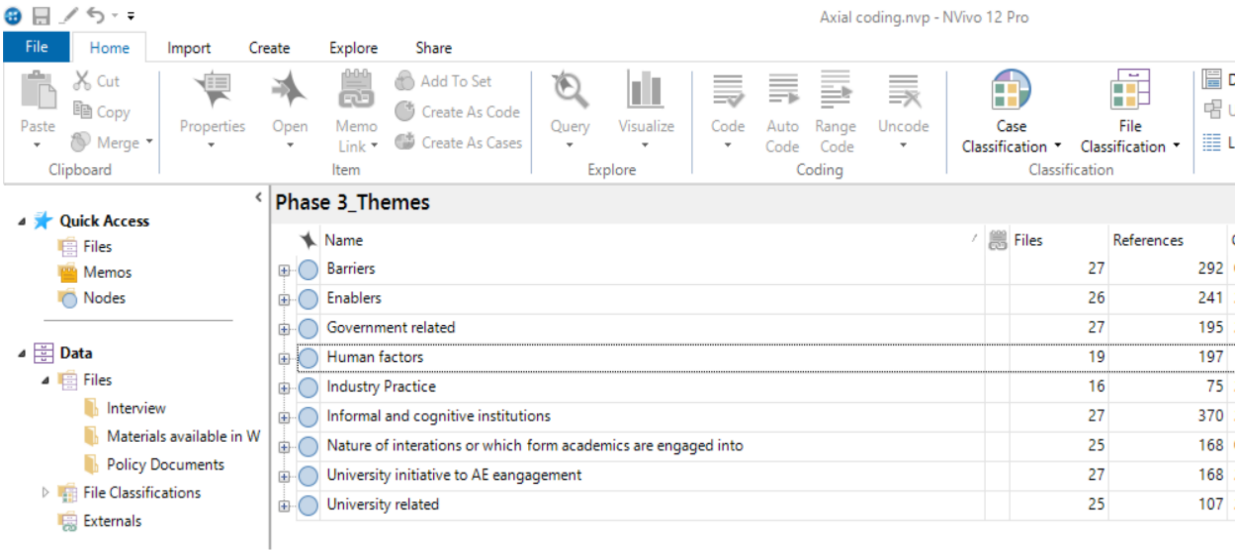


Figure 4.5: Examples of Emerged Themes

The meaning of these themes was found in the literature (Strauss & Corbin, 1998) and referred to the interviewee's experience in the areas of importance for this research. Specific themes were developed and reported during the data analysis based on the participants' core message. Although the researcher faced the challenge of managing and analysing such voluminous data, outlining the research objectives helped the researcher overcome this challenge (Thomas, 2006). To do that, it is essential to understand the research context of the study.

4.4 The Research Context

This research was carried out in the context of Bangladeshi private and public universities. The focus of this study is to understand why academics engage in AE (both formal and informal) and what factors (macro -, meso -, and micro levels) influence academics to engage in AE. There are few studies in the context of developing countries (Hossinger et al., 2020), and the institutions of developing countries differ from those of developed countries and affect academics' AE intentions (Urban & Chantson, 2019). Hence, understanding AE from the developing country's perspective will provide new perspectives and features of AE and contribute to the existing literature. To understand AE, 26 interviews were conducted in this study. The following section will discuss the participant's profile.

4.4.1 The Participants

At the beginning of the interviews, the participants were asked to state their roles, years of industry experience, and entrepreneurial involvement. The questioning was then attempted to delve into their understanding of the AE, for instance, *"What do the terms entrepreneurial university and academic entrepreneurship mean to you?" "Is it prevalent in Bangladesh?", "What is your understanding of the mission of your university?" "To what extent does your university adopt an entrepreneurship mission?".* The researcher then asked the participants about their involvement and the reason for engaging in the different forms of AE. For instance, *"Which of these activities are you involved in?", "Why did you choose those specific forms of engagement?" "What resources are available in your university?" "How does the university recognise your engagement in entrepreneurial activities?".*

The participants (see Table 4.1) represented three groups of people within the university, such as (i) university academics (UA), (ii) university managers (UM), and (iii) university support centre managers (USCM) from a diverse background with varied roles and experiences. The participants are all located in Dhaka, Bangladesh and are from different disciplines, for instance, STEM (Science, Technology, Engineering, and Mathematics) and HASS (Humanities, Arts, and Social Science). As this study aims to understand their subjective experiences, it is essential to look at their academic and entrepreneurial experience, disciplines, job roles, level of education, and university type.

The participants have indicated their involvement in FAE and IAE. Academics are more engaged in IAE (Table 4.2b) than FAE (4.2a). On the one hand, in terms of IAE, academic engagement is highest in contract research (twelve participants), followed by consultancy (ten participants). However, they are least involved in the secondment (only two). On the other hand, regarding FAE engagement, academics are involved highly in research joint ventures (four participants) and patents (three participants). However, no patent is licenced (no participants) to the industry. These tables do not reflect the university managers' and university support centre managers' engagement in AE. The university managers and support centre managers illustrate a similar engagement type – all university managers engaged in IAE, but

Table 4.1 Participants' Information

PARTICIPANT	GENDER	HIGHEST LEVEL EDUCATION	CURRENT JOB ROLE	ROLE	ACADEMIC EXPERIENCE	INDUSTRY EXPERIENCE	FORM (S) OF AE	UNIVERSITY TYPE	DISCIPLINE
UA1	M	Master	Associate Professor	Academic	10 years	No	Informal	Public	HASS
UA2	M	Master	Senior Lecturer	Academic	5-10 years	Yes	Informal	Private	HASS
UA3	M	Master	Assistant Professor	Academic	5-10 years	No	Informal	Public	HASS
UM1	M	PhD	Professor	Dean	>20 years	Yes	Informal	Private	HASS
UA4	M	PhD	Professor	Academic	15 years	No	Informal	Public	HASS
UA5	M	PhD	Associate Professor	Academic	10-15 years	No	Informal	Public	STEM
UA6	F	PhD	Professor	Academic	>20 years	No	Formal, Informal	Public	STEM
UA7	F	PhD	Professor	Academic	15-20 years	Yes	Formal, Informal	Public	STEM
UA8	M	Master	Lecturer	Academic	5-10 years	Yes	Informal	Private	HASS
UA9	M	PhD	Professor	Academic	>20 years	Yes	Formal, Informal	Public	STEM
USCM1	M	Master	Lecturer	Incubator Coordinator	5-10 years	Yes	-	Private	HASS
USCM2	M	PhD	Assistant Professor	TTO Coordinator	10-15 years	Yes	Informal	Public	STEM
UA10	M	PhD	Assistant Professor	Academic	5-10 years	No	Informal	Private	STEM
UA11	M	Master	Lecturer	Academic	5-10 years	No	Informal	Private	HASS
UM2	M	Master	-	Chairman. BOT	-	Yes	-	Private	HASS
UM3	M	PhD	Professor	Dean	>20 years	No	-	Public	STEM
UA12	M	PhD	Professor	Academic	>20 years	No	Informal	Public	STEM
UA13	M	PhD	Professor	Academic	>20 years	No	Informal	Public	STEM
UA14	F	PhD	Professor	Academic	15-20 years	No	Informal	Public	STEM
UM4	M	PhD	Professor	Pro-VC	>20 years	No	Informal	Public	STEM
UA15	M	PhD	Associate Professor	Academic	5-10 years	No	Informal	Private	HASS
UA16	M	PhD	Professor	Academic	15-20 years	No	Informal	Private	STEM
UA17	M	PhD	Associate Professor	Academic	10-15 years	Yes	Informal	Public	STEM
USCM3	M	Master	Assistant Professor	Director	5-10 years	Yes	Informal	Public	HASS
USCM4	M	PhD	Professor	Director	15-20 years	No	Formal, informal	Public	STEM
UA18	F	Master	Assistant Professor	Academic	5-10 years	Yes	Informal	Private	HASS

Notes: M, Male; F, Female; HAAS, Humanities, Arts & Social Science; STEM, Science, Technology, Engineering and Mathematics; UA: University Academic; UM: University Manager; USCM: University support centre manager, 1-26: Respondent number, the order shows the chronology of interview conducted.

Only one was engaged in FAE. Two university support centre managers engaged in IAE, and one had a patent. However, the other two USCMs did not have any engagement experiences. Some academics highlighted that their previous industry experiences helped them to engage in AE activities. Academics also highlighted the effect of discipline on their involvement in AE. It was found that academics from STEM are more involved in both FAE and IAE. Academics have indicated that the university type also influences their involvement. It is seen that public university academics are more engaged in both FAE and IAE compared to their private university counterpart.

Academics have stressed the importance of job roles to get involved in AE. They have also highlighted the effect of gender on their involvement. It was found that the AE is a male and senior academics-dominated activity. The participants were with different roles within the university. Eighteen (18) of them were academics, four (4) participants represented university management, and four (4) participants were university support centre managers. However, looking into their gender gives an asymmetric distribution. Only four (4) participants were women; the rest, twenty-two (22), were male. It also reflects the academia in Bangladesh (Ahsan & Cullen, 2022).

4.4.2 Descriptive Characteristics of the Universities

Participants are purposely chosen from the four (4) universities in Bangladesh, of which two (2) are public universities and two (2) are private universities. A brief detail of these universities is below.

University A started its activities with 3 Faculties,12 Departments, 60 teachers, and 877 students. It comprises 13 Faculties, 83 Departments, 12 Institutes, and more than 56 Research Centres. The number of students and teachers has risen to about 37,018 and 1,992, respectively. The university's primary purpose was to create new areas of knowledge and disseminate this knowledge to society through its students. Since its inception, the University has had a distinct character of having distinguished scholars as faculties who have enriched the global pool of knowledge by making notable teaching and research contributions. Eight academics, two university managers, and one support centre manager from this university were interviewed.

University B offers high-quality research and education through its 18 departments under five faculties: architecture and planning, civil engineering, engineering, electrical and electronic engineering, and mechanical engineering. Six university-led institutes also focus on diverse areas of research. It has over 600 faculty members and over 10,000 undergraduate and graduate students. Graduates from the university have a long history of enjoying extraordinary success worldwide. Three academics and two support centre managers from this university were interviewed.

University C delivers a substantial general education curriculum, has a strategic plan, and has initiated and implemented student instructional learning assessments for degree programmes and courses. It is also developing the infrastructure to evaluate the institutional effectiveness of its accreditation. It is organised into four schools (School of Business and Economics, School of Engineering and Physical Sciences, School of Humanities and Social Sciences, School of Health, and Life Sciences), offering 23 undergraduate and 16 graduate programmes, with over 20,000 undergraduate and graduate students. Interviews were conducted with three academics, one university manager and one support centre manager from this university.

University D is the leading private university in Bangladesh with an explicit focus on Research and Global partnerships. The university currently has 8,423 students, 13,745 alumni and 401 faculty members. The academic curriculum is based on a North American liberal arts model, and the medium of instruction is English. The university has six academic schools: School of Business, School of Engineering and Computer Science, School of Environmental Sciences and Management, School of Liberal Arts and Social Sciences, School of Life Sciences and School of Public Health. Four academics and one university manager from this university were interviewed for this thesis.

Table 4.2a Formal Academic Entrepreneurial Activities (FAE)

Formal Academic Entrepreneurial Activities (FAE)	A1	A2	A3	A5	A6	A7	A8	A9	A10	A13	A14	A17	A18	A19	A21	A22	A23	A26	Total
Spin-off – formation of a new firm to exploit the scientific discoveries of the university research	-	-	-	-	-	-	√	-	√	-	-	-	-	-	-	-	-	-	2
Start-ups – formation of new firms by the university academics	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	-	-	1
Patent - Government-sanctioned rewards to investors that come with some rules and norms for protecting embedded intellectual property	-	-	-	-	-	√	√	-	√	-	-	-	-	-	-	-	-	-	3
License – the right of university-created knowledge transferred to a firm and protected either by an academic partner or a commercial partner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Research Joint Venture – universities are invited to partner with the industry to stimulate and foster research and development	-	-	-	-	√	√	-	-	√	-	-	-	-	√	-	-	-	-	4
Invention Disclosure – researchers disclose the inventions within the university or to the industry and do not come with promises of intellectual property protection.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

Table 4.2b Informal Academic Entrepreneurial Activities (IAE)

Informal Academic Entrepreneurial Activities (IAE)	A1	A2	A3	A5	A6	A7	A8	A9	A10	A13	A14	A17	A18	A19	A21	A22	A23	A26	Total
Consultancy – a company has a problem and wishes for a known solution to be applied to the problem	√	-	√	√	√	-	√	√	-	√	-	-	√	√	-	-	√	-	10
Contract research – undertaking research with the university system to solve a problem for external firms	√	√	√	√	√	√	-	-	√	-	-	√	√	√	-	√	√	-	12
Joint/collaborative research – commercial (government) and academics partner agree to work together to discover new knowledge or propose solutions to a problem.	-	-	-	-	-	√	-	√	√	-	-	-	√	√	-	-	√	-	6
Shared facilities – a university and a commercial partner join to invest in developing and operating a facility or piece of equipment.	√	-	-	-	√	√	√	-	-	-	-	-	-	-	√	-	-	-	5
Secondment – when an academic presents for a period in another organisation	-	-	-	√	-	-	-	-	-	-	-	-	√	-	-	-	-	-	2
Training and development – companies keep their professional knowledge up to date with new developments delivered by academics.	-	-	-	√	-	-	-	-	-	-	√	-	√	√	-	√	-	-	5
Student placement and projects – transfer of a graduate into a company	√	√	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	√	4

4.5 Investigation of Data

Due to its interpretative nature, this study focused on the participants' explanations inductively to develop an understanding of the interpretations portrayed by the respondents (Denzin & Lincoln, 2018). The specific evaluation objectives guided the systematic procedure to use the inductive data analysis approach (Thomas, 2006), explained in the data analysis procedure (Section 3.6). This systematic procedure helped the researcher to reduce the raw data through coding, categorising and linking them to show the relationship. Themes emerged as a way to express the link between categories. Thus, themes are more latent concepts which group all these categories.

In this study, the participants (academics, university managers and university support centre managers) shared their perspectives, concerns, and interests on AE-related issues. Some of these perspectives on the IAE & FAE are shown in Table 4.3 below. Table 4.3 shows that the practice of IAE is common and approved compared to the FAE. Although the government encourages academics to engage in both FAE and IAE, the guidelines and policies related to FAE need to be more apparent to academics. Although the practice of IAE and FAE is evident in Bangladesh, adopting IAE as an entrepreneurial activity is still nascent.

Table 4.3 Different Stakeholders' Perspective towards FAE and IAE

Types of AE	Academics	UM	USCM	Policy documents
FAE	– Lack of opportunity – Industry is not interested in using patents from local academics. – Need much support (Funding, Collaboration, Policy) – Not well accepted by top management and society – Support centres and commercialisation are important	– There is no need for the academics to engage. – It involves more time and risk. – Provide research support. – Need policy related to AE	– Involvement in FAE is a new academic culture. – Develop policies to adopt this practice within the university. – Awareness building is essential. – Needs collaboration with different stakeholders	– Encourage academics to engage in FAE
IAE	– Involvement in IAE is common. – Alternative income source – Not considered AE	– Academics can share their knowledge through IAE. – Universities provide support to engage in IAE	– Not considered AE – Involvement in IAE is common and approved	– Encourage academics to engage in IAE

Source: Interview and document analysis

Along with their perspectives on AE, the participants have indicated some facilitating and inhibiting factors that influence AE in Bangladesh (Table 4.4). It has been found that there are numerous factors involved with the government, universities, and academics.

Table 4.4 Facilitating and Inhibiting Factors of AE

Factors	Facilitators	Inhibitors
Macro level	– Government's knowledge, innovation, and entrepreneurship focus – Government funding for innovation and entrepreneurship – Government's initiatives to incorporate different policies to foster innovation and technology. – Establishment of support institutions	– A lack of proper arrangements, procedures, and structures for collaboration – UGC's implementation barrier and control over private universities – Long patent process – Inadequate budget for research – The inefficiency of government offices hinders the AE
Meso Level	– University's recent focus is to redefine its missions. – Availability of support centres to promote both IAE and FAE – Encourage research and provide research funding. – Universities are building linkage with other universities, industries, and alumni to accumulate necessary resources. – Setting up of support centres to aid with IAE and FAE	– University recruitment policy is AE unfriendly – Inadequate research funds – Workload – Discourage FAE involvement. – Lack of academics with a PhD – The knowledge gap between academia and industry – AE is not recognised in the promotion policy
Micro level	– Active participation in IAE and FAE – Involvement in IAE is well accepted. – AE involvement increases the university's reputation. – Previous industry and entrepreneurial experience facilitate identifying and exploiting the AE entrepreneurial opportunities. – Available IAE opportunities for academic entrepreneurs – IAE is perceived as a learning conduit	– Culture inhibits AE involvement. – Academic fear and self-belief reduced their AE engagement. – Hesitant to share an entrepreneurial identity. – Academics are risk averse. – Academics are unaware of the government's initiative

Source: Interview and document analysis

For instance, it was found from the policy documents that the government has taken different initiatives to foster innovation, technology, and entrepreneurship. However, the implementation barrier and the inefficiency of different offices challenge implementing these policies. In line with the government, universities realised the importance of entrepreneurship and started promoting entrepreneurship into their curriculum and entering collaboration with industry. Although there were challenges and drivers in the process of involving in AE, the participants highlighted the importance of involving in AE (Table 4.5)

Table 4.5 Advantages of Involving in FAE and IAE from University Academics, University Managers and University Support Centre Managers

Types of AE	Academics	University Managers	Support Centre Managers
FAE	– To get recognition – To portray the capability of the academics – To solve local problems – Alternative income source – To start researching from scratch and innovate – To implement knowledge – Exploitation of opportunities available	– Improvement of university ranking – Industry gets benefits from the new technology or patent. – To create different opportunities – Finding solutions to the existing problems	– Building of trust – To convert research products and innovations into intellectual property (IP) in the form of patents and copyrights – To facilitate technology transfer and its commercialisation
IAE	– Application of knowledge – Update with the practical knowledge – To get monetary benefits – Student placement – University branding – Fulfilment of university mission – Better class performance	– To update knowledge – To get research input from the society – Implement and share research findings with society – Financial benefits	– Gives more research exposure – To find solutions for different known and unknown problems – Financial gain –

Source: Interview and document analysis

It was evident that academics, university managers and university support centre managers perceived the importance of engaging in IAE and FAE. However, the participants delineated that involvement in IAE is encouraged as there were more opportunities to be involved than in the FAE.

The first theme that emerged from analysing interview data and policy documents (section 4.5) was the *Government's Role*. Different sub-themes form this theme of the *Government's Role* (Figure 4.6). It shows the process of how data was reduced from codes to themes. Although the government has formulated different science, technology, and innovation policies, such as the National Science and Technology Policy 2011, Strategic Plan for Higher Education 2018-2030, and National Innovation and Intellectual Property Policy 2018, there is still a gap in setting overarching AE policies. For instance, academics, university managers and support centre managers believe that adopting the government's AE-related policy will increase academic engagement in AE. A category called '*new policy*' emerged. Academics and university managers also highlighted the need to change some tax-related policies. They also emphasised the importance of restructuring the higher education system and allowing private universities to offer PhD. So, a sub-theme called '*existing policy reform*' was created.

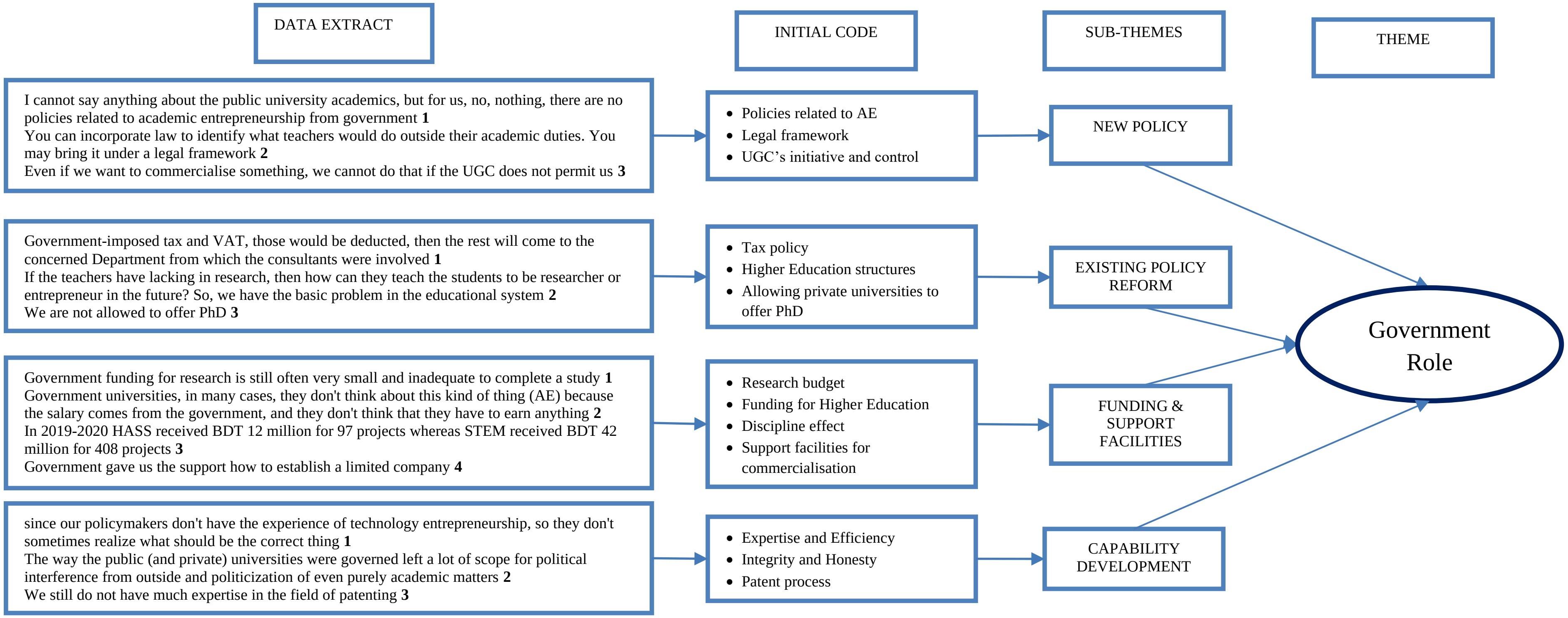


Figure 4.6: Coding Process of Theme – Government Role

Most of the participants in the university setting emphasised the lack of funding for research in the higher education sector. The government's policy documents also support this. Academics exhibited that although funding opportunities are available from different ministries, they face various challenges in making these opportunities available. Academics, university managers, support centre managers, and government policy documents stress establishing institutions to commercialise research and enforce the quality of academic opportunities. Thus, a sub-theme labelled 'funding *& support facilities*' was coined.

The participants indicated that the efficiency of government employees needs to be improved. They have also specified the time and effort in the lengthy patent process. As AE is a new phenomenon, the officials need more expertise. Therefore, a sub-theme was created and labelled as '*capability development*'. This government role will be discussed in detail in chapter four of this thesis, where a detailed analysis of how each of these categories is related to AE is illustrated in the context of this thesis. Hence, the discussion in the next chapter will expand on the participant's description of a new policy, existing policy reform, funding & support facilities, and capability developments.

Although the participants have recognised the importance of the government's role in AE, universities need to propagate and adopt AE. The respondents conveyed that AE is a collective process and requires appropriate decisions from the university management. It was found that the academic council has taken the university's decision, and vice chancellors play a significant role in the process. Any decision or change process needs to be implemented; it passes through many processes and is prolonged within the university. It was evident in the data that there were some issues with academic management because of the top-down and down-top decision-making process. They must decide how the fund will be managed and who will carry out these AE activities. The respondents highlighted that to tap into these resources. They use social networks. Hence, a sub-theme titled '*university capabilities*' was formulated.

Although the participants do not agree regarding the university's role in influencing academics to engage in AE, they all indicate that their universities are developing their curriculum to incorporate entrepreneurship. In addition, these universities are adopting the entrepreneurship mission, though not to the same extent. One of the reflections of this redefinition of the mission is the establishment of support centres. In addition to the government policies, the informants highlighted the importance of setting up different support centres so that the academics can be supported in their involvement in FAE and IAE. The support centre managers have revealed that this support is for every student and faculty in the respective university. These support centres can act as a mechanism to connect with different stakeholders. In this line of departure, the participants illustrated that the universities encourage collaboration within various departments and with other universities. Therefore, a sub-theme called '*entrepreneurial orientation*' was coined.

Although universities focus more on adopting entrepreneurship missions, there is still a lack of policies related to AE from the universities. The academics, university managers and support centre managers have highlighted the importance of recruitment policy reform and enactment of IP policy. They also indicated that there are currently strict rules for academics to engage in non-academic or entrepreneurial activities. They must get permission from the university management to engage in some cases. Only the number of years in service and publications are considered in the teacher's promotion. The university does not believe the journal quality or involvement in the AE activities as promotion criteria. The participants denoted that salary depends on seniority, and their salary is low in relevance to the increment of expenditure (low in South Asia). Although universities encourage research collaboration, they discourage AE engagement as a means of income source. All these imply low demand for AE within the university system. Thus, a sub-theme called '*Demand for AE*' was formed.

The participants have stressed the importance of teaching and research. The academics, university managers and support centre managers emphasised that these universities are teaching-focused and lack a research atmosphere. They have also indicated that there has been a lack of focus from the university to take this research results for the betterment of society. They are instead focusing only on publications. Even though they are involved in IAE, the academics have to share a portion of their income with the university as an overhead. Due to academics' teaching and research focus, they have a large workload. Their AE engagement exacerbates this workload; however, this AE experience also helps them in their teaching and research. Consequently, a sub-theme named '*university culture*' was formed.

Although most participants signified the importance of industry-academia collaboration, several participants emphasised a lack of industry-academia collaboration. One of the reasons these participants mentioned was the knowledge gap between industry and academia. Neither of these domains is aware of their initiatives. Sometimes, this is expressed with the less utilisation of local experts and technology by the local industries, according to the opinion of some respondents. However, recently, there have been different initiatives taken by industry and academia. Several participants illustrated that industry proposals to universities and establishing TTOs, incubators, and entrepreneurship centres indicate these initiatives. They also say that the university's initiative in this regard was perceived to be limited, and hence, they have taken individual initiatives to collaborate with the industry. Moreover, some participants pointed out the lack of research funds and investment in the R&D of private firms. Upon considering all these, a sub-theme called *'industry-academia collaboration'* was formed.

Upon considering all these sub-themes and coding, the researcher has created the second theme, '*University Norms and Practices*'. Figure 4.7 shows the data reduction process, categorisation, and finally, landing on the theme '*University Norms and Practices*'. In chapter six, there will be more explanation of the university norms and practices and how they influence academics to engage in AE in this research context. Therefore, a detailed discussion of universities' capabilities, entrepreneurial orientation, demand for AE, university culture and academia-industry collaboration will be outlined. Although the participants have stressed the importance of government rules, regulations, and university norms and practices in the AE process, the academics decided to be involved in the AE. Therefore, it is essential to understand their perceptions and motivations towards AE.

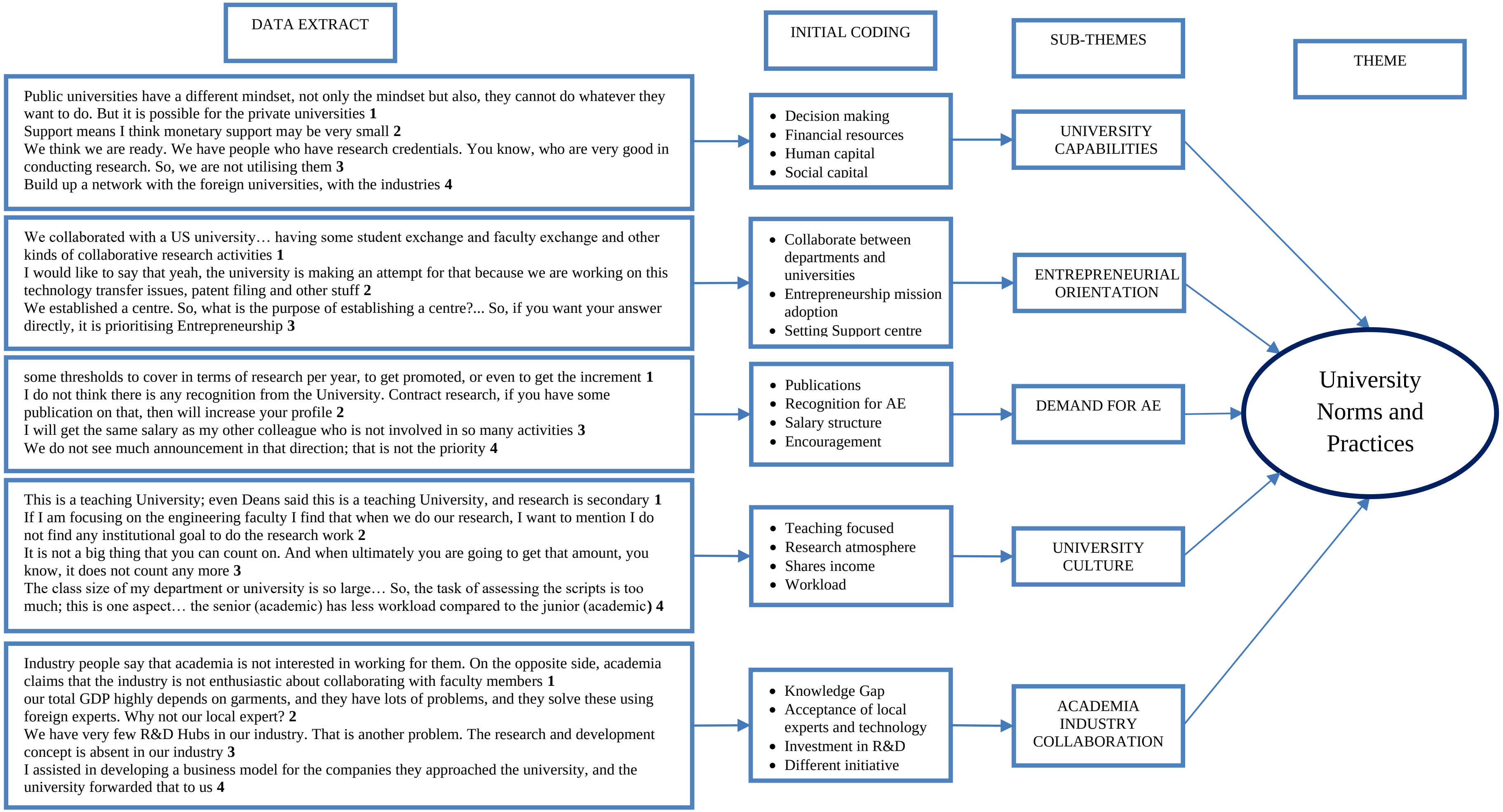


Figure 4.7: Coding Process of Theme – University Norms and Practice

Academics, university managers and support centre managers indicated that AE is new to them. Although they are involved in AE, some highlighted that they have not heard of this term before. Along the same line, academics have limited awareness of the support centres the universities have set up to increase research commercialisation. Some academics revealed that they are less interested in involvement in AE because they cannot balance work and family life. Academics have highlighted the importance of being aware of AE from student life. The government authorities, industries, university managers, and academics need to be oriented to the significance of AE. By being involved in AE, academics can learn how different theoretical knowledge has been applied in practice and how it differs from theory. Academics' involvement helps them understand the real-life problem and how to overcome it. Therefore, they can share these solutions with the industry or related parties. Understanding the ins and outs will help the government develop and adopt good policies regarding best practices. Academic engagement in AE increases academic knowledge and capability and helps improve the capability of stakeholders such as industry, government, and universities. Thus, a sub-theme named '*knowledge and learning*' was developed.

The academics have presented that society has yet to accept academics engaging in activities other than teaching and research. The common perception is that academics only teach and publish. Hence, AE is not yet a practice. Academics feel the importance of AE, but university top management still feels these are not academic tasks. There is a gendered mindset in academia; hence, there is less participation of women academics in academia and AE. Although academics have been involved in entrepreneurial activities, their beliefs stopped them from engaging in certain activities. For instance, some academics prefer publishing instead of patenting because it would increase the cost of innovation and hence does not bring greater good to society. Academics from private universities indicate fear and guilt about their involvement in AE. They are afraid because if the university knows about their involvement, they might sack them. Their guilt originates from involvement in AE, but they do not inform the university. Several participants also highlighted that public university academics are more engaged in AE activities because of these universities' contribution to society and access to the industry. Hence, a sub-theme called '*culture and mindset impact*' was formulated.

Several participants have stressed that their previous industry and entrepreneurial experiences helped them improve their capability and knowledge regarding identifying entrepreneurial opportunities, and the requirements to exploit them also enable them to connect and access new entrepreneurial opportunities easily. Similarly, their network also facilitates this opportunity exploitation. Notably, several academics and university managers indicated that there are more opportunities for IAE available compared to FAE. However, the resource accumulation for these entrepreneurial activities is complex, and their network helped them gather the necessary resources. The participants also denoted that discipline sometimes determines this entrepreneurial opportunity. In terms of FAE, the number is higher from the STEM discipline compared to the HASS discipline academics, whereas in terms of IAE, there was not much deviation found in the academics. Therefore, a sub-theme titled '*individual ambidexterity*' was created.

Academics have highlighted that motivating academics to engage in AE is not an easy task because they believe their job is to do teaching and research. Therefore, they need to understand the underlying positives of engaging in AE. One of these positives that academics exhibit is the chance to apply theory into practice. It yields mental satisfaction for them. Moreover, social commitment and engagement in AE contribute to their commitment to society, giving them confidence and a sense of self-actualisation. Involvement in AE also aids academics in building their network. Thus, the '*intrinsic motivation*' sub-theme was formed.

Along with these intrinsic motivations, academics believe their AE engagement improves their class performance as they can link the theory to practice and explain it in more detail. As academic and entrepreneurial performance transcends the university's boundaries, university peers, colleagues, industry personnel, and government authorities recognise them. As there is better acceptance and network of the academics, it helps in student placement and engagement. In addition to this, involving in AE brings monetary benefits to academics. Several informants illustrated that their experience from the AE enables them to publish their work in prestigious journals, improving the university's image and ranking. Hence, a sub-theme called '*extrinsic motivation*' was developed.

Upon considering all these sub-themes, the researcher created the third theme, '*Human Perceptions and Motivations'*. Figure 4.8 shows the process of data reduction, categorisation, and finally settling on the theme '*Human Perceptions and Motivations*'. In chapter seven, there will be a more explanation of human perceptions and motivations and how they influence the academic's engagement in AE in this research context. Therefore, a detailed discussion on knowledge and learning, culture and mindset impact, individual ambidexterity, and intrinsic and extrinsic motivations will be delineated in chapter six.

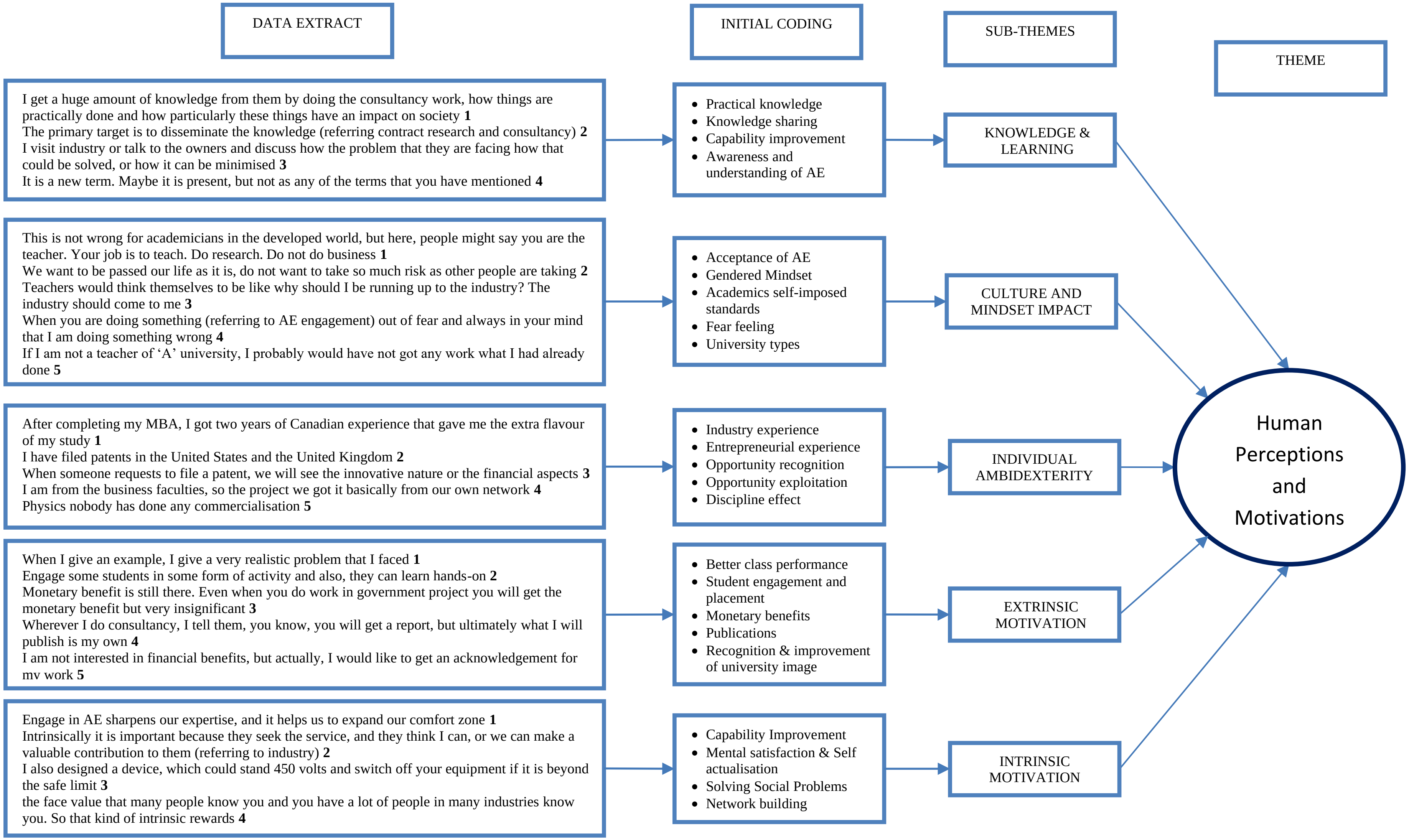


Figure 4.8: Coding Process of Theme – Human Perceptions and Motivations

The researcher constitutes the primary framework based on these three (3) themes (Figure 4.9). Here, the researcher links the themes with the research objectives of 'why the academics engage in AE', making the process transparent and defensible (Welch et al., 2012). Although other themes emerged from the raw data, these are submerged within these three themes. As this study uses the institutional theory (Scott, 2008) as the lens, it is essential to understand the regulative, normative, and cognitive dimensions represented through the macro, meso and micro levels. These levels correspond to the government's role, university norms and practices, and academic perceptions and motivations in this study.

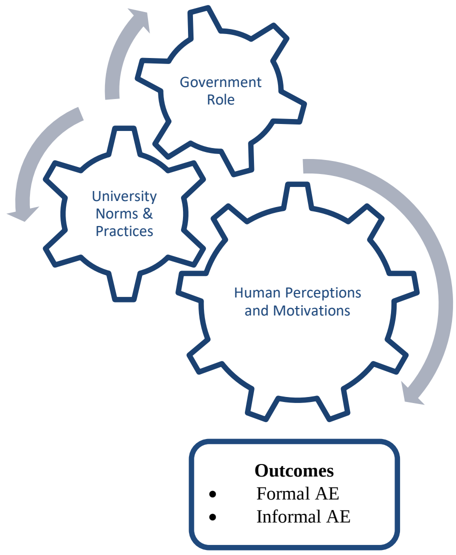


Figure 4.9: Model of Academic Entrepreneurship

This model shows the interactions between these three spheres: government, university, and academics. The outcome of this influence is on the academics to engage in formal or informal AE. However, this primary illustration does not explain the dynamics of these spheres, which will be further elaborated and discussed in chapter seven. While completing the dissertation, the researcher faced several challenges.

4.6 Challenges Faced During the Research

4.6.1 Covid-19 and Change in Data Collection

The first challenge the researcher faced was due to the Covid-19 outbreak. As this study was planned before the pandemic began, therefore the review and approval were in place from the university research ethics committee. However, there were some changes in the data collection methods due to Covid restrictions. Before COVID, it was planned to carry out face-to-face interviews with the participants were, but due to restrictions on individual movement and to comply with the social distancing policies, online interviewing of the academics, university support centre manager, and university manager was an effective tool for conducting qualitative studies (Lobe et al., 2020). This alternative data collection plan is illustrated in Table 4.6. Using this online platform instead of face-to-face does not pose that much difference from an ethical point of view, as in both, it is essential to gain informed consent and ensure the anonymity, privacy, and confidentiality of the participants (Dodds & Hess, 2020).

Table 4.6 Alternative Data Collection Plan

Participants	Original Data Collection Method	Alternative Data Collection Method
University Academics	Stage 1: Communicating with support centre managers and university managers to get access to and identify entrepreneurial academics. Stage 2: Face-to-face interview	Stage 1: Email the deans and heads of the faculties and departments to inform the academics who are requesting to participate in the interview. Stage 2: Interview through Zoom
University support centre managers and University managers	Face-to-face interview	Stage 1: Communicating through email to participate in the interview. Stage 2: Interview through Zoom

When the World Health Organisation declared Covid-19 a pandemic in March 2020, many changes occurred in our daily lives (Ratten, 2020a). The world has taken measures to limit physical interaction and reduce contagion (Liu et al., 2020). Universities shifted from face-to-face to online using digital technologies (Verma & Gustafsson, 2020). All these put tremendous pressure on student enrolment, digital delivery models, and the economic and financial uncertainty of the universities (Maritz et al., 2020). Due to this, all the university employees experienced uncertainties and pressure regarding their workload, job security, and mental health (Charoensukmongkol & Phungsoonthorn, 2020). This was also the case in Bangladesh (Neazy, 2021). As the number of COVID-19 patients rose, the government imposed nationwide lockdown measures to limit people's social interactions and isolate individuals (Islam et al., 2020). During this time, all the educational institutions were closed. This closure of universities brings severe consequences to the university employees' well-being and the students' mental health (Krishnamurthy, 2020).

Employees' mental health deterioration (Charoensukmongkol & Phungsoonthorn, 2020) was also connected to their struggle to differentiate the work and family spheres. The closure of schools and child-care services has increased parental demands, exacerbating this situation (Carnevale & Hatak, 2020). University academics needed to make changes in the academic year to incorporate more online and shorter semesters and modifications to the existing schedules (Ratten, 2020b). This left the academics with no time to adapt and prepare, and they were busy maintaining their newly emerged situation. Therefore, the researcher in this study encountered severe challenges in accessing the academics, university managers, and support centre managers through email, as indicated in the alternative data collection plan (Table 4.6). This led the researcher in a position to develop a strategy to get access to the prospective respondents. The second challenge the researcher faced was accessing the documentary evidence. Due to the drastic alterations in work culture and restrictions from the government mentioned above, the researcher could not contact and recruit the government officials of the relevant ministries. Hence, the researcher needs to develop a strategy to access institutional and regulative information through the collection of documentary evidence available online (Lee, 2021).

4.6.2 Overcoming the Challenge of Interviewing the Participants During COVID-19

After receiving the ethical approval, the researcher identified the participants over many months by looking into their activities (involvement in different forms of AE) from multiple sources, including social media, university websites, and news. Some university academics, university managers, university innovation centre directors, and university TTO managers presented in different webinars and round-table discussions. They discussed industry-academia collaboration, university research commercialisation, university knowledge transfer, and setting up an innovation centre. Their involvement in this activity and academic profile gives them credibility to be recruited in this study. Later, the researcher contacted them through email. However, in this Covid situation, most people, if they do not know someone, would not reply to that email. In the email, the purpose of the study and how the participant’s contribution was necessary to this research were mentioned. Additionally, to build their trust and reliability, the research participant information that comprises the ethical approval from the university ethics committee was sent, but this did not ensure any response from most of them. It is because of the newly emerged responsibility that keeps them busy (Ratten, 2020b). Hence, a phone call follows an email, and the researcher explains over the phone what this study is about, how they can contribute, and how this can improve the AE ecosystem in Bangladesh. Some of them showed interest in participating after talking to the researcher. For those who participated, the researcher asked them to refer to someone in their network who may contribute to this study [snowballing technique, Easterby-Smith et al. (2015, p. 89)]. However, as this was insufficient, the researcher used other methods to recruit the participants for this study. One is using LinkedIn (Roulin & Levashina, 2019).

It is noted that LinkedIn has been used as a tool to select employees for the organisation (Roulin & Levashina, 2019). However, this study used it to connect to potential participants. Not all accepted the researcher's invitation, but those who received the researcher communicated with them several times. It helped explain the position, reduce their suspicion and develop trust in this study (Baum-Talmor, 2019). Later, they were asked if they were interested in participating in this study. Some of them showed interest, while some declined. Those interested in participating asked for the interview guide to orient them to what is expected of them. There is a risk that the participants may feel overwhelmed or choose to respond simply with short phrases due to extended interviews (CohenMiller et al., 2020). After discussing with the supervisory team, the interview guide was sent to them, but when they found the questions conflicted with their role, they declined. Some declined because they saw it too long to meet over Zoom for approximately thirty (30) minutes to an hour for a video interview. Therefore, some were interested in an asynchronous interview (texting or communicating through email). This is understandable because the nature of the research (exploratory) is unfamiliar to academics in Bangladesh and those from a STEM background. As one participant says, "*This is my first experience doing an interview on this topic, and I really liked it*" (A4), 'A' indicates academic and '4' represents the interview number.

As indicated above, academics lacked time to devote to the interviews. Therefore, from the first recruitment, participants shared concerns about scheduling. While at first, a few asked to schedule and reschedule interviews. Most of the interviews took place at night (participants' time), and some continued till midnight as they had classes, meetings, and other commitments during the daytime. As one of the respondents rightly pointed out, "*Before COVID, it was a 24/6 job, but now it is a 24/7 job*" (A16). While the interviews were in progress, the respondents' video was mostly turned off as they felt comfortable and relaxed in their homes and simultaneously cautious about online privacy (Dodds & Hess, 2020). Therefore, the researcher was very flexible about the time, interview methods (zoom with video or without video), and mode (synchronous or asynchronous) they were willing, as the intention was to get in-depth information from them. By following all these, the researcher ended up with 26 interviews during this Covid-19 pandemic.

4.6.3 Overcoming the Challenge of Collecting Documentary Evidence

When collected and organised systematically, documents provide details of the organisation's operations and policies (Lee, 2021). Moreover, due to the digitalisation of contemporary and historical documents, it has become increasingly more accessible for researchers to collect such materials for their studies. However, it is not straightforward in all cases. For instance, although there are many documents, identifying relevant and specific documents to an intended topic is challenging, and this was the case in this study. The pertinent documents to AE in Bangladesh were not available online. To overcome this, the researcher in this study followed the steps delineated by Lee (2021). First, the researcher narrowed the list of potential document sources by conducting a preliminary search (Gross, 2018; Lee, 2021). This initial search aims to identify the most appropriate sources of documents to use as a sample. However, several searches through Google and Web of Science yielded no results relevant to AE in Bangladesh.

The academic articles, blogs, social media posts, newspaper articles, professional journal articles, and conference proceedings were searched here. The intention was to find the available government policies and how these are affecting the academics' engagement in AE. As there are no such policies that specifically mention AE in Bangladesh, different documents relating to varying phenomena, for instance, National Science and Technology Policy 2011, were investigated to understand the explanations and the reasons for different concepts that were likely to be advanced, considered and developed (Lee, 2021) about AE. Although these policies were directed towards technology and innovation, not AE per se, these had some components, for instance, science and technology commercialisation and patents relevant to AE. Furthermore, understanding other science and technology policies is essential for two reasons. First, it defines how these policies ensure achieving science excellence. It is widely accepted that scientific excellence and commercialisation go hand in hand (Bourelos et al., 2012). Second, it illustrates the government's view of developing the science and technology which may affect AE in Bangladesh.

It was also essential to justify how the collected documents are related to other documents (Lee, 2021). As one of the objectives of this study is to understand how the macro-level factors (the processes and policies of the government) influence AE in Bangladesh, the documents thus collected were justified based on the contribution and insights. These documents illustrated the government's support towards the AE in Bangladesh. For instance, the National Science and Technology Policy 2011 (Ministry of Science and Technology Bangladesh, 2011) and the 8th Five Year Plan (Bangladesh Planning Commission, 2020) are directly related to each other as these documents highlighted the importance of collaboration with the industry, academia, and government. Hence, these policies are considered documentary evidence for this study.

However, it is still a question of which of these documents would be selected for analysis, and this study applied a logical process to choose the documents (Lee, 2021). From the extant literature, it is the practice that the Ministry of Higher Education, Ministry of Science and Technology, and Ministry of Industry and Commerce of the government play a significant role in knowledge commercialisation (Abreu & Grinevich, 2013; Bezanilla et al., 2020; Daka & Siad, 2021). Therefore, the researcher objectively investigated these ministries to find relevant online policies and documents. Although many documents are available online on these ministries' websites, this study objectively examined the policies related to research, higher education, science, technology and innovation, research funding, research commercialisation, R&D, and intellectual property.

Temporal bracketing was used (Lee, 2021) to identify the government's current policy towards AE because AE was coined recently (Dalmarco et al., 2018). Documents published or created within the last 15 years were explored. This search allowed the researcher to understand the reform and progress in Bangladesh's higher education and research focus. Although there may be multiple documents from the same ministry in the same year and on the same event, all these were included. For instance, the University Grants Commission (UGC) published Higher Education Achievement in Bangladesh 2009-2018 and Strategic Plan for Higher Education in Bangladesh 2018-2030 in the same year 2018 (Bangladesh University Grants Commission, 2018c, 2018b), and both these documents were added because these discussed the current and future implementation plan of the higher education in terms of research and commercialisation of research. This study also added public and private universities' Recruitment and Promotion Policies (Bangladesh University Grants Commission, 2016, 2019b) to explore how AE was recognised in the universities' appraisal system. In addition, the Ministry of Planning's website was explored because this ministry oversees national planning, policies, strategy, and effective resource utilisation. Consequently, the 8th Five-year plan was identified as a document (Bangladesh Planning Commission, 2020). This objective search helped this study to overcome searching the plethora of texts otherwise (Bowen, 2009) as the search was narrowed down to four ministries of the Bangladesh Government, namely the Ministry of Science and Technology, Ministry of Education, Ministry of Planning and Ministry of Industries. Although there is a risk of missing important material associated with AE produced by other departments or ministries, these ministries develop and implement higher education, science, and technology plans in Bangladesh.

Finally, the texts were systematically collected to ensure the potential for identifying patterns and meanings (Lee, 2021). One of the objectives of this study was to explore how the government influences the academic's AE engagement. Consequently, the documents relevant to AE, for instance, related to technology, research, or higher education, were found on the web pages of the ministries mentioned above. Initially, 22 documents were found. Then, within these documents, specific terms were searched to find out the relevance of these documents to this study, for example, *technology transfer, knowledge transfer, innovation, research commercialisation, spinoff, consultancy, industry-academia collaboration, funding for research and development, intellectual property, patent, technology transfer office, incubators*. After this search, the final list of documents comprised policy documents, such as the National Science and Technology Policy 2011 (Ministry of Science and Technology Bangladesh, 2011), National Education Policy 2010, and Private University Act 2010 (Ministry of Education Bangladesh, 2010a, 2010b), 8th Five Year Plan (Bangladesh Planning Commission, 2020), National Innovation and Intellectual Property Policy 2018, and Patent and Design Act 1911 (Ministry of Industries Bangladesh, 1911, 2018), Strategic Plan for Higher Education in Bangladesh (Bangladesh University Grants Commission, 2018b).

4.7 Summary

This chapter has presented a detailed illustration of this study's research design, approach, and methods. This study took a neo-empiricist approach. The data collection comprised interviewing academics, university managers, support centre managers, and documentary evidence. This allowed data collection triangulation to gain richness and transparency of the phenomena under study. These are analysed using thematic analysis, starting with open coding, then grouped into categories and themes. The following three chapters will discuss these themes in more detail.

CHAPTER FIVE: GOVERNMENT ROLE

5 GOVERNMENT ROLE

5.1 Introduction

The previous chapter discussed the data analysis procedure of this thesis, and consequently, the government's role in Academic Entrepreneurship (AE) emerged from data as one of the themes (Figure 4.5). This chapter addresses the research question, what macro-level factors influence academics' AE engagement in Bangladesh? This chapter contributes to identifying the related actors involved in the AE process in Bangladesh by exploring how the government facilitates and hinders AE activities in Bangladesh. The theme 'Government role' was divided into four sub-themes: new policy adoption, existing policy reform, funding and support facilities, and capability development. These sub-themes have been identified through a series of interviews with the academics, university managers and university support centre managers, and also based on the regulative pillars of the institutional theory, which entails rule-setting, monitoring and sanctioning activities (Scott, 2014, p. 59) and AE literature (e.g., Benneworth & Jongbloed, 2010). This chapter shows how each category and sub-category is related to the AE and contributes to the research objective. Figure 5.1 outlines the structure of the following sections, which fall under theme one, the government role. Each will be discussed in turn.

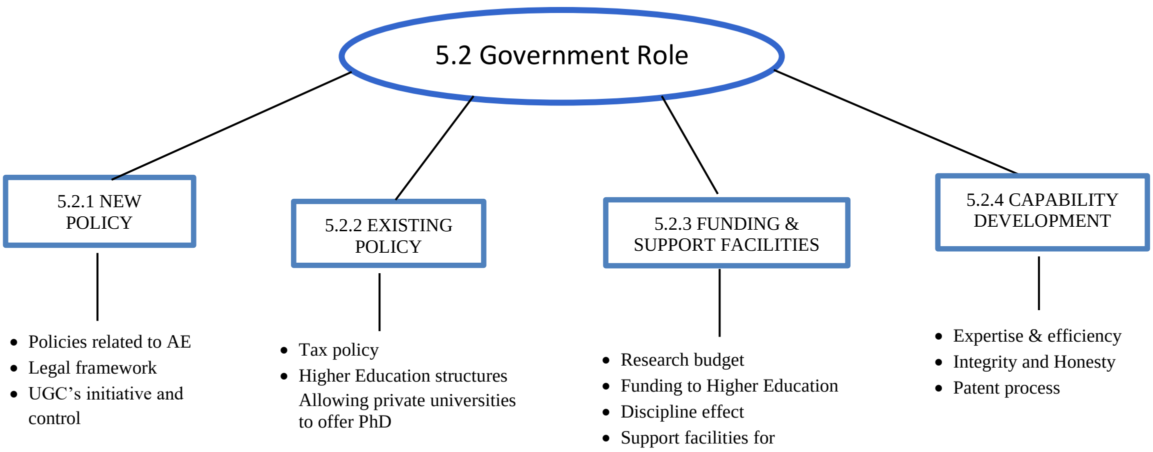


Figure 5.1: Overview of Chapter Five

5.2 Government Role

Before discussing the role of the government in AE in Bangladesh, it is essential to explain the higher education system in Bangladesh and how the government is involved. University education in Bangladesh is divided into three broad streams: (i) The National University (NU),[4]

[4] National university, Islamic Arabic University and Open University are key players in providing higher education to many students and do not have a research focus (Bangladesh University Grants Commission, 2018c; Ministry of Education Bangladesh, 2010a). Hence, the academics in these universities are involved in mass education and are not considered in this study.

which had 59.68% of the total higher education enrolment; (ii) the public and private universities; and (iii) the Islamic Arabic University and Bangladesh Open University (Bangladesh University Grants Commission, 2018c). The Secondary and Higher Education Division of the Ministry of Education formulates policies related to the vision, size, shape, and direction of the higher education sector. The Division transfers government funding to the universities through the University Grants Commission (UGC) (Bangladesh University Grants Commission, 2018c). UGC coordinates and leads the matters of higher education in the country. One of the responsibilities of UGC is to plan, develop and implement higher education and research programmes of the universities. "*All universities will resolve matters about their development programmes related to education, the opening of new departments and expansion of the existing ones with approval from UGC*" (Ministry of Education Bangladesh, 2010a, p. 76).

Moreover, the Government wants Bangladesh to become a knowledge-based economy and focus on the Five-Helix approach (Bangladesh Planning Commission, 2020). Through this Five-Helix approach, collaboration between (i) government, (ii) education and research organisations, (iii) industry, (iv) start-ups & entrepreneurs and (v) investors will be encouraged (Bangladesh Planning Commission, 2020). As universities are essential generators of new knowledge, to achieve this knowledge-based economy, the government is planning to adopt different policies to shape higher education, innovation, entrepreneurship, R&D, and industry-academia relationship through an interdependent relationship between the government, education and research organisation, industry, start-ups and entrepreneurs and investors (Bangladesh Planning Commission, 2020), yet to implement those plans and policies (Bangladesh Planning Commission, 2020).

Five main areas of policy help to understand the current context of AE development in Bangladesh as such: (i) Strategic Plan for Higher Education in Bangladesh 2018-2030 (Bangladesh University Grants Commission, 2018c), (ii) National Innovation and Intellectual Property Policy 2018 (Ministry of Industries Bangladesh, 2018), (iii) National Education Policy 2010 (Ministry of Education Bangladesh, 2010a), (iv) Private University Act 2010 (Ministry of Education Bangladesh, 2010b), and (v) 8th Five Year Plan (Bangladesh Planning Commission, 2020). Before discussing further, it is essential to illustrate what was proposed and the implications of these policies for AE in Bangladesh. It is shown in Table 5.1.

Table 5.1 Policies' Implications for AE

Policies	Excerpts/Discussions/Plans	Implications for AE
Strategic Plan for Higher Education in Bangladesh (SPHE) 2018-2030	• Universities should mobilise resources and funds from the private sector • Legal instruments such as the Bayh-Dole Act of the USA can be followed in Bangladesh • Private universities are allowed to diversify their revenue sources • Restructuring UGC • Establishing network infrastructure and connectivity for a national educational and research network • Uniform recruitment rules for public university	• If universities collaborate with industry, a range of formal activities such as collaborative research, contract research, consultancy, ad-hoc advice, and networking with practitioners can be accomplished to generate additional funds for the university. • Universities can generate income from sharing research outcomes and designing innovation ecosystems • Private universities can generate revenue by engaging in AE activities • UGC would be more supportive towards AE • Incorporation of AE in the recruitment policy would increase participation
National Education Policy 2010	• Exploration of receiving grants and funds from external sources to maintain expenses • Collaboration between universities and the industry to solve their problems	• Encourage to engage in research which in turn can be published and patented • Opportunity for research commercialisation • Increase knowledge and technology transfer to the industry
8th Five-Year Plan	• Academia should undertake R&D for predicting, adapting, and innovating next-generation digital innovations • University should redesign existing products and processes for the Government and the industry • Provide incentive in undertaking R&D for producing patents and expanding the IP base • Foster academics R&D in support of generating IP-based start-ups	• Patents and publications are being produced • Number of innovations introduced in the market • New products which can be commercialised through a spin-off • Academic institutions earn royalties on patents. • Improve the IP portfolio of start-ups or spin-offs from academic institutions • Patents being filed and received by start-ups and integrated into products and processes

Policies	Excerpts/Discussions/Plans	Implications for AE
National Innovation and Intellectual Property Policy 2018	• Establish an appropriate, balanced, and inclusive IP infrastructure with meaningful linkage between the national innovation ecosystem and the market • Encourage the establishment of more Technology and Innovation Support Centres (TISCs), Technology Transfer Organisations (TTOs), R&D centres in the private sector, as well as innovation centres at all government and private educational institutions • Develop and strengthen through appropriate and effective reforms, reorganisation, skill development, capacity building, and support mechanisms for human resources in IP Offices. • Enact or revise existing appropriate IP laws • Allocate adequate funds in the national budget to promote science and technology, innovation, creativity, and overall development of a national innovation ecosystem in the country.	• Increase in patents and opportunity for revenue generation for the universities • Industry-academia collaboration to transfer new technology and innovation resulted in IP assets • Awareness building of the academics increases their propensity to engage in AE • Establishment of TISCs, TTOs, and R&D centres can involve in awareness-raising programmes to ensure diffusion of innovation, creativity, and entrepreneurial competence and competitiveness geared towards their benefits and economic growth and development of the country • Increase the promotion, protection, commercialisation, IP valuation and enforcement of IPRs. • Enactment of new laws or revision of current laws could encourage academics to engage in more innovative activities and stimulate the transfer of technology • Adequate funding would increase academic engagement in AE activities
Private University Act 2010	• Every new department or new avenue of research stream needs to be approved by UGC • The chancellor (the Hon'ble president of the country) selects the vice-chancellor for the private university • Private universities can diversify their revenue from any sources approved by the UGC	• This approval can pose a barrier to private universities' research commercialisation opportunity • This selection depends on strong ties, which often overlook the research and AE orientation of the vice-chancellor • Reduces the university's opportunity to engage in research commercialisation

From Table 5.1, some different policies and acts recognise the role of government, universities, and academics. These policy documents demonstrate the importance of AE in the form of patent, consultancy, and industry-academia collaboration by adapting the Bayh-Dole Act of the USA to commercialise the research, adopting uniform recruitment policy, restructuring UGC, diversifying university revenue sources, revising the IP policies, and facilitating industry-academia collaborations, focusing on R&D. However, there is not much information on the level of implementation.

Similarly, the government emphasises higher education institutions for pursuing basic research, leading to industrial innovation. Here, the government's role is to provide funds for basic research by encouraging innovation within the university. These policies also highlighted exploring the opportunity for higher education institutions (HEIs) to get funds and grants from external sources to maintain the expenses of the HEIs. Consequently, the government role is considered the macro (system) level factor that shapes the national innovation, entrepreneurship, and industry-academia relationship through an interdependent and collaborative relationship. The researcher has found that the government plays a vital role in the AE, both formal (FAE) and informal (IAE), through new policy adoption and reforming existing policies, funding and support facilities, and capability development. These are as follows.

5.2.1 New Policy Adoption

From the data analysis, the researcher has identified new policy adoption as the sub-themes (Table 5.2). As demonstrated above, numerous policies and guidelines have emphasised the importance of collaboration with industry, academia and government. However, no definitive law or policy ensures academics can engage in entrepreneurial activities. On the one hand, the 8th Five-Year Plan pointed out that there will be a policy paper on start-ups that would be implemented in FY2021 (Bangladesh Planning Commission, 2020). On the other hand, the Education Policy 2010 illustrates that academics can engage in institutional consultancy where necessary (Ministry of Education Bangladesh, 2010a). Although these policies have been adopted recently, they are yet to be implemented. The impediment sometimes comes from the implementation of something new [5]. Moreover, this policymaking involves multiple

[5] According to the Global Competitiveness Report 2019, Bangladesh scores 46.8 and ranks 103 out of 141 economies in terms of one of the indicators, 'Future Orientation of Government', which is measured in terms of legal framework to digital business models, stable policy environment for doing business by government; government's response to change and government's long-term vision (World Economic Forum, 2019).

stakeholders. Hence, the process is complex, and it is even more challenging to define an agreed role and responsibilities for the stakeholders, which hinders the execution of such policies (Bangladesh Planning Commission, 2020). Moreover, few participants highlighted that COVID-19 interrupts normal activities.

Table 5.2 Codes and Data Related to Sub-themes: New Policy Adoption

Initial Coding	Representative data
Policies related to AE	"…clarity in legal issues. If it is announced that from tomorrow, academics can engage in new business, I think there will be a big jump in that. This is because as the academics have interest, they do not have to work 9-5, and they are creative thinkers they have the opportunity to engage (USCM24, associate professor and support centre manager at a public university) "…I cannot say anything about the public university academics, but for us, no, nothing, there are no policies related to academic entrepreneurship from government" (UA22, professor at a private university)
Legal framework	"…the big barrier from the government is that in many cases it (AE) is illegal. So, I would say that decriminalise it, legalise the academic entrepreneurship" (UA13, senior lecturer at a private university). "…I have heard from several faculty members that they want to engage in such (entrepreneurial) activities, but what can we do? Do I need to take permission? I am not sure about academic entrepreneurship…Is there anywhere it is written that academics cannot become entrepreneurs? You can incorporate law to identify what teachers would do outside their academic duties. You may bring it under a legal framework" (USCM24, associate professor and support centre manager at a public university)
UGC's initiative and control	"…still, they (referring to UGC) could not make any proper policy or guideline on how to engage the faculty member and align the faculty member with the industry. How to create a bridge between academia and industry. They have a huge failure in this regard" (UA9, senior lecturer at a private university) "…they (UGC) cannot dictate because we are run by our own statute. Our statute determines what we are eligible for and what we can do. University academic council is the body who can think of any kind of changes, and that can finally be approved by the Senate" (UA5, professor at a public university) "Even if we want to commercialise something, we cannot do that if the UGC does not permit us... Whenever we are doing something for profit or commercialising anything, we will have to take permission from UGC... the private university can do something, and the public university can do something. It is not the same" (UM4, professor and university manager at a private university).

Few participants mentioned that uncertainty risk was associated with implementing new policies. These regulations sometimes impose excessive or unnecessary burdens on the universities, even though the Education Policy 2010 and Private University Act 2010 (Ministry of Education Bangladesh, 2010a, 2010b) lay the foundation for private university teachers to collaborate with industry through a consultancy based on industry requirements. This thesis reveals that academics collaborate with industry in consultancy, contract research, training, patent, research joint venture, joint collaborative research, shared facilities, secondment and student placement (Table 4.2a and 4.2b).

Although no separate policy is dedicated to the AE, the government plans to implement a Bayh Dole-like Act for the research commercialisation of the university. One of the policy documents illustrates, "*Bangladesh may benefit from the Bayh-Dole Act of 1980 of USA for fine-tuning terminologies, procedures and policies of IPR*" (Bangladesh University Grants Commission, 2018c, p. xvii). This incorporation of acts like Bayh-dole would allow the "*universities and academics to own, patent and commercialise the inventions developed under government funded research programmes within their organisations and allow the university to generate additional funds through involving in activities such as collaborative research, contract research, consultancy, and the provision of ad-hoc advice and networking with practitioners*" (Bangladesh University Grants Commission, 2018c, p. xiv). Most academics, university managers and university support centre managers agree that the new policy towards AE would improve the academics and universities' engagement in these entrepreneurial activities.

However, these policies often fail to engage more entrepreneurs in the national entrepreneurship and innovation process (Ministry of Industries Bangladesh, 2018). Although the government's adoption of suitable policy is vital for national entrepreneurial endeavours, most participants are unaware of any policies and acts related to AE or the information is not disseminated by the government. This claim is also supported by the National Innovation and Intellectual Property Policy 2018 (Ministry of Industries Bangladesh, 2018), which emphasises establishing different support centres to increase academics' awareness of their engagement in entrepreneurial activities. However, several participants mentioned that the government may have adopted new policies, but there is no initiative from the government to engage academics in the AE process. This implies that the government's initiative to build a supporting environment for AE to connect the different stakeholders is in a nascent stage, which is also supported by the 8th Five-Year Plan of the government (Bangladesh Planning Commission, 2020).

This illustrates a lack of proper arrangements, procedures, and structures for collaboration, and most respondents and Strategic Plan for Higher Education (SPHE) 2018-2030 highlight that the arrangement to collaborate with industry is not structured. This structural gap creates impediments to research commercialisation. While many academics lack shared understanding and knowledge gaps, these initial inadequacies in proper arrangements challenge their engagement with practitioners and industry. Due to these structural gaps, some academics and university managers are concerned about the legal perspective of involving AE. This is because the procedure of involvement in AE is not mentioned in the government policies. This is also echoed in the SPHE 2018-2030, *"Universities have traditionally maintained some link with stakeholders, but these have not been substantial or structured… An appropriate legal framework for university-industry partnership also needs to be established"* (Bangladesh University Grants Commission, 2018c, p. 49).

However, one of the professors at a public university denoted enthusiasm and intelligence among the related stakeholders; sometimes, the "*decision makers follow the guidance from the external agencies*" (UA10). This is also supported by one of the policy documents, "*The World Bank once again came forward to help the ministry and UGC to work on preparing a strategic plan to reflect the growing abilities and aspirations of the country and the need for quality and better governance*" (Bangladesh University Grants Commission, 2018c, p. 11). This illustrates the government's initiative to ensure that the appropriate legal framework is in place or is developed to facilitate the necessary partnerships and links between academia, industry, and government. However, the lack of proper arrangements hinders this collaboration. Consequently, it increases academics' fear of getting penalised and reduces their involvement in AE. Some participants perceived that incorporating the legal framework would set the foundation of what academics are allowed to do in addition to their academic duties. Although the appropriate legal instrument is yet to be implemented, the government has started taking several initiatives, for instance, by declaring 2018-2028 as the *innovation decade* and wanting to make Intellectual Property (IP) an integral part of the national development plans and strategy (Bangladesh Planning Commission, 2020). To implement these, the University Grants Commission (UGC) needs to take the necessary initiatives.

Although UGC is supposed to take several initiatives to increase the collaboration between industry and academia, they are yet to take the necessary steps to collaborate with industry academia. Several participants from public and private universities highlight that UGC does not act to set the policy or guidelines regarding the academics' collaboration with industry.

However, two of the informants at public universities demonstrate that UGC is rearranging their rules and regulations and intends to encourage academics to commercialise research. This indicated that the degree of awareness of public and private universities varies. However, most private and public university respondents agree that UGC has yet to implement these initiatives to bridge the gap between academia and industry. This is also highlighted in the 8th Five-Year Plan of the government (Bangladesh Planning Commission, 2020), which states that UGC will organise seminars and workshops to increase the industry's and academics' awareness of industry-academia collaborations.

Although UGC was responsible for taking the initiative to increase academia-industry collaboration, it sometimes creates impediments for both private and public universities. Three professors at the public universities mention that the public universities are run by their statutes, and, therefore, UGC does not have much control over public universities except fund allocation. The UGC's control over the annual budget implies that public universities must coordinate with the UGC to access these funds. The Senate must approve any changes to the annual budget before submitting it to the UGC. This approval process can be quite time-consuming. However, some participants from public universities denoted that they have the autonomy to operate and can decide their action plans. Hence, public universities can adopt anything if their statute supports it. These participants also mention that academics at the public university enjoy a high level of autonomy and job security. Therefore, despite decision-making autonomy, public universities often encounter research delays due to the prolonged processes involved in UGC's budget allocation.

On the other hand, private universities are regulated by the Private University Act 2010 (Ministry of Education Bangladesh, 2010b). For private universities, UGC is the ultimate decision-maker (Bangladesh University Grants Commission, 2019c). Several respondents from private universities argued that it is challenging to get involved in entrepreneurial activities because they need prior permission to get involved in these profit-seeking activities, even if the Private University Act 2010 (Ministry of Education Bangladesh, 2010b) allowed private universities to explore different sources to maintain their operations. This is due to their non-profit enterprise status, based on which they are not permitted to undertake commercial activities, as opined by the same participants. Therefore, the existing policy reform is seen by respondents as being very much necessary.

5.2.2 Existing Policy Reform

Most participants emphasised the importance of the existing policy reform, such as tax policy, higher education structures and allowing private universities to offer doctorates (Table 5.3). Academic entrepreneurial activities are perceived to be originated and related to innovation and technology. However, the 8th Five-Year Plan illustrate that the technology sector is burdened with tax overload, inconsistent tax policy, higher tax rates, and inefficient tax structure (Bangladesh Planning Commission, 2020). Three professors and one of the support centre managers echo this inconsistency in tax policy. For instance, one of the professors involved in both FAE and IAE describes that tax policies "*are still obstacle to local entrepreneurship of technology" (UA10).*

Table 5.3 Codes and Data Related to Sub-theme: Existing Policy Reform

Initial coding	Representative data
Tax policy	"…if you make something then they will pat your back, keep trying, keep trying, but they (policymakers) will reduce the import duties… we sell 500 VA UPS, you have to pay 1500 Taka (approx. £13) as tax to the government if you want to make it locally. If you import it, you have to pay 150 Taka (approx. £1.3)" (UA10, professor at a public university)
	"…the government-imposed tax and VAT (value added tax) those would be deducted (Consultation fee after deducting the overhead), then the rest will come to the concerned Department from which the consultants were involved" (USCM25, professor and university support centre manager at a public university)
Higher education structure	"…mostly I found that most research is the theoretical aspect of research. So, this is one of the main reasons the industry-academia chain is not working" (UA8, professor at a public university).
	".….students at public universities they are not having that much exposure because we do not have that much qualified faculty members (in terms of engaging students in entrepreneurial activities) …So, if the teachers have lacking in (doing) research, then how can they teach these students to be the researcher or entrepreneur in the future. So, we have the basic problem in the educational system" (UA26, associate professor at a private university)
Allowing private university to offer doctorates	"…… Grants Commission (UGC) has chained them because they are not allowed to take PhD students. This was a big obstacle, so they were allowed to give degrees, so they became degree sort of authorities, but they are not allowed to do research, so whatever research they do is undergraduate research" (UA9, senior lecturer at a private university)
	"……we are not allowed to offer PhD. So if you are not allowed to offer PhD, whoever may think that private universities are not ready, but we think we are ready" (UM4, professor and university manager at a private university).

This inconsistency in the existing tax policy poses a substantial challenge for entrepreneurs who want to establish a new venture based on an innovation that originated in the university setting. This inconsistency in tax policy is also highlighted in the 8th Five-Year Plan

(Bangladesh Planning Commission, 2020). Along with the unfavourable effect of tax policy on setting FAE, three participants from public and private universities highlighted that it is detrimental for the IAE because academics have to pay higher income tax based on their involvement in IAE. They mentioned that it is "*additional income*" to their salary. Therefore, they have a higher tax implication on this additional income (see personal income tax in Bangladesh in Appendix 6). Some respondents who engaged in both FAE and IAE perceive tax policy negatively to their engagement in these entrepreneurial activities. However, it is not only the income tax, but there are problems with other aspects of the tax policy also.

Bangladesh's corporate tax rate on banks at 42.5% is the highest in the region (Bangladesh Planning Commission, 2020). The higher corporate tax rate applied on pre-tax profits of commercial banks also impacts interest rates. Therefore, academic entrepreneurial businesses have to borrow money from the bank with a higher interest rate to establish their business. This higher interest rate may challenge academics to develop their venture (spinoff) and increase business costs and risks. Moreover, private universities are taxed at a rate of 15% of their income (National Board of Revenue, 2022), which compels these universities to operate like businesses. However, they still face restrictions imposed by the UGC.

As outlined in the Strategic Plan for Higher Education in Bangladesh: 2018-2030, the country's higher education system is divided into three (3) broad streams: (i) The National University, (ii) the public and private universities, and (iii) the Islamic Arabic University (Bangladesh University Grants Commission, 2021). Therefore, the UGC has to use much of its resources to maintain and oversee this versatile nature of activities of different streams of higher education. The National Education Policy 2010 illustrates that the education system needs to shift from the traditional theory-based approaches to delivery and assessment demanded by industry (Bangladesh University Grants Commission, 2021; Ministry of Education Bangladesh, 2010a). Three participants emphasised the lack of application-oriented research. This application of knowledge is vital for AE because it ensures how the knowledge will be applied in practice.

However, this problem is unlikely to change within a short time. Different rules run public and private universities, and both these universities need to maintain good industry collaboration so that the knowledge can be transferred and commercialised to the industry. Some public and private university participants realise they can be involved in AE-related activities, while others perceive that they are not. For instance, one of the professors and support centre managers at a public university mentioned, "*Whatever I do outside our regular activities, those have to be endorsed or approved. So, we have a few limitations in getting involved in financial activities.*

But we are trying to change those policies a little bit, or as much as we can" (USCM25). On the other hand, most respondents from private universities believe that existing law does not allow them to start new ventures.

As highlighted above (Table 5.1), different regulations increase the level of activities of the UGC because they need to be aware of these differences when formulating and implementing new policies. Consequently, this anomaly in different rules and legislation may reduce their ability to allow the universities to engage in entrepreneurial activities. One of the policy documents highlights this, *"develop and bring many laws of different universities under a single umbrella legislation, which will remove many of the present anomalies"* (Bangladesh University Grants Commission, 2018c). The reform of existing policies and regulations would clarify the university administration's responsibilities, making UGCs' responsibility to maintain and oversee the universities much more straightforward. This anomaly of legislation and responsibilities may be one of the reasons UGC still does not allow private universities to offer doctorates.

Private universities are not allowed to offer doctorates in Bangladesh. Several informants emphasised that this is important for AE as this would increase the knowledge creation from the private university that can be transferred to the industry. For instance, one of the university managers from the private university mentioned, *"The main contribution in the research comes from PhD students by supervising PhD students. So, we have a huge constraint in knowledge creation" (UM4)*. However, three participants denoted that private universities are established to offer bachelor's and master's degrees. This perception of the academic originated from the evidence that private universities do not have the expertise to supervise and carry out the research, and this is the reason they are hiring ex-professors at public universities to increase their research profile. However, it is not only to build the university's research profile but also to liaise with UGC because most UGC members are public university professors (Bangladesh University Grants Commission, 2021). Consequently, it will be easier for ex-public university professors to access the UGC members.

Two informants from the private university argued they have the human and other resources to conduct research and offer doctoral degrees. For instance, one of the university managers at a private university illustrated, *"we have people who have research credentials, who are very good at conducting research" (UM4).* It suggests that the perception of the UGC is still the same, that private universities only exist to award taught degrees and carry out basic research. However, private universities have developed their capabilities. The intent of private universities to prioritise research is evident in their allocation of funds for research compared to public universities.

5.2.3 Funding and Support Facilities

Most informants discussed the different aspects of funding, such as research budget, funding to higher education, discipline effect and support facilities for commercialisation. Hence, the sub-theme is 'funding and support facilities'. Eight informants suggested that public funding for research is inadequate in Bangladesh. It is supported by one of the policy documents that state funding for research is 0.2% in comparison to the government's plan to provide 2% of the GDP by 2026 (Bangladesh University Grants Commission, 2018c). This research funding is essential for AE because funding is directly associated with the academics' propensity to do research. Bercovitz & Feldman (2008) suggest that research publications related to research commercialisation. Table 5.4 indicates the research allocation by UGC and private universities in the 2018-19 and 2019-20 financial years.

Table 5.4 Allocation of Research Funding by University Type

Description	2018-19	2019-20	Increase	%
Allocation by UGC to research in public universities	734.0	795.8	61.8	7.77
Private universities own research allocation	1,008.1	1,117.3	109.2	9.77

Source: Bangladesh University Grants Commission (2021) (Note: In millions BDT (approx. £9,000)

This indicates that overall, the research allocation in public and private universities has increased in recent years, and private universities spent much more on research than public universities. While the public universities receive funding from UGC to carry out research (795.8 million BDT), private universities spend more funds (1,117.3 million BDT) for research in 2019-2020 as private universities do not receive any funding from the government. This research funding shows the research emphasis and the fundamental change in private universities. Although this shift in private universities is demonstrated with research funding, this has yet to change the perception of the UGC, as shown through UGC's action. Still, private universities are not allowed to offer doctorates, and UGC appears to believe that private universities are established to provide taught degrees, in other words, teaching-oriented universities. This perception that private universities are "doing only basic research" is shared by two academics at the public university. However, this perception has changed and is illustrated by informants from private and public universities. In essence, private universities allocate funds to expedite the research atmosphere to create more opportunities for commercialising the research outcome. This commercialisation income contributes to the university's operational funds along with the tuition fees. This implies that private universities need to increase their revenue and would be expected to be more interested than public universities in engaging in AE.

One of the policy documents illustrates that *'…in recent years, the public-sector funding is seeing a decline'* (Bangladesh University Grants Commission, 2018c, p. xvi). Although government funding in higher education has declined, public universities receive most of their grants from the government. This is highlighted by one of the support centre managers in a public university, *"and the government universities, in many cases, they do not think about this kind of thing (AE) because the salary comes from the government, and they do not think that they have to earn anything (referring to AE involvement). They can just take the money from the government" (USCM25).*
This dependence of public universities on government funding reduces their opportunity to seek incentives to identify other sources of funds. Conversely, several informants at the private university, along with these policy documents, illustrate that private universities are financed by their income from tuition fees. According to the Private University Act 2010, private universities can decide to be involved in any revenue-generating activities (Ministry of Education Bangladesh, 2010b). However, UGC has not yet approved that private university academics can engage in entrepreneurial activities except the research and teaching-based AE (such as consultancy, patent, training, and guest lectures) (see section 5.2.1). Hence, even though private universities increase their research funding, academics are less engaged in FAE and IAE than public universities (Tables 4.2a and 4.2b).

One of the policies illustrates that this research funding from the government is still inadequate for conducting cutting-edge research (Bangladesh University Grants Commission, 2018c). This can be described in comparison with other countries. In Bangladesh, R&D[6] expenditure is 0.2% of its GDP and ranked 97 worldwide (out of 141 countries. In contrast, India spends 0.6% of its GDP (rank 52), Pakistan spends 0.2% of its GDP (rank 87), Israel 4.3% of its GDP (rank 1) and the Korean Republic 4.2% of its GDP (rank 2) (World Economic Forum, 2019). One of the academics from the public university highlighted this research funding inadequacy: *"Government agencies have been providing research grants regularly for the last couple of years… government funding for research is often very small and inadequate to complete a*

[6] R&D covers basic research, applied research and experimental development (WEF, 2019)

study" (UA6).

Although there is limited research funding, two informants stress that the government provides funds to the university and sets the framework for utilising this fund. They perceive that this regulation influences their academic flexibility and creates discomfort. Although private university academics struggle to follow the designed structure while conducting research for the government, academics in public universities are aware of this government intervention. They are prepared to accept it within their role in the university. Along with the university type, this funding difference is evident or influenced by the discipline.

Several academics suggest variations by discipline about government funding. For instance, government funding is directed towards science, technology, engineering, and mathematics (STEM) disciplines. Although the number of students is higher in social science, arts, humanities, education, and business (HASS) disciplines than in STEM disciplines, they receive less funding (see Table 5.5). In 2019-2020, HASS received BDT 12 million for 97 projects, whereas STEM received BDT 42 million for 408 projects. This illustrates that UGC funded more projects that are coming from STEM as compared to HASS projects.

Table 5.5: Allocation of Research Funding from the UGC by Discipline

Description	2018-19	2019-20	Change	%	No of projects	Total Students
Arts and Humanities	3.38	7.00	3.62	51.73	97 (Total)	185,656
Social Science	3.41	5.00	1.59	31.90		
Science and technology	40.34	42.00	1.66	3.95	408	147,564

Source: Bangladesh University Grants Commission (2021). Allocation is for public universities

Some participants argued that although the government is putting more importance on STEM, it will take some time to get the effect. The importance of STEM is related to the government's action plan to encourage innovation in universities and to become a knowledge-based economy (Bangladesh Planning Commission, 2020). Although the government funding through UGC is more directly towards public universities and STEM disciplines, it is not purely about discipline. Through Startup Bangladesh, the government offers various forms of investment, including equity, convertible debt, and grants, to startups at pre-seed, seed, and growth stages (*Startup Bangladesh Limited*, 2022)[7]. It provides funding as long as individuals can initiate

[7] Startup Bangladesh Limited is the flagship venture capital fund of ICT Division of the government (https://www.startupbangladesh.vc)

innovation with their business ideas, which benefits society. Due to the innovative nature of the ideas, one of the academics at a private university from the HASS discipline secured government funding for his start-up. He mentioned, "*They (government) help if your business is promising. If you can make sure that you have a promising business and it is beneficial for society, I think the government is there to help you. They have the tendency to help" (UA14).*

This illustrates the government's intent to support entrepreneurship and grow innovation by setting up start-ups; however, it is not for academic startups or spinoffs. This study found that most academic respondents engage in IAEs instead of FAEs, which are more marketable and innovative. The participants from the STEM are more involved in FAEs than the participants from HASS – five academics from STEM engage in FAEs, whereas only one from HASS engages in FAEs (see Table 4.2a). However, 18 participants engage in IAEs and prefer to engage IAEs to commercialise their knowledge (see Table 4.2b and Chapter Seven for more details). Therefore, although there is a funding discrepancy by discipline, academic knowledge is transferred mainly to the industry through IAEs.

In addition to funding, the government is planning and taking the initiative to set up dedicated offices and institutions to support innovation and entrepreneurship. For instance, incubators, specialised industrial parks to support the growth of the high-tech economy (Bangladesh Planning Commission, 2020) and three technology transfer offices (TTOs) in three public universities under the Higher Education Quality Enhancement Project (HEQEP)[8] assistance to elevate the commercialisation of the research outputs of the academics (Bangladesh University Grants Commission, 2018c). However, three participants from the public university denoted that the TTO in two universities was shut after the project period. For instance, one of the professors at a public university said, *"They had an office for technology transfer at 'X' university, but it only lasted for the project period. The project finished in three years, and that office is all gone" (UA7).*

However, as the project was funded by the World Bank and after its completion due to funding constraints, the TTO was not operational afresh. Like other developing countries, the

[8] A major involvement of the World Bank in Bangladesh's higher education has been through the Higher Education Quality Enhancement Project (HEQEP). HEQEP was launched in May 2009, and the project's main objective is to improve the quality and relevance of the teaching and research environment in higher education institutions by encouraging both innovations and accountability within universities and by enhancing the technical and institutional capacity of the higher education sector (Bangladesh University Grants Commission, 2018c)

government receives a fair amount of funding from the World Bank under the HEQEP project to improve the quality of higher education.

Moreover, the Innovation Design and Entrepreneurship Academy (IDEA) promotes innovation and entrepreneurship across the country; Bangladesh Hi-Tech Park Authority and Start-Up Bangladesh, under the government's ICT division, are nursing and promoting IT start-ups. As one of the academics from the private university who set up his firm mentioned, *"The government gave us the support to establish a limited company and gave us free services for the account keeping and maintenance support" (UA14).*

This indicates that the government is promoting entrepreneurship and innovation and becoming a hi-tech economy. Although the government keeps establishing new facilities and institutions, two professors highlighted that the desired efficiency and functionality of these offices are yet to be achieved. This importance of capability improvement and skill development was also supported by the National Innovation and Intellectual Property Policy 2018 (Ministry of Industries Bangladesh, 2018) (see Table 5.1 for more details).

5.2.4 Capability Development

The excerpts from policy documents and the emphasis by several participants illustrated the significance of expertise and efficiency, integrity and honesty, and patent process, leading the researcher to identify another sub-theme called 'capability development'. The National Innovation and Intellectual Property Policy 2018 emphasised the importance of developing and strengthening the IP offices through appropriate and effective reforms, reorganisation, skill development, capacity building, and support mechanisms for human resources (Ministry of Industries Bangladesh, 2018). Three participants from the public university also support this. For instance, one of the professors at a public university who recently filed one of her patents said, *"We still do not have much expertise in the field of patenting" (UA7).* Due to the lack of expertise of the patenting office in the country, the government hires experts from abroad to support patenting activity. She continued, *"they (government) called up WIPO[9], brought in people, helped us set up the patenting work" (UA7).*

Although the government intends to incorporate these changes, there was no initiative from the government to improve the expertise and quality of the patent office. Two professors at public university universities argued that inexperience in technology and excessive administrative

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[9] WIPO, World Intellectual Property Organisation https://www.wipo.int/portal/en/index.html

discretion prevented the politicians from implementing efficient reform. For instance, one of the professors indicated, *"Since our policymakers do not have experience in technology entrepreneurship, they do not sometimes realise what should be the correct thing. Unfortunately, the people at the top they do not have the experience, even if they have a good heart, even if they have a good intention" (UA10).*

Even if the politicians intend to implement changes, their initiatives are ceased because of their technological inexperience. Similarly, several academics raise concerns about the integrity and honesty of some government offices. Like in other developing and transitioning economies, corruption is widespread in Bangladesh and was ranked 146 (out of 180) in the 2020 Corruption Perception Index (Transparency International, 2020). Three informants alleged corruption in some government offices. For instance, one of the professors at a public university mentioned, *"Wherever you want to follow regulations, you have to pay bribes… this is very common… I will add some of my analysis that when British colonial power imposed heavy taxes on those local industries, they could not compete… started a culture of corruption. Now corruption has invaded the whole country" (UA10).*

Although the implication of this lack of governance on the research commercialisation is not directly identifiable, it creates obstacles for the whole entrepreneurial ecosystem. It thwarts the implementation of policies and programmes in Bangladesh. Three respondents alleged corruption in the form of favouritism and biases towards getting government-funded projects. For instance, one of the professors from a public university said, *"If I apply for a project, I am not getting that project even though my project is a very nice one. Why I am not getting, you have to call someone, or you have to take someone in your team… this faculty member is from that university, I will not give him. It is one type of corruption" (UA17).*

Thus, academics feel they are prevented from accessing government-funded projects even though they are capable and from public universities. However, three participants suggested that the political connections of the academics play an essential role in their access to funds. For instance, one of the professors at a public university mentioned, *"One researcher does not have good (political) connections, and for that reason, s/he might not manage the fund" (UA8).*

Although some respondents' strong political affiliation helps get funds, this is not confined to awarding funds. The SPHE 2018-2030 illustrated that *"the way the public (and private) universities were governed left a lot of scope for political interference from outside and politicisation of even purely academic matters – such as selection of teachers. Election of Vice*

Chancellors, and in particular the Deans of different Faculties, was usually contentious, with partisan politics often overriding considerations of merit" (Bangladesh University Grants Commission, 2018c, p. 13). This political interference in the higher education system, both public and private universities, is likely to impact overall teaching and research performance negatively. This selection of the university Vice-Chancellor (VC) and appointment of teachers has significant implications for commercialising university research. The university leaders who are oriented and have been commercialising their research are likely to create a supporting environment for the research commercialisation and motivate the academics and other related parties to be involved in the process. The teachers who are interested or are already involved in commercialising their research output will be enthusiastic to carry out this AE.

However, two participants with patenting experience argued that the process is time-consuming. For instance, one of the professors at a public university stated, *"I also applied for a few patents, but the process was so long that I lost interest. I did not pursue them" (UA10).* This view of the slowness of patenting is supported by the recent data on patent application status in Bangladesh (Table 5.6), as it is found that the number of patent applications has increased both locally and internationally. However, the number of accepted patents has not increased at the same rate locally compared to international acceptance. In 2021, out of 69 local and 378 international new applications for patents, only 29 and 211 were accepted locally and internationally, respectively.

Table 5.6 Recent Patent Application Status

	New Patent Application			Patent accepted		
Year	Local	Foreign	Total	Local	Foreign	Total
2018	69	299	368	19	119	138
2019	66	347	413	8	121	129
2020	38	363	401	5	135	140
2021	69	378	447	29	211	240

Source: Ministry of Industries Bangladesh (2022)

Although time is one of the factors, other factors are associated with this. Two participants stated that of these other factors, the patent requires funding and support facilities from the government. For instance, two professors at a public university who filed a patent recently mentioned, *"I understand a lot of money has been spent on this patent, and every year, a lot of money has to be spent to uphold the patent" (UA7) and "I find that the documents need to be submitted, especially since the people dealing with them are not actually equipped with the technological patent. So, I find it difficult when I apply for a technological patent" (UA8).*

The above statement shows that when academics apply locally, they believe that it would cost less than international patent applications. However, they are concerned with the cost and the professional expertise of the people involved in patenting, which would make the process much faster. This lack of capacity of the IP offices in terms of technological patents and expertise of the IP offices is still at the nascent stage. Therefore, in the National Innovation and Intellectual Property Policy 2018, the emphasis was placed on skill development, capacity building, and support mechanisms for human resources of IP offices (Department of Patent, Design and Trade Marks and Bangladesh Copyright Office)' (Ministry of Industries Bangladesh, 2018, p. 6).

5.3 Summary

This chapter addresses the research question, what macro-level factors influence academics' AE engagement in Bangladesh? This study found that the government has been playing an essential role in the higher education system in Bangladesh. The findings are summarised in Table 5.7.

The government is aware of the challenges in adopting this 'Multiple Helix' approach to policy making (Bangladesh Planning Commission, 2020, p. 659). The main challenge is not the incorporation of policies but related to implementation and making the ecosystem's stakeholders aware of how to implement them. Respondents perceive that the government's role, such as policy support and UGC initiatives, adversely affects the public and private universities' entrepreneurial activity. The government has adopted different policies to support innovation. However, there is a problem with implementation. For instance, the National Education Policy 2010 indicated that universities must have autonomy (Ministry of Education Bangladesh, 2010a, p. 31). According to the Private University Act 2010 (Ministry of Education Bangladesh, 2010b), private universities are likely to engage in any activities to ensure their source of income. However, UGC poses a barrier to the private university. Consequently, AE engagement by private universities is low compared to public universities.

On the other hand, public universities are run by their statute. Although public universities can change their laws to adopt this entrepreneurship policy, they do not feel the need to engage in AE to generate revenue for the universities as the government provides salaries. The government has adopted different policies, but they have failed to build the awareness of the related stakeholders, especially the academics, who are unaware of such policy changes. Academics also need to become more aware of these policy changes.

Table 5.7 Key Findings of Theme One: Government Role

Sub-themes	Findings
New policy adoption	– Although the government has adopted different policies related to innovation and entrepreneurship, there is no definitive law or policy that clarifies how academics can engage in entrepreneurial activities – There is a paucity of proper arrangements, procedures, and structures for collaboration – UGC's control over universities creates unfavourable conditions for the universities – Academics from both public and private universities were unaware of the recent government policy adoption
Reform of existing policy	– Inconsistent tax policy hinders entrepreneurial activities – The education system needs to be more application-oriented to understand AE – Diverse higher education structures divert the focus of the government out of innovation and entrepreneurship – UGC's unwillingness to influence private universities' exposure to research activities by offering PhD – Higher corporate tax increases the cost of borrowing
Funding and Support facilities	– Government increased funding for research – Research based on STEM receives more funding than HASS because of the size of the discipline – The government has reduced funding for the universities and asked to mobilise resources from the private sector – Public universities are still receiving grants and funds from the government – Private universities do not receive any funding from the government, and they operate through their fund – There are different support facilities available from the government
Capabilities development	– Inefficiency of government offices hinders the AE – Governance dysfunction reduces the implementation of policies and programmes – Long time in the patent process poses a barrier to patenting – Lack of expertise reduces the academic's interest in filing a technological patent – Lack of integrity and dishonesty of some public officials inhibits the academic entrepreneurship process – Universities are influenced by political interference, which reduces their performance

These different rules for public and private universities increase the anomaly for the UGC that, in turn, reduces their ability to oversee the entrepreneurial activities of the universities. Additionally, UGC does not allow private universities to offer research degrees, which reduces their capability to attract funds and opportunities to commercialise the research outputs. Moreover, the students and academics need to learn how to transfer their knowledge and research to industry. Even though academics start commercialising their research, they face a tax burden. Local entrepreneurs with technology-oriented businesses must pay a considerable amount of tax. However, if the same technology is imported, it can be done with minimum import duty. Moreover, the corporate tax is 42.5%, which increases the cost of borrowing from the banks for entrepreneurs.

This thesis illustrates that the public funding for research, which is 0.2% of the GDP, is inadequate to support the research required for effective AE. However, private universities allocate more research funds than public universities because the latter depends on government funds and grants. Even though public universities are provided with government funds, the government's specific rules reduce their flexibility in utilising those funds. This thesis reveals that government funding in higher education is declining, and universities are being asked to mobilise resources from the private sector. Despite this, public universities still receive the majority of their grants from the government, while private universities operate based on their revenue. Moreover, the allocation of research funding is discipline dependent. Although the public funds are more directed towards the STEM discipline than the HASS discipline, the government is more concerned about the societal benefit of the public funds.

Along with the funding, the government also supports the growth of innovation and entrepreneurship through different offices and institutions, though this is nascent. This indicates the willingness of the government to facilitate entrepreneurship generally. This support is critical for research commercialisation as the academics lack knowledge of the external sectors. However, respondents argue that inefficiency, lack of integrity and political interference reduce the implementation of policies and programmes related to AE.

CHAPTER SIX: UNIVERSITY NORMS AND PRACTICES

6 UNIVERSITY NORMS AND PRACTICES

6.1 Introduction

The data analysis procedure chapter shows that the university norms and practices toward academic entrepreneurship (AE) have emerged as a theme (Figure 4.7). Therefore, the university norms and practices are discussed in this chapter. The chapter identifies the related actors (for instance, university and industry), emphasising the university perspective and how it influences the AE in Bangladesh. This chapter addresses the research question, what are the university-level factors that influence academics AE engagement in Bangladesh?

The theme 'university norms and practices' has been broken down into five sub-themes: university capabilities, entrepreneurial orientation, demand for AE, university culture, and academia-industry collaboration. These sub-themes were identified through initial analysis of interviews with academics, university managers, university support centre managers, and policy documents (see Chapter Four). This chapter shows how each category and sub-category is related to the AE and contributes to the research objectives. Figure 6.1 outlines the structure of the following sections.

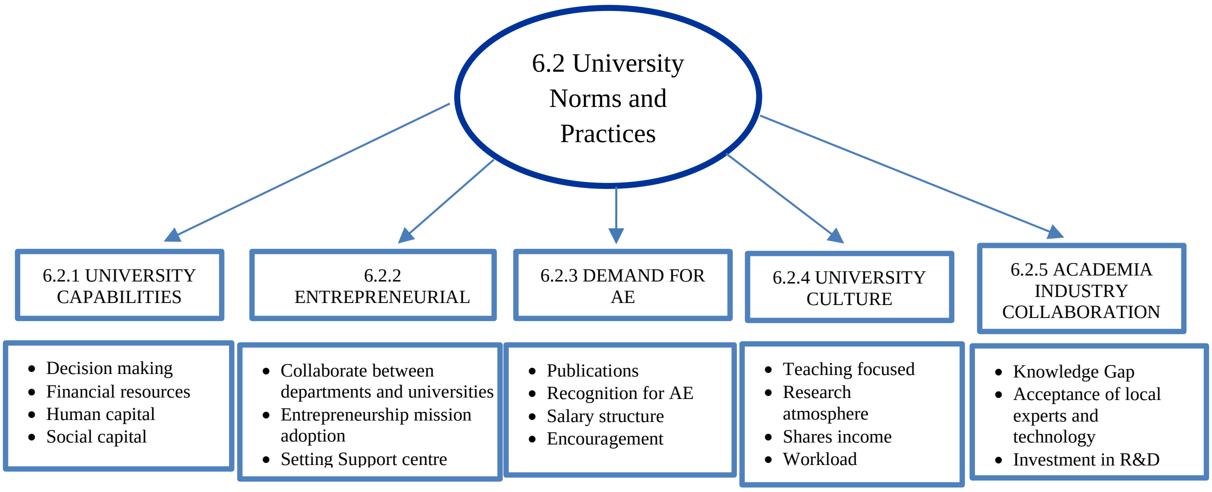

Figure 6.1: Outline of Chapter Six

6.2 University Norms and Practices

It was evident from the initial analysis of the interview data that a wide range of university practices and norms influence AE. The participants know different actors, enabling and impeding factors related to university norms and practices to engage in entrepreneurial activities. These were grouped into university capabilities, entrepreneurial orientation, demand for AE, university culture and academia-industry collaboration. Tables 6.1, 6.3, 6.4, 6.5 and 6.6 show the supporting evidence for the findings summarising the informants' perceptions of university norms and practices and the institutional context at the meso level. These tables contain representative data and initial coding, which underpin the sub-themes.

6.2.1 University Capabilities

The mere presence of macro-level pressures does not guarantee that new initiatives related to AE will be embraced at the university level. Most participants described that the existing university capabilities determine how well universities adopt this AE and are considered a sub-theme (Table 6.1). Some university-related decisions are directly the responsibility of the government. For instance, the Chancellor (the honourable President of Bangladesh) directly appoints the Vice-Chancellor (VC), Pro Vice-Chancellors (Pro VC) and treasurer. In private universities, the board of trustees (BOT) establishes and oversees university matters, such as creating and recruiting new employees, ensuring funding, placing a list of names for VC, Pro VC and treasurer to the Chancellor, approval of service rules (Ministry of Education Bangladesh, 2010b).

Table 6.1 Codes and Data Related to Sub-theme: University Capabilities

Initial coding	Representative data
Decision making	"Public universities have a different mindset, not only the mindset but also, they cannot do whatever they want to do. But it is possible for the private universities if they want, they can do that" (UA22, professor at a private university)
	"It's also one of the factors why private universities can get ahead faster" (USCM25, support centre manager and professor at a public university)
Financial resources	"Support means I think monetary support may be very small" (UM16, university manager and professor at a public university)
	"I have seen millions of millions of dollars worth of equipment being just thrown away, even they have not been used at all. So that's how University resources have been misused" (UA10, professor at a public university)
Human capital	"I couldn't take a person doing outstanding research but didn't have an excellent academic background in their (referring to university administrator/manager) terms" (UA10, professor at a public university)
	"We think we are ready. We have people who have research credentials. You know, who are very good in conducting research. So, we are not utilising them" (UM4, university manager and professor at a private university)
Social networks	"…build up a network with the foreign universities, with the industries" (UA2, senior lecturer at a private university)
	"…this is the largest university; it can pull the resources… If there is any shortage of resources that the inviting organisation needs, can provide the necessary skill gap or resource gap because they can give a lot of contacts… this kind of network facilities they also seek from the engagement" (UA10, professor at a public university)

The VC plays a crucial role in the academic council and syndicates to approve the necessary initiatives for public and private universities (Bangladesh University Grants Commission, 2018c, 2021). Several participants said that adopting something new is lengthy and time-consuming as the proposal progresses. For instance, one of the support centre managers and an associate professor at a public university noted that:

> *When I proposed the idea (setting up an entrepreneurship centre), it went from department to faculty, faculty to academic council, Deans Committee to the subcommittee to syndicate… a minimum of nine steps, and these at least require one-month minimum intervention… So, it took almost more than a year to make it institutionalised (USCM24)*

Although this decision-making process is time-consuming, three informants stated that for private universities, it is faster. The public universities' statutes do not allow them to adopt anything new unless approved by the syndicate and institutionalised. One professor at a public university stated that public university *"administration is very complex and methodical; it follows many conventions" (UA5).* Due to the university's operation and size (number of students and several disciplines), the dynamic shift in a public university is not easy. However, private universities have fewer students and offer fewer disciplines than public universities (Bangladesh University Grants Commission, 2021). Moreover, one university manager at a private university mentioned that they (private universities) have the freedom to accept anything when the academic council approves it. This freedom enables private universities to adopt new policies quickly.

However, due to UGC's intervention – for example, taking permission to initiate new endeavours and collaborate with industries – adopting AE within the private universities is proceeding slowly. Some informants also point out the university's intervention. Seven respondents said they require permission from the university administration to engage in AE regardless of whether they belong to public or private universities. This suggests that universities also exhibit slowness and bureaucracy. Therefore, university management needs to determine whether they will permit this academic engagement. For instance, a private university professor said that when everything is for the benefit of the students, society, and country, *"then our mindset will definitely change, and that would come from the top management" (UA22).*

In addition to decision-making capabilities, universities require funding to implement good research and be involved in AE. Most participants agreed that research is a prerequisite for AE activities. Five participants highlighted the lack of funding for research in public universities.

Public universities rely on UGC and the education ministry because they make the funding decisions, whereas private universities run on their income. UGC's recent report shows that private universities deployed more funds into research than public universities (Table 5.4).

Although there is disagreement among the participants regarding the sufficiency of research funding, the UGC annual report asserted that each university failed to utilise funds allocated for research (Bangladesh University Grants Commission, 2021). One of the reasons may be the lack of projects submitted to exploit this research funding. On this note, three academics mentioned that the funding allocation for each project was so small that they could not finish their research project and hence did not apply for that fund. For instance, one of the professors at a public university mentioned, *"The funding amount is not much to support the whole work" (UA8).*

Another reason two participants suggested was the misuse of research funds. For example, one of the public university professors said, *"To buy equipment and to repair it for sending abroad or to bring in an engineer from abroad can incur costs reaching hundreds of thousands of dollars. You don't have that money. So, the whole research stopped" (UA10).* In this example, funding was used to purchase lab instruments and other necessary supporting materials, leaving insufficient funds for the research. This example of the inefficiency of utilising research funds may pose a barrier to these four universities engaging in AE.

Appropriate human resources are essential to utilise these financial resources and research. Several participants highlighted the need for an adequate supply of human resources. For example, one of the professors at a public university mentioned, *"The human resource and money problems are always there" (UA10).* One of the reasons two informants stated that when someone comes back after completing a PhD from abroad, they often fail to apply that knowledge in the Bangladeshi context. This limited knowledge application is exacerbated by a lack of PhD researchers in Bangladesh, highlighted by five respondents. For instance, one of the university managers at a private university stated, *"we have a dearth of academicians who have PhD degrees" (UM4).*

The Strategic Plan for Higher Education in Bangladesh (SPHE) 2018-2030 confirmed this view of the shortage of academics with PhD in Bangladesh (Bangladesh University Grants Commission, 2018c). However, a PhD is essential because it gives academics the necessary skills to conduct research. Table 6.2 shows the number of academics with PhD in public and private universities.

Table 6.2: Number of Academics with PhD in Public and Private Universities in 2020

University Type	No of Universities	No of students	Total academics	Number of PhD	% of PhD academics
Public	43	314,930	15,194	5,651	37.19
Private	107	328,689	15,277[a]	2,950[b]	19.31

Source: (Bangladesh University Grants Commission, 2021), [a] full-time 11,712 and part-time 3,565; [b], full-time 1,694 and part-time 1,256

Table 6.2 shows the numbers of students, academics, and PhDs at public and private universities in 2020. The private university includes full-time and part-time academics, of which part-time scholars are mainly from public universities (Rahman et al., 2019). Moreover, three scholars highlighted the lack of institutional support from the universities to accept the PhD from the local institutions. This is also supported by the recruitment policy for public and private universities (Bangladesh University Grants Commission, 2016, 2019b). SPHE 2018-2030 indicated, "*Entry-level recruitment does not require a doctorate, and many senior-level faculty members also do not hold doctorates*" (Bangladesh University Grants Commission, 2018c, p. xvi). In addition, four participants emphasised that for the recruitment of teachers, priority has been given to excellent educational backgrounds, and they may not be good at research. On the other hand, those with good research backgrounds but without excellent education experience missed the opportunity to be recruited. For instance, one of the professors (UA10) at a public university described this sort of eye-headedness and impractical attitude within the university as detrimental to an innovation culture.

Moreover, SPHE 2018-2030 showed that "*there is also no staff development programme"* (Bangladesh University Grants Commission, 2018c, p. xvi). Similarly, three participants denoted that they need to develop their capabilities to be involved in AE because they do not get much support from the university regarding their involvement in AE. For instance, one of the participants (UA26) at a private university said there is not much work (in reply to the university's initiative to build your capabilities).

Social networks are another capability of the university that plays a significant role in accumulating resources. These four universities are prominent in the country. Three participants from both public universities believed that the university's reputation helps them to engage with the industry for entrepreneurial activities. Due to the large size of the public universities, academics within these institutions amass the resources and skills necessary to engage in various entrepreneurial activities. However, this scenario is changing because of the research endeavour of both these private universities. Four informants from private universities illustrated that their universities took the initiative to build strong ties with the industry and international universities to increase their collaboration in performing research. Besides, the industry is more oriented to the quality of academics, not just mere affiliation. For instance, one of the participants at a private university stated that when firms found any *"particular faculties are doing good research and have international reputations, they are more interested in collaborating with the university" (UA2).*

Moreover, five respondents from these four universities demonstrated that their institutions have a strong student and alumni base. They are working in every sector in Bangladesh. These universities focus on building strong connections with alumni to tap into their expertise. For example, one of the support centre managers and a professor at a public university mentioned that they established links with their alumni around the world to *"use their expertise in building our research facilities and laboratories and using their experience in our research" (USCM25).* SPHE 2018-2030 also supports this alumni engagement: "*The alumni of the universities will be tapped to build resources. Each university will ensure that fundraising and outreach efforts concentrate most strongly on those areas where the need is the greatest*" (Bangladesh University Grants Commission, 2018, p. xiv).

In sum, the university's capabilities play an essential role in the entrepreneurial engagement of the university and the academics. The long decision-making process reduces the opportunity to tap into the available opportunities for academics. Moreover, this was exacerbated by insufficient funding. Although funding is available, this is used to acquire laboratory instruments and other essential supporting materials, which can deplete funds and sometimes make it inadequate to carry out a project. Another critical factor is the person or human resources using these financial resources. There is a shortage of academics with doctoral qualifications in the country. This doctoral degree is crucial as it equips academics with the essential skills and capacities for conducting rigorous research. However, institutional support is lacking to enhance these academics' capabilities. This lack of human capital reduces universities' exposure to the industry as they seek academics with research expertise and international reputations to collaborate with. In addition to reputation building, these universities focus on building a solid tie to engage the alumni to accumulate the resources necessary for research. These findings contribute to the objective of identifying the factors influencing the AE. The university's capabilities play a significant role in AE. The capabilities of these four universities are sometimes favourable for the AE; however, at the same time, they inhibit the academics' AE endeavour. The same factors can be facilitators or inhibitors. For instance, private universities allocate more research funding compared to public universities.

This difference in these capabilities reflects the unique nature of the university type, i.e., public and private universities. This decision-making difference is due to the nature and size of the public university. Institutionalising anything new for AE took a long time in public universities, but these private universities showed prompt decision-making despite regulatory barriers to accepting AE. These public and private universities showed their interest in building social capital by developing industry-academic collaboration and alumni engagement. However, these universities still lack in developing and hiring AE-focused human resources.

6.2.2 Entrepreneurial Orientation

This thesis found evidence that the intentions of these universities were distant from the members' intentions and attitudes, for instance, academics. However, it is still early to posit that all these universities are entrepreneurial. Most participants highlighted that these universities collectively showed some entrepreneurial features, hence the sub-theme, "entrepreneurial orientation" (Table 6.3). Most participants were found to be involved in either FAE or IAE, with four informants engaged in both (Table 4.2a and 4.2b). This collaboration with the industry yields commercial benefits for academics and the university. Hence, most respondents stated that academics and universities seek opportunities to engage and collaborate with private and public organisations. To illustrate, one of the professors at a public university explained that public and private universities in Bangladesh are trying to engage with industries, *"Whether it is private or public, and doing various types of activities, most of those activities are commercially viable" (UA1).*

In addition to the university's collaboration with industry, universities collaborate with other universities, and within the universities, collaborate between different departments for research. This collaboration between and within universities is essential not only for research but also for research commercialisation. Four participants illustrated that it is valuable to form a team with different expertise who can contribute to AE. They further exerted that a researcher may not have all the skills required, but by collaborating with other academics, they can gather them. This collaboration also helps them to distribute and share their responsibilities with others. For instance, one of the professors at a public university mentioned that it *is a shared responsibility, and any particular person is not bogged down or stick to do it around the clock. The total job is done by a wider range of people (UA5).*

Table 6.3 Codes and Data Related to Sub-theme: Entrepreneurial Orientation

Initial Coding	Representative data
Collaborate between departments and universities	"We collaborated with a US university… having some student exchange and faculty exchange and other kinds of collaborative research activities" (UA21, professor at a private university) "…For commercialisation, the product needs an operations team, marketing team, business policy team, business model… Maybe a researcher is very good at his research, but he is not good at the business model. Yeah, so that is how the university can help" (UA23, associate professor at a public university)
Entrepreneurship mission adoption	"…I would like to say that yeah, the university is making an attempt for that because we are working on this technology transfer issues, patent filing and other stuff" (UA19, professor at a public university) "…there are many promotions, and different seed funds are also available for student entrepreneurs. So as an institution, I would say that 'D' University promotes student entrepreneurship. I would say that not the entrepreneurship of the Staff or Academic entrepreneurship" (UA13, associate professor at a private university)
Setting support centre	"…We established a centre. So, what is the purpose of establishing a centre?... So, if you want your answer directly, it is prioritising entrepreneurship" (USCM24, support centre manager and associate professor at a public university) "…received a grant from University Grants Commission (UGC) through Higher Education Quality Enhancement Project (HEQEP) to establish a technology transfer office at 'B' University between July 1st, 2016, and June 30th, 2018. There were five faculty members involved at TTO during the project period" (USCM12, support centre manager and associate professor at a public university)

Although this collaboration between departments and universities is not always reflected in entrepreneurial activities, several participants mentioned that they have collaborated with other public and private universities to apply for national and internationally funded research projects where they intend to solve existing problems. For instance, one of the professors (UA22) at a private university said that along with his institution, two other institutions have applied for international research funding worth $1,000,000. Their project was on *"renewable energy technologies and the applications"*. He further continued that their research would contribute to addressing the ever-existing energy crisis.

On the one hand, five interviewees mentioned that they took the initiative to collaborate and engage in different commercially viable activities. On the other hand, seven participants believed that their universities collectively showed some entrepreneurial mission adoption while some were in the process of adopting. Notably, while the majority of participants, excluding two university managers and two support centre managers, lack clarity regarding the entrepreneurship mission, they are aware of certain entrepreneurial initiatives within their respective universities. This awareness among university and support centre managers stems from their proximity to adopting and implementing entrepreneurial missions within the university.

Eleven participants highlighted university initiatives or activities that exemplify adopting an entrepreneurship mission. These include universities adopting policies related to entrepreneurship, fostering industry collaborations, involving employers in advisory boards, modifying the school's name to reflect entrepreneurship, setting up support centres to aim for entrepreneurship, integrating entrepreneurship into the curriculum and organising diverse competitions. While most participants indicated that their universities primarily prioritise promoting student entrepreneurship, these informants underscored the importance of integrating policies related to AE within their institutions. For instance, a professor from a public university mentioned that the university lacks centralised policies associated with AE, *"we must have the policies to have all the rules and regulations and how it will work; everything needs to be mentioned" (UA8).*

On the other hand, three public and private university participants indicated that their institutions have already formulated several policies pertaining to AE. Simultaneously, some believed their universities were in the early stages of embracing entrepreneurship. For instance, one of the support centre managers at a public university mentioned they *"have formulated a few policies about patenting and licencing, but still, we are not there about the detailed policy about entrepreneurship" (USCM25).*

In contrast, one of the university managers at a private university and a professor at a public university talked about the growing entrepreneurship endeavours of their universities, *"we do not have a written policy; we have just incorporated it into our strategic plan (referring to changing the school's name). So maybe soon, within one year or two years, we will be developing our policy on how to support this entrepreneurial initiative" (UM4) and "our administration or people like the executive heads are thinking in that direction, and recently, you know 'A' university has established a centre. So that is proof that the university is trying to promote entrepreneurship. If not before, I would say now they are concentrating or focusing on that direction" (UA23).*

Although the statements above illustrate that one public and one private university have already begun to incorporate into their policies, and the other two universities (one public and one private) are in the process of doing so, most participants in this study perceived that public universities are ahead in adopting some elements of entrepreneurship mission compared to private universities. This is surprising because private universities are expected to commercialise their research to cover operational costs. They are assumed to be more entrepreneurial than public universities, even though many of these activities are student centric.

Notably, despite the limitations in research commercialisation at private universities due to macro-level barriers, the two mentioned private universities demonstrated an entrepreneurial orientation and are taking initiatives to embrace AE policies. Five interviewees from private universities confirmed that adopting this entrepreneurial mission is evident by establishing different support centres to nurture and promote the university's entrepreneurial mission.

The SPHE 2018-2030 demonstrates that three public universities (this study includes two of these) have established technology transfer offices (TTO) to commercialise the research outputs created by academics (Bangladesh University Grants Commission, 2018c). Four participants stated that some of these support centres started with the grant received from UGC under the Higher Education Quality Enhancement Project (HEQEP). They further mentioned that after the project was completed, the TTO was discontinued. For example, one of the support centre managers and associate professor at a public university outlined that they received a grant from UGC through HEQEP to establish TTO at university 'B', *"However, after ending the project, TTO has not been established at 'B' university within its revenue budget" (USCM12).*

In addition, eleven informants from these four universities indicated that their institutions had shown numerous endeavours to set up different support centres for the university's commitment to entrepreneurship. They also established the Innovation and Entrepreneurship Centre (ICE), incubators, TTO, and the Research and Innovation Centre for Science and Engineering (RISE). These interviewees further noted that the functions of these support centres depend on the person managing them. For example, one of the professors at a public university stated that *"there is a centre like an innovation centre, but it is at the initial stage and more individual-driven rather than university-driven" (UA5).*

This individual characteristic of the support centre manager is essential as it determines the success of the support centre. In this line of departure, one university manager at a private university illustrated the quality of the support centre manager and stated that the commercial wing *"should be headed by someone from the industry, having an academic neck and should be treated as an isolated entity, a separate entity to nurture these entrepreneurial skills" (UM4).*

Some support centres solely support student entrepreneurship, and some support students and academics. For instance, support centres in these two private universities are established to support student entrepreneurship. However, support centres in these (two) public universities aim to support academics and students. More specifically, anyone within the university who is interested can apply to get help. In addition, five participants from two private and two public universities illustrated that their institution has separate offices to support academic consultancy and other research-oriented works in the industry and to support patents, licencing, and spinoffs. Although the support provided by the private universities through these centres is limited to industry collaborations, the academic participants from public universities highlighted some of these centres' activities: building university industry-academia collaboration, encouraging research, patenting, awareness building, and linking stakeholders such as government, trade bodies, and industries. This connectivity would enable the academics to build their network and find appropriate resource support. For example, one of the support centre managers underscored this network building, *"we will connect them (academics) with the industry for a supply linkage… looking forward to some financial support" (USCM24)*.

To conclude this section, the entrepreneurial orientation of these four universities plays a vital role in how well they adopt the entrepreneurship agenda. Academics from these public and private universities collaborate between departments and universities to take the research endeavour ahead. Moreover, these four universities exhibited elements that reflect their adoption of an entrepreneurship mission. For instance, they have adopted policies related to AE and established support centres to assist academics in accessing the resources required for AE. Although the primary focus of these support centres is to promote student-centric entrepreneurship, these universities are moving forward to facilitate academics in transforming their research and innovations into intellectual property and establishing spinoff companies. The two public universities are at the forefront of establishing such centres to support academics compared to the two private universities. It is clear from the participants' statements that these universities showed their interest and commitment to AE through their entrepreneurial orientation, however, with a different pace. This is also supported by the SPHE 2018-2030, which shows that three public universities have established TTO to commercialise the research outputs created by academics.

6.2.3 Demand for AE

From the data analysis, this thesis has identified the demand for AE as the sub-theme (Table 6.4). Most academics emphasised the significance of publications while also underscoring factors like recognition for AE, salary structure and encouragement. These aspects emphasise that the demand from academics and university leaders for AE within the university system of these institutions is still limited. Most informants in both public and private universities mentioned that the number of research publications is one of the criteria for academics to be considered for promotion and increment. Moreover, most participants perceive that publishing would help them build a reputation, which is one of their responsibilities. Therefore, academics engage in research because it is obligatory for their job and career progression. However, three participants emphasised that only the number of publications counts, not where outputs are published. For instance, one of the professors at a public university mentioned that only the journal articles count, *"whatever the journal, whether it is a so-called private university journal or an IEEE transaction… not much official recognition for your quality work" (UA8).*

Table 6.4 Codes and Data Related to Sub-theme: Demand for AE

Initial Coding	Representative data
Publications	"… to get a promotion, a certain number of publications and good quality publications must be in place. Otherwise, you do not get the promotion" (UA18, professor at a public university).
	"…some thresholds to cover in terms of research per year, to get promoted or even to get the increment or even to have the jobs stable that we have right now" (USCM11, support centre manager and senior lecturer at a private university)
Recognition for AE	"… for these types of work (referring to AE); I do not think there is any recognition from the University. Contract research, if you have some publication on that, then will increase your profile" (UA19, professor at a public university)
	"… our annual evaluation is quite comprehensive. We need to show our performance in three areas: teaching, research, and service; teaching and research are fairly the same everywhere, and service has two categories: service to the university and society. So, in that case, we can write over what I have done and how I have contributed" (UM4, university manager and professor at a private university)
Salary structure	"I will get the same salary as my other colleague who is not involved in so many activities (referring to AE)" (UA8, professor at a public university)
	"… how can we do some extra jobs with other private and public entities. So, there is some extra income is generated" (UA1, professor at a public university)
Encouragement	"Not a requirement but encouraged. And as I told you, there is a provision for providing seed money. So definitely, they (AE) are encouraged" (UM4, university manager and professor at a private university)
	"We do not see much announcement in that direction; that is the priority" (UA23, associate professor at a public university)

Contrary to this, the recruitment and promotion policy demonstrates that the research paper must be published in a Scopus-indexed or peer-reviewed journal to be considered for promotion criteria (Bangladesh University Grants Commission, 2018c).

Moreover, three informants demonstrated that if someone publishes more than the required number of publications for promotion, they will not receive recognition from the university. This perspective is supported by the SPHE 2018-2030, which highlights the lack of incentives for research and discourages academics from participating in research activities (Bangladesh University Grants Commission, 2018c). In addition to publications, most participants stated that academics are recognised based on their teaching and administrative work. This is also supported by the recruitment and promotion policy for the universities (Bangladesh University Grants Commission, 2018c). However, two academics said these policies are fixed at these public universities. For instance, one of the university support centre managers at a public university said that they could not control or change the policy and *"have fixed criteria for promotion that are a little bit different or strict in the context of Bangladesh" (USCM25).*

Four participants, including one university manager, highlighted that even though these entrepreneurial activities are not considered in the university promotion criteria, they can add value and may increase their reputation within the university. For example, one of the university managers at a private university said that their annual evaluation is comprehensive and *"need to show our performance in three areas: teaching, research, and service and service has two categories: service to the university and society. So, in that case, we can write over what I have done and how I have contributed… As it is included in the annual evaluation, I would say it has an impact on our increment" (UM4).* Moreover, three participants believe their universities are trying to motivate academics to contribute to society through their research findings.

On the other hand, four respondents from both these public and private universities have illustrated that AE is not actively encouraged. Additionally, one private university manager and two public university managers have indicated that academic engagement in AE is not a requirement. For example, one of the managers at a private university states that it is not the academic's responsibility to engage in entrepreneurial activities. Their primary responsibility is to teach and do research *"not to become an entrepreneur because entrepreneurs always (work in a) challenging mode" (UM15).*

Several informants have indicated that academic involvement in entrepreneurial activities was insignificant, but it has recently experienced growth. One of the reasons is the lack of understanding or clarification of the concept of AE within these universities. On the other hand, this also highlights a mindset issue among academics, as those who collaborate with firms are more likely to develop research and entrepreneurial ideas than academics who do not. Two participants assert that they do not consider consultancy, contract research, and other IAE to be entrepreneurial activities; instead, FAE is considered entrepreneurial. For instance, one of the university support centre managers and a professor at a public university confirmed that *"consultancy is a sort of service, expert service, but entrepreneurship is different and what we are doing from this centre that's research and innovation" (USCM25).* Similarly, five interviewees have argued that involvement in IAE (consultancy, contract research, joint research, secondment, guest lectures, training) is well practised and accepted compared to the FAE (inventions disclosure, patent, licencing, spinoff).

Four informants, including one from a private university and three from public universities, acknowledge the insufficient salary structure drives them to engage in AE. Three respondents indicated that their salary remains the same regardless of their involvement in activities beyond teaching and research. Consequently, these academics seek opportunities to augment their income by participating in activities that offer financial benefits. For example, a professor at a public university mentioned that the salary they receive from the university is insufficient to meet their needs, *"it is really difficult to maintain a family and everything" (UA8).*

This section explains that the demand from academics and university leaders for AE within the university system is minimal. Universities still primarily consider teaching, research, and administrative service as critical factors for promoting and advancing academics. However, a university manager at a private university mentioned that they have included academics' contributions to society and the university in their annual evaluation plan as a form of service. Although engagement in AE is not a direct criterion for promotion, there is mixed evidence regarding encouragement from the university. One public and one private university encourage academics to engage in AE; however, a university manager at a private university discourages this AE engagement. This discouragement may be due to the misunderstanding of the concept of AE. Several participants believe that IAE is not AE. Therefore, some participants engage in IAE not as an entrepreneurial endeavour but as an alternative source of sustenance. This involvement in IAE by the academics is due to their insufficient salary structure and less financial potential in FAE.

6.2.4 University Culture

The interview data shows that university culture is essential in determining employees' behaviour and how they work in the university setting and, therefore, is considered a sub-theme (Table 6.5). Most participants emphasise that their universities focus more on teaching than research and have to prioritise teaching to disseminate knowledge. For instance, one of the assistant professors at a public university has stated that their university enhances the quality of education by sharing the knowledge developed by others in universities in developed countries instead of *"enhancing the quality of education by generating more in-house research" (UA3).*

Table 6.5 Codes and Data Related to Sub-theme: University Culture

Initial Coding	Representative data
Teaching focused	"… this is a teaching University; even Deans said this is a teaching University, and research is secondary" *(UA10, professor at a public university)*
	"… teaching is always a priority here. In the context of Bangladesh, teaching is always a priority because that is how we are built" *(USCM25, support centre manager and professor at a public university)*
Research atmosphere	"… for individuals who have a knack for doing research, they do not find good institutions in the country where you can carry out research… This expertise to work together in a big team in a big group to solve the problem this approach is missing" *(UA7, professor at a public university)*
	"… if I am focusing on the engineering faculty like I find that when we do our research, I want to mention, I do not find any institutional goal to do the research work" *(UA8, professor at a public university)*
Workload	"… most of the teachers used to teach five courses in a semester, so dealing with these five courses and then going for research and becoming a founder of a big company is difficult. And every section you have, like almost 40 students, is not easy work, you know you have to take mid-term (and final exams), and there is huge work, course load" *(UA14, senior lecturer at a private university)*
	"… the class size of my department or university is so large… So, the task of assessing the scripts is too much; this is one aspect… the seniors (academic) have less workload compared to juniors (academic)" *(UA3, assistant professor at a public university)*
Shares income	"… the university would deduct overhead, government-imposed tax and VAT (value-added tax). The rest will come to the concerned department from which the consultants were involved. Then each department has a different set of rules on how that money would be distributed. In some departments, maybe that total money would be going to the consultants, in some departments would get a percentage of that money. So, each department has a different set of rules" *(USCM25, support centre manager and professor at a public university)*

> "The amount is still in Bangladesh. It is not a big thing that you count on. And when ultimately you are going to get that amount, you know, it does not count any more" *(UM4, university manager and professor at a private university)*

Although most participants underscore the teaching focus of the university, four participants reveal that their university emphasises both teaching and research. For example, one of the support centre managers (USCM25) mentioned that their centre is actively working to bring research into focus.

Two informants from both private universities denote that their institutions recognise the teaching and research outcomes through different awards. Even if teaching and research are considered for promotions and incentives, this award-giving shows the importance of teaching and research to these private universities. In this line of departure, seven participants illustrate the importance of the research atmosphere within the university. This research focus is significant as it increases academics' opportunity to generate quality research, which findings they can commercialise through FAE or IAE and create social impact. Five interviewees responded that although their universities emphasised research, there is a lack of research atmosphere. By research atmosphere, they mean the existence of institutional goals towards research, support for research, and the setup to work together to solve problems and to carry out research. However, in public and private universities, these features of the research atmosphere vary. On the one hand, two informants from two public universities highlight that some of these features, such as the 'organisational goal towards research', are minimal. On the other hand, five academics at public and private universities illustrate that they collaborate with others for research purposes. For instance, an associate professor at a public university stresses his collaboration with other researchers from his university and other universities, *"That is the kind of collaboration we do, but institutional collaboration for research is not much" (UA23).*

This collaboration initiative is inadequate even though the two informants indicate they collaborated and formed a team to conduct research. One of the reasons for this limited collaboration, identified by two participants, is the lack of a platform that can bring together individuals with diverse expertise and skills from various disciplines. Such collaboration would enable academics to share knowledge, learn from one another, and engage in joint research endeavours. For instance, two university support centre managers at two public universities also emphasise the importance of platform, *"not find us on the global map of research and innovation. Why is that the case? Definitely, we do not have a RISE or such an institution or such an office (referring to the platform)" (USCM25)* and *"they also need interaction and* *knowledge sharing within themselves… In Bangladesh, there was no platform for the interdisciplinary people to come under one umbrella, but ICE is going to do this" (USCM24)*

Although the entrepreneurial platform is essential, four respondents informed that it is still in the nascent stage and that performing good research requires the individual initiative of the academics. However, they mention that academics struggle to manage time due to limited institutional support regarding workload management. This workload is attributable to the large class size, checking many scripts and taking exams multiple times a semester. For instance, one of the academics at a private university mentioned that they are busy with their course load, *"teaching four to five courses over the semester of four months"* (UA9).

The participants from the public university also support this. Two informants illustrated that this workload varies based on the seniority of the academics. The academics' position determines the workload they need to carry out. Although senior academics have reduced the teaching allocation, the research endeavours intensify their workload. For instance, one of the professors (UA10) at a public university who published his research findings instead of FAE said that he had put much pressure on his family due to his high engagement in research activities, *"I have to do something new, something useful, and that's why, except for my sleep, I am getting engaged the whole time, and that is how I do more than 16 or 18 hours a day" (UA10).*

Fourteen participants underscore that this teaching and research workload exacerbates this work-life balance, and twelve participants underline that it reduces their time to engage in activities other than teaching and research. Four of these fourteen informants have responded that although they are interested in AE, the workload and job responsibilities inhibit them. Even they need to prioritise and balance their work and life. For instance, one of the assistant professors at a public university has mentioned that he intends to engage in AE but *"may need to compromise my personal life" (UA3).*

Several interviewees have informed that even if they are involved in AE activities and generate income from them, ten participants revealed that they have to share a portion of that income with the university. For illustration, one of the associate professors at a private university mentions that he has to share some of the revenue generated from his AE activities because *"I am engaging myself with outside activity. Most likely, I will be sitting in the office and doing the desk work. Even though I'm not using the exact facility, or maybe my work does not require any machine or lab facilities, I'm utilising the time of the office" (UA13).* Five interviewees denote that their universities have different policies regarding how much the academics share with the university when they engage with industry in collaboration, consultancy, or research. This sharing portion varies from 10% to 30%, depending on the type of work, resources, and support they get from the university.

Overall, as highlighted by the interviewees, these universities are teaching-focused but also realise the importance of research. However, the research atmosphere is still developing, leading academics to take the initiative to conduct good research. This teaching and research focus increases their workload, reducing their availability to engage in activities other than teaching and research. Therefore, academics have less time to engage in any entrepreneurial activities. Although they engage, they need to share a portion of that extra income outside the university with their university. Therefore, university culture creates a barrier to academics' AE engagement.

6.2.5 Academia-Industry Collaboration

Twenty participants have emphasised the significance of academia-industry collaboration, and this study has constructed this sub-theme, "academia-industry collaboration" (Table 6.6). They believe that academia-industry collaboration is essential for AE as the knowledge from the university is transferred to industry, and industry provides funding and other support for academia. However, a recent report by the Dhaka Chamber of Commerce and Industry (DCCI)[10] indicates a lack of industry-academia collaboration (Dhaka Chamber of Commerce & Industry, 2021). Some academics also support this perspective of the lack of collaboration between academia and industry. Three participants believe that one of the reasons for this lack of cooperation is the misunderstanding and knowledge gap between industry and academia. This misunderstanding is due to their infrequent communication and collaboration. Two respondents perceive that the industry is not interested in collaborating with academia. For example, one of the professors at a public university mentioned, *"The people who are working at the top level of the industries do not feel that they need research output to increase their productivity to accelerate the growth rate of the organisation" (UA18).*

However, three participants demonstrate that the industry is interested in collaborating with academia and, more specifically, in academics with an excellent academic profile and research

[10] Dhaka Chamber of Commerce & Industry (DCCI), established in 1958 under the Companies Act 1913, is Bangladesh's largest and most vibrant business chamber. The main objectives of DCCI are to promote private sector enterprises and businesses with advocacy, awareness, and policy inputs to the government. (https://www.dhakachamber.com/)

background. This is also supported by the recent DCCI report (Dhaka Chamber of Commerce & Industry, 2021).

Table 6.6 Codes and Data Related to Sub-theme: Academia-Industry Collaboration

Initial coding	Representative data
Knowledge gap	"Historically, we see that they (referring to industry) are not frequently communicated. They are not frequently in touch. That is why we have some misunderstandings about each other" *(UA1, professor at a public university)* "… an industry people say that academia is not interested in working for them. On the opposite side, academia claims that the industry is not enthusiastic about collaborating with the faculty members" *(UA8, professor at a public university)*
Different initiative	"… we are in the take-off stage of the development, so many development activities and entrepreneurial activities are happening around the country, and therefore, the academics have a lot to contribute to those ventures. And depending on the call, I mean request or invitation from outside (referring to industry), they reply in their capacity" *(UA5, professor at a public university)* "I assisted in developing a business model for the companies they approached the university, and the university forwarded that to us *(UA13, associate professor at a private university)*
Acceptance of local experts and technology	"… our total GDP highly depends on garments, and they have lots of problems, and they solve these using foreign experts. Why not our local expert?" *(UA17, professor at a public university)* "… now have a few industries who have employed foreign consultants to come and help them set up… because they have already made the bridge between the industry and academics… We have been trying hard to see how this can be bridged. The gap is narrowing, but it is still there" *(UA7, professor at a public university)* "Robotics is comparatively a new subject in Bangladesh. Some industries are using robots in Bangladesh. Till now, we have been dependent on foreign solutions. Those solutions are expensive. We need to focus on local solutions" *(UA8, professor at a public university)*
Investment in R&D	"Have you seen any R&D Department in any organisation in Bangladesh? No, probably this is why the patent is not so important" *(UA18, professor at a public university)* "We have very few R&D Hubs in our industry. That is another problem. The research and development concept is absent in our industry" *(UA8, professor at a public university)* "… some firms like I mentioned that Energypac and Walton, have some R&D positions. Still, most industries do not have that R&D positions or do not invest that much money in R&D positions, but maybe they will do in the near future. This is the basic gap, I think" *(UA19, professor at a public university)*

In this same line, two interviewees from private universities denote that they do not have the knowledge and support from the university to collaborate with the industry. Moreover, they perceive that the industry only collaborates with academics from public universities who have the knowledge, resources, and political affiliation[11]. For instance, one of the senior lecturers (UA2) at a private university believes that when the industry needs any support, they first contact the public university academics because *"the policymakers of the industries are still relying on the public university's faculty members" (UA2).*

However, this perception that public university academics get contacted for collaborative activities is not always accurate because the industry looks into the academic's previous industry collaboration experience and research background. For instance, one of the professors at a public university who has engaged in academia-industry collaboration through IAE has said that the industry looks at the profile and identity of the academics *"for that person usually, the call from outside is very high" (UA5).*

In this line of departure, four participants from both public and private universities who are engaged in AE, highlight that the industry lacks preparation and confidence for effective industry-academia collaboration. In addition, two interviewees emphasise the necessity for the industry to implement some policies to foster greater engagement between academics and industry. For example, an associate professor at a private university pointed out that companies consider reforming policies to create an environment where such collaborations can flourish, *"1. Formal setup of including academics in the consultation/ improvement programmes 2. Structured co-op programmes for students under the joint supervision of academia and industry. 3. Endowments in university research and consultation projects" (UA13)*

One of the policy papers also supports this view of the participants: "*Universities have traditionally maintained some link with stakeholders, but these have not been substantial or structured… An appropriate legal framework for university-industry partnership also needs to be established*" (Bangladesh University Grants Commission, 2018c, p. 49). Although several participants have highlighted this lack of industry-academia collaboration, six informants illustrate instances where academia and industry have taken steps to collaborate. They identify that these efforts are evident in industry proposals presented to universities, establishing TTOs, and creating incubators and entrepreneurship centres within universities. Despite acknowledging the existence of these initiatives, fifteen interviewees indicate that the efforts from the university's side have been somewhat limited. Hence, individual academics have

[11] It has been found that most of the political leaders are businessmen and they have their origin in the public university and that is why they rely more on the public university (Bangladesh University Grants Commission, 2021)

taken the initiative to engage in AE. Two of the academics from public universities mentioned, *"few faculty members, and academics, are trying to do it or bring it on their own, but it's not like with huge institutional support" (UA16)* and *"some faculties have their motivations. They are doing it themselves… they are not going through the institute because there are certain policies for a certain percentage of the income they have to subscribe to the university. Some faculties are engaged with different companies" (UA9).*

Seven respondents, alongside their individual-level initiatives, expressed their intention to cultivate stronger academia-industry relationships. One technique they mentioned involves incorporating industry professionals onto the university board. This practice of involving industry experts is also endorsed in a recent annual report of the DCCI, "*Industry representation in the academic council and advisory board of universities could help minimise the gap between the industry and the academia*" (Dhaka Chamber of Commerce & Industry, 2021, p. 31). Moreover, three informants indicate a proactive approach to collaborating with the industry when they perceive the potential for obtaining resources to support their research endeavours. For example, a professor at a public university mentioned that they actively seek funding opportunities as a means of fostering collaboration, *"that (funding) will help us to do some sort of activity" (UA5).*

On the other hand, six participants explained that, on occasion, companies reach out to universities or academics when they require support in solving specific problems. However, three participants note that this industry's inclination to collaborate with university academics remains somewhat limited, leading the industry to seek help from foreign experts. The recent DCCI annual report also supports this, "*many industries usually recruit foreigners as skilled manpower to run the operations*" (Dhaka Chamber of Commerce & Industry, 2021, p. 257). However, recently, DCCI signed a "*Memorandum of Cooperation (MoC) with different universities for expansion of its training areas*" and a "*Memorandum of Understanding (MoU) with twelve Universities to strengthen industry-academia collaboration*" (Dhaka Chamber of Commerce & Industry, 2021, pp. 231, 257). The signing of this agreement shows the growing intent of industries to utilise university academics as valuable resources to aid in acquiring skilled executives.

In addition, the recent DCCI report underscored that firms harbour a long-term goal of collaborating with academia "*to develop cutting-edge, disruptive technology*" (Dhaka Chamber of Commerce & Industry, 2021, p. 31). However, four respondents stressed that local business owners tend to procure licences from developed countries and implement those technologies domestically despite their high costs. This dependence on foreign technology proves detrimental to local innovation and industries. By collaborating with academia, the industry could have potentially lowered innovation costs and improved the university's intellectual property (IP) capacity. For instance, an associate professor at a public university said that the industry gets the formula/licence from outside and manufactures it in their plants, but in *"developed countries, the industries play an important role in driving the universities' need-based/applied research and IP development" (UA6).*

Moreover, two informants opined that the industry continues to acquire foreign technologies due to a lack of confidence in local technologies. Consequently, importing established technologies allows businesses to attain immediate results. As noted by a professor at a private university, efforts to convey the potential benefits of collaborating with local experts have not been successful in making them understand the opportunities. *"We do not make them (industry) understand that it is possible in our country, and we can do that, give some time and opportunity to do that" (UA22).*

As indicated by three participants, another reason for adopting foreign technology is to minimise investment in research and development (R&D). While two participants expressed that some large businesses possess their R&D facilities, they often lack designated university research funds. Additionally, two interviewees observed that local companies do not perceive research collaboration with universities as advantageous for their interests. One of the professors at a public university highlighted this sentiment, *"Private companies never come forward to give money to research. So, the linkage between a commercial company and the university is completely absent" (UA18).*

This view is supported by one of the recent reports by DCCI: "Public and private sectors need to provide financial support to research activities of the universities" (Dhaka Chamber of Commerce & Industry, 2021, p. 31). Two respondents described this research fund allocation of the industry as a win-win for industry and academia. For example, a professor at a public university illustrated that firms could easily use university academics to conduct research *"because this is a cheap source of conducting research compared to if they do it from their side" (UA18).*

Hence, the industry can use the university's resources to conduct more cost-effective research than their research endeavour. It would help the industry focus on commercialising innovation and, at the same time, enable academics to carry out cutting-edge research. Moreover, one of the university managers (UM16) perceived that each firm's research budget remains unutilised due to their lack of interest in R&D investment.

As discussed above, there has been a noticeable lack of academia-industry linkage, and participants believed it is due to the lack of communication and knowledge gap between academia and industry. This knowledge gap has led local businesses to rely on foreign technologies and experts, which offer quicker outputs and lower R&D investment. However, there have been recent initiatives by academics, universities, and industry to bridge this gap. In conjunction with industry, these two public and private universities are taking initiatives to bridge this gap between academia and industry. These initiatives include joint research projects, funding provisions, and the creation of avenues to commercialise university research and innovations, all aimed at enhancing academia-industry collaboration.

These findings provide valuable insights into how such a lack of academia-industry collaboration reduces opportunities for AE. While participants previously viewed academia-industry linkage as a barrier to their entrepreneurial involvement, recent actions taken by one of the apex industry associations (DCCI) demonstrate their recognition and understanding of the importance of such academic collaboration. However, these initiatives suffer from poor communication, leaving participants unaware of the industry's efforts.

6.2.6 Summary

To conclude this section, although the government adopted different policies to support AE, implementing these policies depends on the university norms and practices. This chapter addresses the research question, what are the university-level factors that influence academics AE engagement in Bangladesh? The participants believe that university capabilities, entrepreneurial orientation, demand for AE, university culture, and academia-industry collaboration play a vital role in these universities adopting AE.

It is evident from the interviews that the university's capabilities – namely decision-making, financial resources, human capital, and social networks – are essential for the entrepreneurial engagement of the university and the academics. Notably, differences in capabilities are observed among the four studied public and private universities.

Public universities, given their large size and bureaucratic structure, encounter challenges when it comes to embracing new decisions and implementing changes, unlike private universities. Surprisingly, however, these public universities are actively adopting policies related to AE. On the other hand, despite facing regulatory challenges from the UGC and lacking specific AE policies, the two private universities have taken steps towards fostering entrepreneurship. In addition, the informants indicate the presence of research funding, but it's worth noting that UGC's report demonstrates that private universities allocate more funding for research than public universities. However, this allocation is sometimes misused and insufficient for comprehensive research projects.

In addition to financial resources, universities' human capital plays a crucial role in facilitating the adoption of AE. Both interview data and the UGC report highlight a shortage of academics holding doctoral degrees, which is essential in equipping academics with the necessary skills and capabilities for effective research. Despite this challenge, the interviewees indicated that their universities actively establish robust connections with alumni to involve them in the research process. Simultaneously, efforts are being made to develop industry linkages to accumulate necessary resources for research endeavours.

While these universities have displayed some intention and engaged in activities related to adopting AE, it is still too early to label them definitively as entrepreneurial entities. Some of these activities include inter-departmental and inter-university collaborations, the incorporation of an entrepreneurship mission, and the establishment of support centres for entrepreneurial endeavours. According to the informants, university collaborations extend to partnering with other institutions whenever opportunities for research projects arise. The interviewees also pointed out instances of the university management incorporating elements of entrepreneurship mission, although their primary focus remains supporting students. Additionally, findings from the interviews indicated that these universities have established technology transfer offices (TTOs), incubators, and entrepreneurship centres to facilitate and support entrepreneurial activities. Notably, two public universities have emerged as leaders in supporting academics engaged in AE through their dedicated support centres.

The participants indicated that even though their universities are either providing or working towards providing support for academics in the realm of AE, the demand for AE within the university system is still evolving. They highlighted that their universities continue to value criteria such as teaching experience, publications, and service to the university (and, to some extent, service to society) as the basis for promotions and increments. Despite AE not being explicitly recognised in these processes, some universities encourage academics' entrepreneurial engagement, while others discourage it. The interviewees argued that academics often engage in AE as an additional income source despite these circumstances, as the existing salary structure falls short of meeting their financial needs.

Table 6.7 Key findings of Theme Two: University Norms and Practices

Sub-themes	Findings
University capabilities	• Due to the large size and bureaucratic nature of these public universities, it took a long time to institutionalise anything new compared to these private universities • Private universities allocate more research funds than public universities. • There is a lack of academics with a PhD • Public and private universities are focusing on building linkages with alumni and industry to accumulate the necessary resources for research
Entrepreneurial orientation	• Collaborating between departments and universities for research projects • The adoption of these universities' entrepreneurship missions tends to be student-centric. However, public universities are supporting the academic entrepreneurship endeavour • These universities set up different support centres such as TTOs, incubators and entrepreneurship centres to support academic entrepreneurs
Demand for AE	• Universities recognise the teaching, research, and service to the university as the criteria for promotion • Some universities encourage and some discourage academic AE engagement • Participants involve in FAE and IAE or both as an alternative source of income due to salary insufficiency
University culture	• These universities emphasised teaching more. However, the focus on research is gaining attention from some universities • Academics face a huge workload that reduces their opportunities to engage in activities other than teaching and research • Participants have to share 10-30% with the university when they engage in AE activities
Academia-industry collaboration	• Lack of academia-industry linkage • There was a knowledge gap between academia and industry • Local businesses focused on getting immediate results may lead the local resources to be underutilised. • The industry has yet to adopt policies to accommodate academics, for instance, how a full-time university academic would provide support to them • Import technology and purchasing designs from the parent firms hinder the academics' opportunity to engage in patent and licence

Another noteworthy point highlighted by the participants is the prevailing university culture. They mentioned that most universities prioritise teaching over research, with research being of secondary importance. However, private universities strive to balance teaching and research, increasing the workload for academics. This heightened workload is a barrier for academics to engage in entrepreneurial activities. Even when they manage to undertake such activities, they are often required to share a portion of their earnings with the university.

It was evident from the interview data and a recent report by DCCI that there is a lack of academia-industry collaboration. This can be attributed to a knowledge gap in both academia and industry. Several respondents perceived that the industry focuses on immediate output, leading local businesses to acquire licences from abroad and hire foreign consultants instead of collaborating with universities. This view of the participants finds support in a recent report published by one of the apex associations of industries (DCCI). However, the report also highlights that academia and industry have undertaken different initiatives to bridge this academia-industry gap, initiatives of which the participants seemed to be unaware.

While some universities' practices are favourable for academic entrepreneurial endeavours and others' practices inhibit them, the participants indicated that they had been involved in FAE, IAE, or sometimes both. This implies that the capabilities and practices may occasionally enable or hinder AE efforts, but it is not solely the norms and practices of the universities that form the barrier. Instead, the lack of proper direction or guidance reduces most participants' interest and intention to be involved in AE. They also highlighted that although their universities establish different support centres and undertake various initiatives, these are not adequately communicated. As a result, academics are unclear about whether to involve the university or initiate the AE process independently. In addition, the interviews also revealed a coordination problem within these universities. The academics were unaware of where to access information about different opportunities. For example, some participants from public universities noted a lack of funding, while the UGC report suggests that research funding remains unutilised. This misinformation highlights a communication and coordination gap regarding the allocation of research funds by the university. On the one hand, this could be attributed to these universities' primary focus on teaching, leading to the allocation of most resources toward this endeavour. On the other hand, it could be attributed to the inadequate research funds allocated for each project, as illustrated by the participants.

Moreover, this situation could be attributed to the varying stages of entrepreneurship adoption that universities are currently experiencing, which is expected to improve over time. One public university has already embraced the entrepreneurship mission, while one public and two private universities are still adopting it. Notably, some norms and practices of these universities are not yet entirely conducive to AE, thereby adding to our comprehension of how university norms and practices impact academics' AE endeavours. The findings concerning university norms and practices are summarised in Table 6.7 and provide insights into the identified sub-themes. Despite the challenges outlined above, academics remain involved in AE. Hence, it is essential to understand why academics engage in AE from the cognitive level, discussed in the next section.

CHAPTER SEVEN: HUMAN PERCEPTIONS AND MOTIVATIONS

7 HUMAN PERCEPTIONS AND MOTIVATIONS OF ACADEMICS

7.1 Introduction

This chapter presents the findings related to the perceptions and motivations of the participants in this study. This chapter addresses the research question, what individual-level forces influence academics to engage in AE in Bangladesh? The initial analysis of the interviews and policy documents reveals that while there are some initiatives from the government and university, it is ultimately the academics themselves who determine their engagement in entrepreneurial activities. The participants, including academics, university managers, and support centre managers, emphasised the significant role their perception, cognition, and motivation played in their engagement in AE. The interviews demonstrated that participants were involved in knowledge exchange, industry-academia collaboration, and FAE and IAE activities. Therefore, understanding the motivational factors driving academics' entrepreneurial behaviour becomes crucial.

Academics' perceptions and motivations are considered micro-level factors within this study, collectively identified as the 'Human Perceptions and Motivations' theme. This chapter illustrates the interconnections between each category and sub-category with AE, thus contributing to addressing the research question: 'What are the individual (micro-level) factors influencing academics' involvement in AE?' The structure of the upcoming sections categorised under the theme "Human Perceptions and Motivations" is outlined in Figure 7.1.

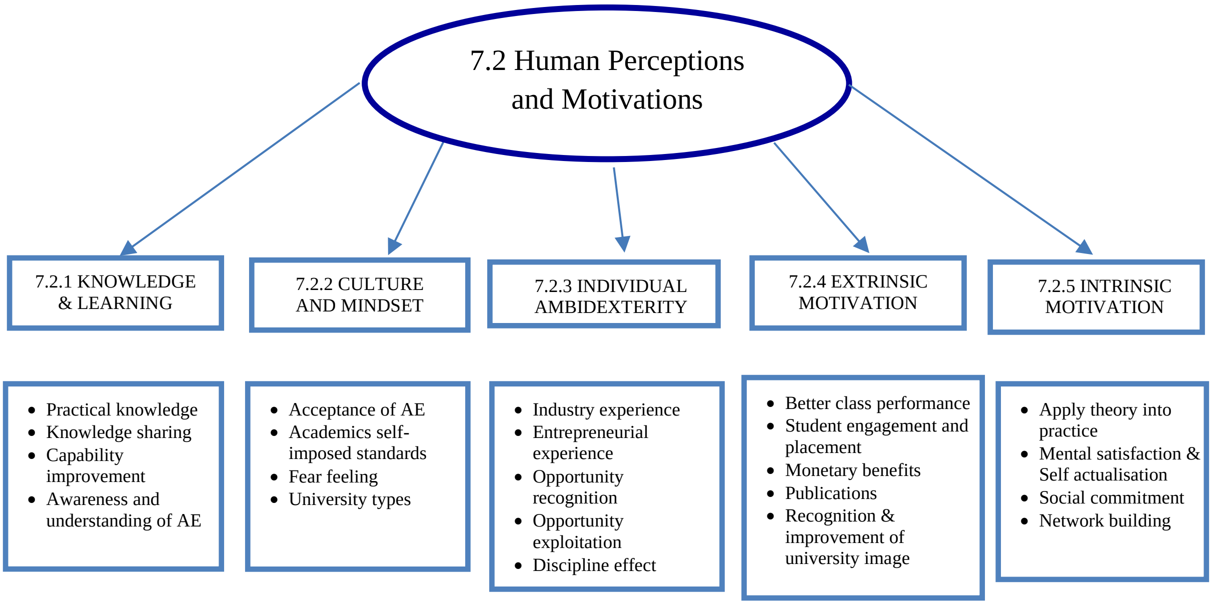

Figure 7.1: Outline of Chapter Seven

7.2 Human Perceptions and Motivations

It is apparent from the interviews that academics maintain distinct perceptions, cognitions and motivations for engaging in entrepreneurial activities. These perceptions, cognitions and motivations can be categorised into knowledge and learning, individual ambidexterity, extrinsic motivation, intrinsic motivation, culture, and mindset impact (the chapter structure is depicted in Figure 7.1).

7.2.1 Knowledge and Learning

Based on the data analysis, this thesis has identified 'knowledge and learning' as the sub-theme (Table 7.1). Most academics highlighted the significance of knowledge and learning gained through participation in AE. They underscored that their engagement in AE enabled them to access practical knowledge, comprehend real-world problems, share insights, offer problem-solving solutions, adopt effective strategies, and enhance their capabilities. Most academics and two of four university managers indicated that their involvement in AE facilitated their alignment with practical applications. Academics perceive their involvement in AE as a pathway to acquire practical knowledge that might not be readily available in books.

Most informants believe that their engagement helps them apply theoretical knowledge. Moreover, several participants stated that involvement in AE increases their opportunities to apply theoretical knowledge while gaining diverse insights. Through their engagement in AE, these informants acquire practical knowledge and stay updated with recent knowledge. As a professor at a public university underlined, *"When I get exposure to this sort of engagement (referring to AE), I see how real-life policies or how real-life businesses are going on. And in many cases, they have very little connection with the academic issues" (UA1).* This AE engagement allows academics to learn about recent developments in knowledge, such as how businesses operate and how real-world practices differ from academic knowledge. Participation in AE and acquiring practical knowledge enable academics to understand real-life problems better.

Similarly, several participants illustrated that participation in AE enables them to understand real-life problems. Six of eighteen academics and two of four university managers underscored that engagement in AE allowed them to comprehend practical issues and enhance their knowledge due to their immersion in the real world. Although differences exist between the theoretical and practical fields, involvement in AE orients academics to these variations in application. Given the distinction between theory and practice, some academics encounter challenges when implementing their ideas. However, their involvement in AE gives them the confidence to overcome these challenges. This shared belief among participants demonstrates that their participation in AE contributes to knowledge development, regardless of their affiliation with public or private universities.

Table 7.1 Codes and Data Related to Sub-theme: Knowledge and Learning

Initial Coding	Representative data
Practical knowledge	"Let me start with this contract research. So, this gives me practical experience; I mean, being an academic, I know a number of things that can be done theoretically. But when you come to the practical field, you have to encounter some other issues that are actually impacting" (UA19, professor at a public university) "I get a huge amount of knowledge from them by doing the consultancy work, how things are practically done and how particularly these things have an impact on the society" (UM4, professor and manager at a private university)
Knowledge sharing	"…actually, the primary target is to disseminate the knowledge (referring to contract research and consultancy). Everything what we do in Bangladesh, mostly from noble knowledge sharing perspective" (UA18, professor at a public university) "…they are the practitioners (referring to industry), and we have the latest knowledge and research and the development of the theories. So, they can also learn a lot from us" (UA5, professor at a public university)
Understanding local problems	"I visit industry or talk to the owners and discuss how the problem that they are facing how that could be solved, or how it can be minimised" (UA13, associate professor at a private university) "…when I do this collaborative research, I find that this thing actually gives me the opportunity to instantaneously give me the idea of the practical problem, I mean, large scale problems of the society" (UA19, professor at a public university) "…When you face first hand obstacles, it makes you better not only in terms of confidence you build from facing the sort of things rather it makes you confidence to face different types of problems" (UA1, associate professor at a public university)
Awareness and understanding of AE	"I do not know exactly what I mean because I have never heard this term. This is the first time I am hearing about this term…worked as a board member in two large government organisations…I did not think that this is also part of academic entrepreneurship" (UA18, professor at a public university) "I believe it is a new term. Maybe it is present, but not as any of the terms that you have mentioned. So yeah, it is a new thing maybe in Bangladesh, it is yet to develop" (USCM11, Lecturer and support centre manager at a private university)

Moreover, seven participants mentioned that gaining this orientation of firsthand problems and obstacles builds their confidence and resilience in facing practical challenges. Involvement in AE, particularly IAE, equips academics to comprehend practical problems and empowers them with the confidence to tackle these challenges in the future. This understanding of problems also helps academics in devising solutions. Therefore, one of the motivations for academics to engage in AE is to provide solutions to stakeholders within the AE ecosystem. However, three academics focused on solving local problems aligned with their expertise. Although academics have the motivation to solve numerous challenges faced by industries, several participants highlighted a lack of effective industry-academia communication. This communication is crucial because academics can offer the necessary solutions for industry problems. Consequently, academics can only comprehend problems and provide solutions when there is effective communication from the industry. The participants' perceptions of academia-industry collaboration remain consistent regardless of their career position and university attachment. In addition to understanding problems and providing solutions, AE engagement allows academics to share knowledge.

Seven out of eighteen academics and two out of four university support centre managers emphasised that their engagement in AE allows them to share knowledge with various stakeholders, such as students, government entities, and industries. However, it is primarily through IAE that academics engage in knowledge sharing. To facilitate this knowledge transfer, two public and one private university support centres enable academics to share their insights and experiences with colleagues within the academic community and the industry. As academics share their theoretical and practical knowledge with practitioners, they also gain valuable insights from them, as highlighted by twenty participants. This reciprocal exchange of knowledge benefits both academia and the industry. In addition, eight academics and one university manager noted their contribution to the government by disseminating knowledge, offering training, and developing policy documents that can be implemented on a large scale. This widespread application of knowledge promotes the country's industrial and economic development. Consequently, this dissemination of knowledge to diverse stakeholders keeps these participants updated with the latest insights and supports the nation's economic advancement. Moreover, the practical knowledge acquired by academics through their hands-on experience equips them to contribute to formulating appropriate policies related to their respective disciplines.

However, some participants stated that the government offices only reached out when they identified the appropriate individuals to develop relevant policies. Consequently, academics provided consultancy services to the government to formulate policies related to their areas of expertise. For example, one university manager who is also a professor mentioned, *"I am a* *member of the task force of the Ministry (X*[12]*) in Bangladesh. I have also contributed to formulating a national action plan... I was a committee member for the Bangladesh (P) acts and (Q) rules" (UM20).*

This perceived value among participants in supporting the government is similar, irrespective of their career positions and university affiliations. However, this study reveals that those who engage in government support hold senior positions or are experts in their respective fields. One possible explanation could be that over 80% of the participants held professorship (assistant to full professor), which inherently aligns with their expertise. Although the participants are selected based on their active role in AE, surprisingly, this study does not identify a significant impact of university affiliation on their engagement in AE. This is unexpected as some participants believed that academics from public universities had more opportunities to collaborate with the government than private universities. One explanation for this finding might be that academics from private universities already had prior exposure to government collaborations. Additionally, government contact with academics could be primarily driven by their expertise. For instance, one of the respondents at a private university with expertise in human resource management mentioned, *"I speak with many stakeholders. That was related to increasing the quality of the education, aligning our graduates with the current employer, increasing their employability, to make them market driven" (UA9).*

In addition to knowledge sharing, involvement in AE enhances the capacities of academics. Several participants emphasised that participation in AE is crucial in improving their capabilities. This involvement increases their expertise and contributes to their personal growth by pushing them beyond their comfort zones. The new knowledge acquired through AE engagement bolsters their abilities. It empowers them to apply it within academia and industry, enabling them to make a meaningful impact on society. For example, a professor at a public university who is active in FAE and IAE said, *"I should do something that can improve the quality of life of people in the third world, especially in Bangladesh. So that is why I was looking into areas. That is how I came into solar water heaters and disinfectant system" (UA10).* Moreover, three respondents illustrated that their engagement in AE allows them to become familiar with the skills required in the job market. This exposure to industry

[12] X, P, and Q are used to anonymise the name of the ministry

requirements enables academics to integrate and incorporate these skills into their teaching content, which often enhances their capabilities.

Building upon this perspective, four participants recognised the significance of developing their capabilities to engage in AE. As a result, they highlighted the importance of acquiring the appropriate skills and expertise. Although AE involvement certainly enhances the capabilities of academics, they also need to possess the right expertise to engage in AE effectively. Moreover, three respondents pointed out that their involvement in IAE has contributed to developing their capabilities to identify opportunities for FAE. This is because academics can apply the theoretical knowledge they gain through IAE, which enables them to grasp the best business practices. The practical knowledge acquired through these experiences can be used to establish new businesses or spinoffs. One participant stated, *"In order to start any formal agreement or any formal process, I should have some knowledge in an informal setting so that you may consider it as a preparatory step towards a formal engagement" (UA13).*

Although most participants understood the underlying concept of various forms of AE activities, they were generally unaware that these activities fell under the umbrella of AE. Most informants lacked an understanding of the distinction between IAE and FAE. While it is not expected that academics would be conscious of this difference, such awareness is crucial. It could enhance their understanding and foster the development of an entrepreneurial mindset among academics, ultimately enabling them to engage more effectively in AE activities. Even though the AE concept is new, the academic involvement in IAE and FAE is not. One of the respondents indicated, *"This trend is prevalent in Bangladesh, which started probably many years back" (UA10).*

However, there appeared to be a variance in perception regarding AE. This thesis reveals that the participants are involved in teaching-related activities such as providing training and seminars to industry (six academics and two university managers) and government (seven academics and two university managers). On the other hand, several participants have been involved in research-related activities such as consultancy, contract research, and patents (see Table 4.2a and 4.2b for more details).

> *I think there is a difference in the idea here. I am not seeing consultancy as academic entrepreneurship… Consultancy is a sort of service, expert service, but entrepreneurship is different… My understanding about academic entrepreneurship is that we have some innovation, and we support spinoffs, licencing, start-ups, that kinds of things or technology transfer (USCM25)*

All these activities encompass a commercial aspect. Notably, four participants perceive these activities as modes of knowledge transfer or service. In addition to this commercial and knowledge transfer aspect, three academics mentioned student placement as a part of their industry engagement. This student placement represents a form of knowledge transfer from academia to the industry. Consequently, IAE has this knowledge transfer and commercial component. However, two participants indicated that AE involves commercialising research through establishing a firm or transferring technology or patents to the industry through licencing. This conception of AE among academics aligns with FAE.

Four academics from the private university perceive their lack of awareness as defining their involvement in IAE. Therefore, they did not explore the potential opportunities to engage in IAE or FAE. One of the reasons behind their lack of awareness stemmed from the university's limited initiative towards promoting AE. To enhance this awareness and understanding, three participants stressed the importance of incorporating the significance of AE in the curriculum. This way, individuals could develop an understanding of AE from their student years, fostering a future generation of academic entrepreneurs. While universities build awareness and knowledge of AE, the prevailing culture and academic principles also significantly influence academics' engagement in AE.

In summary, it is evident from the above discussion that although participants might be unaware of the term 'academic entrepreneurship' (AE), they have engaged in AE through IAE and FAE activities. The motives centred around knowledge and learning have driven their involvement in AE. Most participants perceived that involvement in AE enhances their opportunities to acquire practical industry knowledge and share it with various stakeholders within the university ecosystem, including students, university managers, and industries. This knowledge enables them to understand the problems faced by Bangladeshi businesses and offer solutions through their industry engagement. This understanding of the local issues allows participants to provide valuable solutions.

In essence, the motivation for knowledge and learning facilitates participants' personal growth and equips them to identify the areas where they can contribute to resolving challenges local industries face. These findings answer the research question, "What individual-level factors influence academics to engage in AE?" It becomes clear that knowledge and learning are essential factors that drive academics in this study to engage in AE. Notably, there was no discernible difference between junior and senior academics, whether from public or private universities. Most participants view AE engagement as a channel for acquiring new knowledge.

Creating new knowledge aligns with academic responsibilities and underscores the significance of lifelong learning for personal development. This perspective also aligns with the government's goal of transitioning into a knowledge-based society. However, academics, university managers, and support centre managers also indicated that cultural influences and individual and societal mindsets significantly impact their entrepreneurial behaviour, a topic explored in the next section.

7.2.2 Culture and Mindset Impact

Most participants illustrated the influence of national culture on academic AE engagement, such as acceptance of AE, risk-taking propensity, and mindset differences of the people (see Table 7.2). Seven informants recognised that, within the country, it is not widely accepted for university academics to engage in activities such as starting a new business. Their role is primarily seen as teaching and researching. Although this is a widespread perception of academics' lack of engagement in business ventures, one participant pointed out that this perception has roots in customs and values that date back 2000-3000 years, *"brahmins (preachers) will do the knowledge and science and technology" (UA10)*.

This illustrates that a particular group of individuals possess knowledge and avoid involvement in other activities. This mindset is deeply rooted in Bangladeshi teaching culture and challenges academics to explore or participate in business endeavours. However, academics are deemed acceptable to engage in other entrepreneurial activities related to teaching and research. This variance in perception exists because these IAE and FAE activities prioritise knowledge and align with their commitment to lifelong learning.

Moreover, two participants expressed reluctance to take risks, a perspective influenced by the broader societal tendency towards risk aversion. This inclination finds support in Hofstede's insights on national culture. It shows that Bangladesh exhibits a high score[13] in uncertainty avoidance, implying that individuals feel threatened by ambiguous or unknown situations and have established beliefs and institutions to avoid these circumstances (*Hofstede Insights*, 2023). Consequently, some participants noted that traditional job-seeking behaviour is encouraged within society. Due to this perceived cultural barrier, few academics indicated their

[13] Bangladesh scores 60 on this dimension and thus has a high score. Countries exhibiting high Uncertainty Avoidance maintain rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas. In these cultures, there is an emotional need for rules (even if the rules never seem to work), time is money, people have an inner urge to be busy and work hard, precision and punctuality are the norm, innovation may be resisted, security is an important element in individual motivation. (https://www.hofstede-insights.com/)

unwillingness to participate in activities beyond the academic sphere. On the one hand, this reluctance is rooted in their cultural context, and on the other hand, it is driven by the necessity to secure an alternative source of income. Notably, five informants from public universities emphasised their preference for teaching over research, citing financial benefits when teaching in other educational institutions.

Table 7.2 Codes and Data Related to Sub-theme: Culture and Mindset Impact

Initial Coding	Representative data
Acceptance of AE	"I think this is not wrong for maybe for academicians in the developed world, but here people might say you are the teacher. Your job is to teach. Do better there. Do research. Do not do business" (UA23, associate professor at a public university) "… most people think that academia is mostly responsible for taking classes, evaluating the students and just checking answer scripts. This is the main task of the academia" (UA8, professor at a public university) "The thing is that the willingness, the academics they should not only engage with teaching, but they also need to engage with this kind of things (referring to AE). So, most of the faculty members, for example, they are not thinking in such a way, especially the university teacher" (professor at a private university)
Gendered Mindset	"…as a female, I also have some barriers, I think, because even I do not focus on my career much, and sometimes, we want to be passed our life as it is, do not want to take so much risk as other people (male counterparts) are taking" (UA26, associate professor at a private university) "…It has not been easy, always difficult, especially for any woman that (hits) the glass ceiling. Someone the other day was saying a ceramic ceiling: it is even harder than the glass ceiling for a woman (to get through)" (UA7, professor at a public university)
Academics self-imposed standards	"…since we are not patenting, we just published. If someone copies our technology, develops it, and makes (product out of) it, we do not mind. We think that if we extend the knowledge that technology is also part of knowledge, and knowledge is for free use. Other people will also improve on it. So, I do not think we should make knowledge a commercial product (UA10, professor at a public university) "…teachers would think themselves to be like why should I be running up to the industry? The industry should come to me" (UA7, professor at a public university)
Fear feeling	"…when you are doing something (referring to AE engagement) out of fear and always in your mind that I am doing something wrong" (UA13, associate professor at a private university) "…I used to feel fear of people knowing that I am the founder of the company… even you might lose a job as far I know, some people lost their job because they got involved with corporate work while doing teaching activities in this country." (UA14, senior lecturer at a private university)

Initial Coding	Representative data
University types	"There are so many people (academics) who engage in entrepreneurial activities, but they never expose themselves as entrepreneurs. They have a fear of sharing this… you have a group of academics who is an entrepreneur but do not mention, but some of them are gladly mentioned." (USCM24, associate professor and manager of the support centre at a public university) "I am a faculty at 'A' university, we have a certain reputation, and due to that reputation, many outside offices are willing to work with us. So, this is really an advantage, or you can call it a big support for us… If I am not the teacher of 'A' university, I probably would have not got any work what I had already done" (UA1, associate professor at a public university) "…industry nowadays searching the profile of the faculty members searching the reputation of the university. If they see that any particular faculties, they are doing good research, they have international reputations. Then they are more interested to collaborate with the university" (UA2, senior lecturer at a private university)

Three participants perceive that their involvement in AE could detract from their focus on teaching and research. However, some respondents highlighted that academics increasingly adopt an entrepreneurial mindset, indicating a desire to participate in activities beyond teaching and research that hold commercial value. Despite the participants being selected based on their engagement in IAE or FAE, the assertion that academics embrace this entrepreneurial mindset carries significant weight. They believe that their involvement in AE complements their teaching and research endeavours. This symbiotic relationship between AE and teaching and research is crucial, as it can encourage academics to nurture the entrepreneurial mindset both within the university and in society at large. One of the university managers at a private university mentioned, *"I do not think these (teaching, research, and AE) are conflicting. These are complementary; whatever you learn from entrepreneurship, you can apply in research, and whatever you learn in research, you can apply in the classroom in teaching" (UM4).*

Despite the growing prevalence of this entrepreneurial mindset, four female participants highlighted the existence of a gendered perspective within society. While these female academics encounter challenges stemming from societal norms, they often find strong family support. However, one participant mentioned that her family members raised objections, impeding her involvement in AE. Another challenge they confront relates to their caregiving responsibilities, encompassing motherhood and other familial duties. These responsibilities also reflect the cultural values ingrained in the society. It is commonly perceived that women, especially wives, are expected to prioritise family care; thus, prioritising a career is not deemed a primary goal for women. This sentiment was elucidated by a female assistant professor at a private university who shared her perspective. Although she harboured an interest in engaging in AE and identified some opportunities, her limited time due to family obligations prevented her from participating in AE. One of the assistant professors at a private university indicated, *"Our parents do not allow us to be more focused on our careers. They want us (me) to focus more on the family…. my family is not allowing that to do so because there is no one in my home to look after my kids" (UA26).*

In addition to the gendered perspective, several participants acknowledged the self-imposed standards that discourage them from engaging in certain forms of AE. Three participants pointed out their preference for not commercialising knowledge and focusing solely on publishing rather than patenting. Among these, two participants believed that patenting inventions could increase technology costs, limiting widespread adoption. In contrast, the third participant expressed that since AE is not widely embraced in the country, they were unwilling to commercialise their research. On the other hand, five informants believed that it is the industry's responsibility to initiate collaboration with them. However, this mindset sometimes results in these academics being left behind regarding industry collaboration, as it hampers effective communication between academia and industry. Similarly, six participants, including four academics, a university support centre manager, and a university manager, articulated that academics are primarily meant to teach and conduct research without necessarily engaging in entrepreneurial activities. This reflects the broader cultural attitude towards academia.

In contrast, three participants pointed out that academics often hesitate to reveal their entrepreneurial identity. One of the university support centre managers at a public university mentioned that while some academics are comfortable showcasing their entrepreneurial identity, others are reluctant to do so. This duality in identity demonstrates the complex mindset of academics. Since AE has not yet become a standard practice in the country, academics believe they should conceal their entrepreneurial identity. This sentiment is exacerbated by the fact that two participants from private universities expressed concerns about potential job loss if their employers were to discover their involvement in entrepreneurial activities. Conversely, these academics were less worried about losing their positions due to the higher job security within the public universities. Meanwhile, two participants from private universities who hold senior positions expressed that it is acceptable for academics in private universities to engage in business endeavours. This divergence in viewpoints can be attributed to the early stage of AE's development. It is still being accepted as a legitimate practice within academia, as indicated by several participants.

Two respondents declined to answer some questions, fearing it might jeopardise their identity. Similarly, a university manager (UM15) believed that these entrepreneurial activities demand more commitment and risk-taking from academics, potentially impeding their academic responsibilities. Conversely, another university manager (UM4) explained that FAE (such as spinoffs or start-ups) is inherently riskier and demands more significant commitment. This difference in perception stems from their individual experiences – the former has experience establishing firms, whereas the latter is involved in IAE (consultancy, secondment).

Five respondents perceive that the type of university, whether public or private, impacts academics' involvement in AE. They posit that academics from public universities are more actively engaged in AE activities due to these institutions' societal contributions and industry accessibility. While some academics across both university types are involved in consultancy and other forms of IAE, the participants emphasised that it is primarily the professors from public universities who tend to excel in these areas. This inclination towards public university professors is attributed to the institution's esteemed reputation and the professors' wealth of experience executing such IAE projects. However, a contrasting viewpoint was shared by one university manager (UM4) and two academics (UA2, UA22) at private universities, and two academics (UA7, UA10), and one university support centre manager (USCM25) at public universities. They expressed that this perception is counterintuitive in today's context. They indicated that industries are now prioritising the capability and reputation of academics before initiating collaborations, regardless of the university's classification.

In summary, the study has revealed that participants' cultural differences and mindsets significantly influence their engagement in AE. Several participants emphasised that starting businesses as academics is not culturally acceptable. However, they find engagement in other research-based FAE, including patent, invention disclosure, and IAE engagement, acceptable. This viewpoint difference arises from the belief that these research-based entrepreneurial activities complement their academic responsibilities. At the same time, some participants are concerned that increased commitment to AE could impede their educational duties.

In addition, four female academics noted a distinctive mindset towards women. They expressed facing societal and familial challenges compared to their male counterparts when attempting to engage in AE. Women academics often perform family responsibilities, including caregiving, motherhood, and familial chores, reducing their available time for AE. This gender-related perception aligns with societal norms where women are expected to prioritise family over career. Cultural factors also influence participants' mindsets. Some adhere to certain beliefs and standards that deter their engagement in AE. For instance, some female academics are risk averse due to concerns about work-life balance. Conversely, few participants believe patenting inventions could raise production costs, leading them to prefer publishing to allow broader utilisation of their inventions.

Some participants from private universities highlighted a sense of fear associated with AE engagement, as it is not yet a common practice in their institutions for academics to be involved in FAE or IAE. Although public university academics did not overtly mention fear, some expressed reservations about revealing their entrepreneurial identity. This feature indicates a difference between private and public universities. While job security is generally higher in public universities, the prevailing lack of acceptance for AE inhibits participants from openly embracing their entrepreneurial identities. Additionally, some participants perceived that public university academics have more AE opportunities than their private university counterparts. This preference towards public university academics is attributed to their institutional size, historical economic contribution, and prior experience. However, some participants pointed out that industries are now shifting towards valuing the quality of academics over their affiliations when seeking collaborations.

These findings illustrate how cultural and cognitive aspects influence academics' engagement in AE, shedding light on the individual level factors that shape AE involvement in Bangladesh. The results indicate that factors such as societal and university non-acceptance of AE engagement, risk-taking tendencies, mindset variations (including gender-related attitudes), fears of disclosing entrepreneurial identity to the university, and self-imposed standards serve as inhibiting factors. In contrast, university type and acceptance of research-based FAE and IAE facilitate academics' AE engagement. Notably, no significant difference was found between junior and senior academics. This study underscores that AE is an individual endeavour, highlighting the importance of understanding how academics identify and exploit AE opportunities.

7.2.3 Individual Ambidexterity

This thesis revealed distinct pathways through which participants amassed knowledge, incorporating industry and entrepreneurial experiences to identify and seize AE opportunities and the influence of their academic disciplines on their entrepreneurial involvement (see Table 7.3). Several academics shared how they embarked on entrepreneurial endeavours upon recognising entrepreneurial opportunities (FAE and IAE) during their time as academics. While not all participants had industry or entrepreneurial exposure, five respondents with industry experience highlighted the pivotal role of industry experience in shaping their AE engagement. Some had acquired this experience before entering academia, while others had gained it during their academic tenure. They noted that this prior exposure enabled them to understand the industry's culture, mindset, and requirements. These insights, in turn, facilitated their engagement in consultancy activities.

Table 7.3 Codes and Data Related to Sub-theme: Individual Ambidexterity

Initial Coding	Representative data
Industry experience	"…after my graduation, I joined a software company. I worked as a software engineer there for a little more than two years… I think any sort of activity or experience can help or do help. I am going for consultancy in a software firm. I know what it is like in the software firm because I used to work there. I understand the culture and the mentality of the employees and the managers because I have experience (UA23) "…After completing my MBA, I got two years of Canadian experience that gave me the extra flavour of my study. So, I came to know textbook learning and practical learning and how these two go together. When these two are combined, then you get a complete set of ideas which gives you the marketable skills" (UA14, senior lecturer at a private university)
Entrepreneurial experience	"…my academia-entrepreneurial journey gives me the confidence to implement a lot of ideas (e.g., Department of Innovation and entrepreneurship, incubator) in university" (UM15, chairman of board of trustees at a private university) "…We developed a novel product from the outcome of our research, and hopefully, we will go for a commercial production from the result of that research" (UA8, professor at a public university) "…I have experience doing patenting, not licencing. I have filed patents in the United States also in the United Kingdom. I have those kinds of experiences" (USCM25, professor and support centre manager at a public university)
Opportunity recognition	"…If you talk about collaborative research, yes, we do research with government or governmental organisation… the government provides some funds, so we apply for it through University Grant Commission, although the fund is not that much" (UA23, associate professor at a public university) "…BRTC office sends the work to the concerned department. Then the department assigns the work to us that you work in that area, so you should work on that project… In majority of the cases, but not always, because sometimes the outside organisations do not know about BRTC… then they directly contact the department… Once they come directly to the department, we request them to send a letter to the BRTC, and then BRTC sends it to us. I mean, we officialise it this way (UA18, professor at a public university)

Initial Coding	Representative data
Opportunity exploitation	"…as a university teacher, I could not be an entrepreneur… the University rules are not designed to help the people in all aspects... so I bend their rules in that I took the function that I would like to become an honorary member of this or honorary president of this so that I will not take any money. So not taking any money allowed me to wipe up a lot of things" (UA10, professor at a public university)
	"…The device (we developed) has been tested for several users. The users are satisfied with the performance of the device, and as it is a unique, low-cost device, we believe it is commercially feasible" (UA8, professor at a public university)
	"…I am from the business faculties, so the project we got it basically from our own network" (UA2, senior lecturer at a private university)
Discipline effect	"…Faculty of Engineering they have a consultancy with private and government different sector, but mathematics (department) we do not have" (UA17, professor at a public university)
	"…Physics nobody has done any commercialisation. Everybody publishes papers, and that is the end of it" (UA10, professor at public university)
	"…some of the faculties we have that type of opportunity (referring to AE) but not all the departments" (UM20, professor and manager at a public university)

In addition to this enhanced understanding, three participants highlighted that their industry experience had honed their skills. This exposure enabled them to bridge theory and practice, enhancing their marketable skills. Moreover, five participants underscored how their prior industry attachment complemented their teaching endeavours, aiding in curriculum development, implementation of innovative ideas, and research initiatives. Notably, a university manager at a private university, who had established a firm and accumulated industry experience before founding the university, emphasised the positive influence of industry experience on his AE engagement. A Chairman of BOT at a private university demonstrated, *"My industry experience and entrepreneurial experience; it really helped me to design the course curriculum, talk with our faculty, motivate them, guide them, and also change the course curriculum as for the fit for the market" (UM15).*

Similarly, three respondents exemplified how their industry-academia orientation empowered them to initiate measures to nurture innovation and entrepreneurship. Building upon industry experience, ten respondents with FAE or IAE experience underscored the significance of prior academic entrepreneurial engagement. Although not many participants were involved in FAE (six academics and two university support centre managers), the number engaged in IAE was notably higher (seventeen academics, two university managers and three university support centre managers), as indicated in Tables 4.2a and 4.2b. Several participants pointed out various reasons for the limited involvement in FAE. As mentioned, establishing a business is not common among academics.

Additionally, two participants who held patents elaborated that the patenting process is time consuming, demanding more capital investment and raising the technology's cost. Hence, they expressed their lack of interest in pursuing patents. Participants also noted a limited demand for licencing, as local industries tend not to procure university patents. However, participants find engagement in IAE acceptable due to its compatibility with teaching and research endeavours. Additionally, IAE offers more opportunities, as emphasised by a university manager at a private university who has been actively involved in different forms of IAE. One university manager and professor at a private university highlighted, *"There are more opportunities for consultancy and contract research" (UM4).*

It was evident that most participants are actively engaged in IAE for industry and government. This thesis revealed that participants have been involved in consultancy (ten), contract research (twelve), joint or collaborative research (six), shared facilities (five), secondment (two), training and development (five) and student placements (four). These diverse entrepreneurial experiences have assisted most participants in recognising and seizing opportunities for such entrepreneurial activities. Their involvement in IAE helps them apply their knowledge and identify FAE opportunities. Participants exhibited varying levels of initiative. However, there were instances where the university's support centre initiated the entrepreneurial engagement process. Additionally, offers for engagement sometimes originated directly from industries.

Similarly, fourteen participants indicated that AE relies heavily on individual initiatives. They recognise entrepreneurial prospects and actively apply for them. For instance, three participants explained how they seize funding opportunities by submitting proposals for industry or government projects, such as consultancy or contract research, to access available funding. Occasionally, industry or government entities reach out directly to potential academics. Upon agreement, participants engage in a range of activities. Some of these participants collaborate with university support centres for their IAE engagement due to these centres' established industry connections.

In addition, four participants mentioned that businesses often approach university support centres or the respective academic departments seeking assistance. The support centre liaises with the respective department when the required expertise aligns with the academics' proficiencies. Subsequently, specific academics within the department are assigned the task, presenting them with a new opportunity. A university support centre manager (USCM25) shared that their centre had facilitated funding of three projects from the UK and the USA. These projects include CO_2 reduction, solar energy-based chemical fuel production, COVID-19 research, and shipbuilding. However, when it comes to FAE, opportunities typically stem from academics themselves. Academics identify and propose these opportunities. For instance, a professor at a public university mentioned, *"The device (we developed) has been tested for several users. The users are satisfied with the performance of the device, and as it is a unique, low-cost device, we believe it is commercially feasible" (UA8).*

In addition to patenting and spinning off, two participants indicated that they first identified potential markets before embarking on spinoffs and startups. Notably, these participants – a professor at a public university and a senior lecturer at a private university – took the initiative to establish their firms. This underscores that not everyone is inclined to initiate such ventures. The process entails a significant research investment and commitment from academics before establishing their firms. These individuals recognised a gap in products or services and saw it as an entrepreneurial opportunity. They believed their expertise and knowledge enabled them to discern this FAE opportunity. Differently, the university support centre manager who held a patent emphasised the pivotal role of the university support centre in identifying a patent's potential and facilitating the application process, *"when someone requests to file a patent, we will see the innovative nature or the financial aspects and other things that are relevant to that particular process" (USCM25).*

Therefore, the academics primarily took the initiative in identifying entrepreneurial opportunities for both IAE and FAE. However, companies or government departments sometimes present such opportunities directly through channels like university support centres or academic departments. Although these participants did not mention receiving support from their university's support centre for their firm establishment endeavours, two university support centre managers elaborated that fostering such entrepreneurial initiatives is among the objectives *"to assists and advise in establishment of spin-off companies and review the contracts and agreements related to the transfer of university technology" (USCM12).* This evidence suggests that the university support centre aims to aid academics in establishing firms. However, the level of support remains limited, as few academics (none of the participants presented their work to these centres) independently developed their research ideas for commercialisation.

In addition to recognising entrepreneurial opportunities, how academics engage in AE plays a vital role in how these opportunities are harnessed. Several participants shared how they capitalised on the opportunities that came their way by setting up firms, creating novel products, forming teams, and amassing resources. Although some participants believed that university teachers are not allowed to set up a firm, one participant, who happened to be the founder of a firm, mentioned that he navigates around these regulations by becoming an honorary member of the newly established firm to leverage the opportunities. This shows the academic's determination, resilience, and tenacity to engage in entrepreneurial activities by exploring alternative avenues. He mentioned, *"Actually, it was a new product in the whole world, and there was no such product in the whole world. They said we cannot market it… In Bangla, there is a word called 'Jid' (meaning determination), that sort of motivation within, look this equipment is low cost and it gives proper safety, so I should try" (UA10).*

Seven informants from public and private universities highlighted the importance of personal networks to take advantage of entrepreneurial opportunities and use their networks to overcome the lack of support from the university in their engagement in AE. These networks have provided them with knowledge, skills, and valuable information. Moreover, three university support centre managers acknowledged the importance of such connections. They have actively expanded and diversified these networks, bringing different stakeholders under the umbrella of the centre. However, fourteen respondents mentioned occasionally forming teams to undertake entrepreneurial activities. This collaborative approach among academics facilitated sharing responsibilities and mutual support in tackling entrepreneurial opportunities. These participants demonstrated that although the initiative for engaging in AE might originate from an individual, the nature of AE activities involves a combination of skills. Hence, a preference for teamwork is evident, "*When we do informal research activity with organisations… with a group of people… So, it is a shared responsibility, and any particular person is not a bog down or stick to do around the clock. The total job is done by a broader range of people… for a full range of time" (UA5).*

Engagement in AE necessitates diverse resources, and some participants have expressed the need to accumulate these resources (e.g., human, financial) before their AE involvement. These participants have recognised that the essential human resources (typically the academics) are selected based on their capabilities to contribute to AE and are in alignment with the firms' goals. Firms provide all other essential resources required for conducting entrepreneurial activities, occasionally even supplying human resources when necessary. However, four informants have highlighted instances where they require support from academics specialising in other disciplines. In such cases, the university support centre serves as a platform, facilitating the integration of specialists from various fields.

Three managers from university support centres, representing both public and private universities, have highlighted that centres play a pivotal role in connecting various stakeholders within the AE ecosystem. These centres facilitate the engagement of academics in AE endeavours. This perspective aligns with the goals outlined in SPHE 2018-2030, which emphasises the establishment of Technology Transfer Offices (TTOs) in three public universities '*to develop intellectual property management by the university and boost up the commercialisation of research outputs created by the faculty*' (Bangladesh University Grants Commission, 2018c, p. 49). This exemplifies the intention behind university support centres – to assist academics in capitalising on the opportunities available to them. Although the primary purpose behind establishing university support centres is to reinforce the entrepreneurship mission of the university, these centres are occasionally *"disorganised, and few of the supports that a researcher would expect from an institution or an academic institution, those are not really available here" (USCM25).* This implies that university support centres are not effectively achieving their objectives of recognising and fully exploiting FAE activities. Moreover, the identification and utilisation of these opportunities occasionally vary based on the academic discipline.

Four respondents have illustrated that due to their academic disciplines (which are less applied), they struggle to identify suitable entrepreneurial activities to engage in. For instance, those in basic sciences and humanities expressed limited exposure to entrepreneurial prospects. One of the reasons is the perceived inability of academics in these fields to translate the knowledge they possess, as highlighted by a few informants. This deficiency in capacity has resulted in a shortage of commercialisation and practical application within these subject areas. However, a few participants countered this perspective by asserting that the challenge is not inherently tied to the academic discipline. Instead, they argue that the key lies in finding applications of the subject matter that can give rise to entrepreneurial opportunities. *"We were doing research in biomedical physics areas related to the application of physics in medicine. And we had quite a bit of success" (UA10).*

As a result of this knowledge application, several informants believed that academics from engineering, business and management disciplines have greater access to entrepreneurial opportunities than those from other fields. This notion is reinforced by the observation that the government allocates more funds to science, technology, engineering, and mathematics

(STEM) compared to the humanities, arts, and social science (HASS) disciplines (for more explanation, see Chapter 5). Consequently, STEM academics should have more avenues for engaging in AE. However, some participants outlined that opportunities were limited due to the constrained scope of their disciplines within the country. Conversely, three respondents actively involved in FAE and IAE emphasised that the opportunities are not contingent on discipline. Instead, their intention to apply their knowledge and contribute to society and their inherent capabilities and skills created openings for them. This is particularly evident in academics who engage in IAE and share their expertise with others. However, FAE necessitates research with commercial value, transferable through patent, licence or setting up of firms. Three participants clarified this distinction and noted that most academics prioritise producing high-quality publications over assessing the research's commercial viability. Moreover, a professor from a public university illustrated that patenting holds more significance for basic science than engineering, thereby introducing a disciplinary effect. Consequently, a lack of capabilities and skills in comprehending the marketability of research and the limitations within specific disciplines restrict the potential to explore new avenues such as innovation and patenting.

In summary, it was evident that some participants had industry experience before joining academia, while others engaged in AE activities (e.g., consultancy, contract research, secondment, training and development, patent, spinoff and startups) during their time in academia. These previous industry and entrepreneurial experiences helped them identify possible FAE and IAE opportunities. This is because their industry and entrepreneurial experience orient them to the requirements of the firms. In addition, university support centres also aided these participants in recognising and exploiting numerous IAE opportunities. However, the rules and regulations to support FAE are still being developed. Several participants also utilised their connections to identify and exploit these opportunities. For instance, some participants indicated that they initiated engagement in IAE when they saw funding available from industry, government ministries, or international agencies. On the other hand, some participants explained that when firms and government agencies needed support, they collaborated with academia and entrepreneurial opportunities (such as consultancy, policy development, training and development, and secondment) were presented to these participants. Some participants highlighted the importance of personal networks for accessing resources, information and skills required to identify and fulfil these opportunities.

Notably, participants engaged in FAE indicated that identifying and exploiting entrepreneurial activities is largely an individual initiative. However, some participants received support from the government and universities to file patents. However, these were not transferred to the industry. Regarding spinoffs and start-ups, some participants identified the demand for medical devices and urban gardening in Bangladesh, prompting them to establish their firms to capitalise on these opportunities. To leverage these opportunities, they tapped into support from their networks. The participants in this study pointed out an absence of entrepreneurial opportunities in the natural sciences (for instance, physics, chemistry, and maths) compared to the applied sciences (such as engineering and applied physics) and social sciences (such as business studies). Additionally, participants from public universities exhibited more prior AE experience than their counterparts from private universities, resulting in a significant difference in identifying and exploiting AE opportunities between the public and private universities. This variance is attributed to public universities' more established and resource-rich nature than private ones. Participants from public universities could draw upon these resources and personal networks to explore and exploit AE opportunities.

While participants highlighted the significance of previous entrepreneurial experience in identifying and exploiting AE opportunities, it is notable that senior academics might be better poised to recognise such opportunities. Interestingly, no difference was found between the perceptions of junior and senior academics. This is because the participants interviewed in this study are involved in different forms of AE to some extent. Thus, they might not fully realise how their career positions influence their ability to identify and exploit AE opportunities. These findings contribute to understanding the question: *What micro level factors influence academics to be involved in AE?* This study identifies that the individual ambidexterity of participants plays a pivotal role in academic engagement in AE. Individual ambidexterity can be defined as the individual-level cognitive ability to adapt flexibly within a dynamic context by appropriately shifting between exploration and exploitation" (Good and Michel, 2013, p. 437). This ability is crucial as it aids academics in recognising and exploiting existing AE opportunities and exploring new ones. Several academics highlighted the importance of motivating academics to engage in AE. However, numerous participants indicated that motivating academics is challenging, especially if they are not inherently self-motivated. Mullins (1993) suggests that this motivation serves as the driving force – both intrinsic and extrinsic – for individuals to achieve their goals and fulfil their expectations.

7.2.4 Extrinsic Motivation

Most participants referred to elements of extrinsic motivation, such as monetary benefits, improved class performance, publication opportunities, student placement, recognition, and improvement of the university's image (Table 7.4), as the driving forces behind their engagement in AE. Eight participants emphasised that they were motivated to participate in AE due to enhancing their class performance through AE experiences like secondment, consultancy and established firms. These participants believe that they can share their entrepreneurial experiences in the classroom. Furthermore, they mentioned that sharing relevant examples and practical problems made their classes more engaging and informative than focusing solely on the textbook. This AE experience enables them to effectively explain concepts in class due to their deep understanding of the problems. A private university associate professor stated, *"Not only the example in the textbook but also newer examples" (UA13).*

Table 7.4 Codes and Data Related to Sub-theme: Extrinsic Motivation

Initial Coding	Representative data
Better class performance	"…I see the difference between my classroom teaching that I did before, like before 2015 and after 2015. When I give an example, I give a very realistic problem that I faced. A very relevant example in my class" (UA14, senior lecturer at a private university) "…the consultancy and industry experience, I know what is required in the industry, so I can teach my student at least inform them. This is what you need in this industry, so that helps a lot actually during my teaching or even in my research" (UA23, associate professor at a public university)
Student engagement and placement	"…also engage some students in some form of activity (referring to AE) and also, they can learn hands on, this is one issue (UA5, professor at a public university) "…when you have the engagement with industry, you can accommodate your student for the employment. That is beneficial for both the industry and the university or the student at the university" (UA13, associate professor at a private university)
Monetary benefits	"Monetary benefit is still there. Even when you do work in government project you will get the monetary benefit but very insignificant" (UA9, senior lecturer at a private university) "…it did not occur to me that I would be richer if I filed this patent... Actually, in most patents, you do not have any financial benefit because very few of patents are actually licenced. Maybe out of 100, only one patent is licenced. So, for most patents, you do not get any return" (USCM25, professor and support centre manager at a public university) "…it is not the sole objective, but it is there (referring to monetary benefits from IAE involvement). It plays a role, yeah, why not" (UA13, associate professor at a private university)
Publications	"…the university is focusing on these sorts of activities, like consultancy and industry engagement, so that we can do some research and publish it" (UA2, senior lecturer at a private university)

Initial Coding	Representative data
Recognition & improvement of university image	"Wherever I do consultancy, I tell them, you know, you will get a report, but ultimately what I will publish is my own, so I do not want any interference on that one. So, publication is another motivation" (UM4, professor and manager at a private university) "… it is mainly the recognition that this has been a work has been done by this group or this institution… this is of value to the world. So that is mainly my attraction… To put a stamp that we can do patenting at university, to make it visible that we are capable (UA7, professor at a public university) "…I am not interested in financial benefits, but actually I would like to get an acknowledgement for my work" (UA8, professor at a public university) "…if we write something in our profile (referring to AE involvement), definitely university image also going up" (UA2, senior lecturer at a private university)

Five informants perceive that their involvement in AE improves their class performance and helps academics ensure that students understand how firms in the Bangladeshi context operate. Moreover, three participants indicated that one of the reasons for engaging in AE is to hire students to become familiar with AE activities. These respondents believe that this experience would increase the capacity of these students and assist them in their future careers. Similarly, three informants also place their students in different firms using the networks they establish during these industry-academia collaborations, even though a central office oversees student placements. This suggests that these academics are mindful of students' well-being when engaging in various AE activities. Notably, three university managers – two from private universities (UM4, UM15) and one from a public university (UM20) – reflected that some firms want to connect with their universities to showcase the skillsets they seek in prospective candidates. This interest reflects the growing confidence of these firms in these participants and, consequently, in their universities and students. As a private university manager echoed, *"Previously, I used to go to them (referring to firms) and give them an offer, now they give us the offer that we want to come to your campus. We want to showcase what we do and what the skills that are required to be successful in our organisation are" (UM4).*

Most of the participants suggested that one of the reasons for their engagement in AE is financial gain. This monetary benefit is crucial because several informants mentioned the inadequate salary structure for academics. On the other hand, three senior academics and two university managers mentioned that the economic benefit they received for their IAE activities was insignificant. Notably, junior academic participants place more emphasis on this alternative income. This implies that the significance of these economic benefits varies with the academics' positions. Several senior academics emphasised recognition is more important to them than monetary gains. In contrast, junior academics prefer financial benefits over recognition. A junior academic indicated, *"It is mainly the recognition that this has been a work done by this group or this institution… this is of value to the world. So that is mainly my attraction, but obviously, there are financial implications… To put a stamp that we can do patenting at university, to make it visible that we are capable" (UA7).*

More specifically, regarding the motivation to patent, a few participants identified recognition and potential financial implications as the primary reasons. However, three professors with patents indicated that it is not the financial benefits but the acknowledgement of their work that drives them to patent. It represents an achievement and effort to claim ownership of the innovation they created before anyone else takes credit for it. Similarly, multiple participants emphasised how stakeholders such as the government, society, university, and colleagues recognise their involvement in AE, which keeps them motivated. For instance, a senior lecturer from a private university illustrated, *"The government has given us the recognition… community is giving us the recognition. I think one day university will recognise" (UA14).*

Four participants also highlighted the significance of enhancing the university's image through their engagement in AE. They indicated that numerous academics from their university engaged in industry and government collaborations, directly impacting the university's reputation. Notably, the importance of this aspect varies based on the participant's career status. For instance, senior academics and university managers emphasised the university's reputation, while junior participants placed more value on income generation. Moreover, there was no evident difference based on the university type (public or private). On the other hand, several informants illustrated that one of the reasons for their AE engagement is to generate publications. Their involvement in AE provides them with research ideas. For example, given the challenges faced by Bangladeshi firms, participants can transform these practical issues into theory development. This motivation for publication is consistent across participants irrespective of their position, gender, or university type.

The knowledge generated from their AE involvement drives them to disseminate it through publications. These publications are affiliated with their universities, enhancing their national and international reputations. This implies that AE engagement indirectly elevates the participant's and the university's status.

In summary, several participants identified that AE engagement offers external benefits. For example, participants in this study noted that their AE involvement enhances class performance, student engagement, and placement. They also gain monetary rewards and opportunities for publication and contribute to improving the university's image. Junior academics place more emphasis on financial gains. In contrast, the senior academics see their AE engagement as a source of new topics and data they can publish and consequently improve their and the university's reputation. However, no difference was found between perspectives from public and private universities. Most participants indicated that these extrinsic motivating factors are more relevant to IAE than FAE. This is likely due to the disparity in the number of participants involved in IAE compared to FAE. Although participants shared their experiences in establishing firms, they did not emphasise the significance of discussing the implications of patents within the classroom. Moreover, if anyone requires support for patenting, they can obtain it from university support centres. While FAE activities such as patenting contribute to academics' reputation, they did not extensively mention setting up firms or startups to enhance their self-image, likely due to the societal misconception that academics cannot be entrepreneurs. These findings address the question: What micro level factors influence academics to engage in AE? This thesis has identified that academics emphasise external factors such as better class performance, monetary benefits, publication opportunities, student placement, recognition and enhancement of university image for their entrepreneurial engagement. Understanding this extrinsic motivation is crucial because participants value these factors as motivators for their AE engagement. This study also identified some intrinsic motivating factors, which are discussed below.

7.2.5 Intrinsic Motivation

Most participants engaged in AE stated that their involvement brings them inherent satisfaction. They identified capability improvement, mental satisfaction, self-actualisation, solving social problems, and network building (see Table 7.5) as intrinsic motivations driving their AE engagement. For instance, several informants stated that their AE involvement exposes them to industry and academia, enhancing their capabilities and enabling them to think creatively. Conversely, two junior academics expressed the need to improve their capabilities for AE engagement. Although these two participants believed they lacked specific capabilities, four other respondents believed that their AE engagement could aid in developing these skills. For instance, five participants indicated that involvement in AE required an understanding of how firms operate in the context of Bangladesh, familiarity with interdisciplinary approaches, and the ability to write proposals.

Table 7.5 Codes and Data Related to Sub-theme: Intrinsic Motivation

Initial Coding	Representative data
Capability Improvement	"…engage in academic entrepreneurship sharpens our expertise and helps us expand our comfort zone. It makes us more robust (UA13, associate professor at a private university) "...more exposure working with other people (referring to industry) rather than the academic will make me more interdisciplinary knowledge, or I can work in the industry as well as in academia" (UA26, assistant professor at a private university)
Mental Satisfaction & Self Actualisation	"…intrinsically it is important because they seek the service, and they think I can, or we can make a valuable contribution to them (referring to industry)" (UA5, professor at a public university) "…there is a desire in human minds to create their own company. So, for self-actualisation, can be one of the reasons of self-actualisation of building an own company or building a self-brand you can say so that one of the motives" (UA13, associate professor at a private university)
Solving Social Problems	"…I designed a handmade power adapter from the mains. I sold it to my friends in college… I also designed a device, which could stand 450 volts and switch off your equipment if it is beyond the safe limit" (UA10, professor at a public university) "…went to deep sea for 2 to 3 weeks… I saw that during fishing, they (fishermen) use dynamo… it has sound and not only that, but it also uses diesel. So, we thought that the fish normally runs away for this sound. We can use solar power. But the solar, you know that it is in the daytime, right? So, we need some storage device… they can use that while fishing so they can actually save the diesel and they can actually harvest more fish" (UA22, professor at a private university)
Network building	"…Another motivation is to build up networks. You know when I work with outside people, it helps me to build a network" (UA1, associate professor at a public university) "… they (university) are trying to develop it (referring to academia-industry collaboration) with network" (UA2, senior lecturer at a private university) "…the face value that many people know you and you have a lot of people in many industries know you. So that kind of intrinsic rewards" (UA5, professor at a public university)

In addition to capability, most participants involved in AE stated that their engagement brings them mental satisfaction and a sense of accomplishment. For instance, when these participants apply theoretical knowledge in practical settings, they feel contentment knowing they can effectively apply their knowledge. Moreover, some academics highlighted that AE engagement, particularly IAE, enhances class performance, as evidenced by student evaluations. This positive feedback from students brings them joy, which holds significant value for these participants. Four informants explained that they enjoy working within IAE as it allows them to acquire new knowledge and apply their existing expertise. Shifting to spinoffs, three participants demonstrated that their engagement with spinoffs fulfils their talents. They emphasised that not everyone can recognise the potential of research or ideas and convert them into marketable products or services, even though they sometimes receive support from their personal and professional networks. Among these three participants, two (one professor at a public university, UA10, and another senior lecturer at a private university, UA14) perceived that setting spinoffs enables them to establish their own identity and experience self-actualisation – in other words, a sense of fulfilment.

Some participants emphasised the importance of addressing social problems as a motivating factor for their AE engagement. When they identified local problems, they endeavoured to solve them by applying their knowledge, which often resulted in creating products and services. For instance, one professor (UA10) at a public university who had experience with IAE and FAE mentioned introducing a device that safeguards electronic devices from electricity fluctuations. Although it is not always the case that problem-solving efforts result in tangible products, such endeavours align with the university's goals of knowledge transfer and entrepreneurship. Achieving these entrepreneurial goals enables participants to fulfil their social commitment. Most participants perceive an additional responsibility toward society alongside their teaching obligations. One of the professors at a public university mentioned, *"If we can do some innovation and try to do something for our society, we will develop our country. So that is the motivation (to engage in consultancy and contract research)" (UA22).*

Some participants believe that their contributions to society transcend the country's economy. Additionally, seven participants emphasised the importance of strong ties with both industry and academia. They thought that these ties between industry and academia could be cultivated through their AE engagement. In this context, their inclination leaned towards IAE as opposed to FAE. The reason for this preference is that, within the realm of FAE, there was less interaction with the industry, as no patents were licenced to local industries, and spinoffs and start-ups did not require substantial attention from the industry to establish themselves. On the other hand, IAE demanded that these participants collaborate closely with the firms whenever necessary. This network of ties is pivotal as it enhances industry-academia collaboration for the university. This explains why the participants emphasised establishing robust connections with other stakeholders within the entrepreneurship ecosystem. These stakeholders encompass key personnel in different ministries, various firms' managers, and university support centres' managers. Some participants also pointed out that their involvement in AE helped them build personal and professional networks that they believed would be valuable for future AE endeavours. This was possible because their engagement in AE allowed them to collaborate with individuals outside of academia.

To summarise the aspect of intrinsic motivation, it was evident that most informants attributed significance to this intrinsic factor due to its ability to help them realise their full potential. Notably, there was little difference in the intrinsic motivation observed between participants from private and public universities. However, distinctions emerged when comparing junior and senior academics regarding capability development and solving social problems. Junior academic participants emphasised enhancing their capabilities more, whereas senior academic informants believed these skills could be improved through their engagement in AE. Additionally, senior academics placed a higher value on addressing societal problems and contributing to society than their junior counterparts. However, no significant variance was detected in participant's perceptions of other factors, such as mental satisfaction and network building. This understanding of participants' motivation is substantial as it underscores the inherent worth that academics associate with their involvement in IAE and FAE. These findings aid the researcher in addressing the question: What micro level factors influence the academics to engage in AE? Hence, this study reveals that participants value capability improvement, mental satisfaction, self-actualisation, solving social problems, and network building as the intrinsic motivating factors influencing their involvement in AE.

7.2.6 Summary

This chapter addresses the research question, what individual-level forces influence academics to engage in AE in Bangladesh? The study has revealed that various participants' perceptions and cognitive processes, including academics, university managers, and university support centre managers, substantially influence their commitment to AE. The interview discussions underscored that these participants identified several factors, such as knowledge and learning, culture and mindset, individual ambidexterity, and extrinsic and intrinsic motivations, as pivotal driving forces behind their involvement in AE. The key findings about the overarching theme of "Human Perceptions and Motivations" are outlined in Table 7.6, encapsulating the identified sub-themes.

Table 7.6 Key Findings of Theme Three: Human Perceptions and Motivations

Sub-themes	Findings
Knowledge & Learning	• Most participants were unaware of the term 'academic entrepreneurship' but actively participated in both IAE and FAE. It does not create any barriers for them. • IAE is seen as a conduit to gather practical knowledge and understand local problems and share that knowledge with industry and the government • Some participants have patents but are not licenced to any Bangladeshi businesses; hence, they were not found as a mode of knowledge exchange in this study • Few participants established spinoffs and start-ups to apply their research knowledge to practice • Knowledge and learning act as a facilitator for the participants in this study to be involved in AE
Culture & Mindset Impact	• Culture has a profound impact on the mindset of most participants and sometimes creates a barrier for them • Due to the culture of the country, several participants believed that entrepreneurship is not the job of an academic; instead, it should be teaching and research • Some participants have their beliefs which also reduced their exposure to involved in FAE (for instance, the patent would increase cost), and this is why they disclose their inventions • Some female academics stated that their familial responsibilities, teaching, and research reduced their AE exposure. However, they showed resilience and were involved in AE • Some participants from both public and private universities were hesitant to share their entrepreneurial identity because of fear and unacceptance of AE in the country • Several participants believed that due to the university's reputation, the academics at public universities get more AE opportunities. However, some participants indicated that this scenario is changing as the industry is looking at academic qualifications along with affiliation
Individual Ambidexterity	• Previous industry and entrepreneurial experience enable several participants to understand the needs of the industry and hence, position them to identify the entrepreneurial opportunity • When there is a good funding opportunity for research, academics apply for these opportunities • University support centres provide support to identify and exploit the AE opportunity. However, some participants circumvent the university support centres by using their network to exploit the AE opportunity • There are available opportunities for IAE for academics • This AE opportunity and exploitation sometimes depends on the discipline. For instance, participants in applied science have more opportunities compared to participants in natural science • Several participants described themselves as risk averse and, therefore, prefer teaching-based IAE to research-based IAE or FAE

Sub-themes	Findings
Extrinsic Motivation	• Better class performance and recognition for the academics and university are typical for most participants irrespective of position and university affiliation • Some participants want to engage the students in different (AE) projects to improve their capabilities and place the students in the industry using their connections established through industry-academia collaboration, even though there is a central university system to place the students • Early career participants attach more importance to financial gains. Although senior participants address the financial motive, they put more emphasis on generating publications from their AE engagement • Enable the participants with research ideas
Intrinsic Motivation	• Early career participants feel they need to improve their capabilities to engage in AE, whereas senior participants believed that those capabilities could be developed through AE involvement • AE engagement fulfil academics' social commitment • Most participants perceived that solving social problems and improving performance gives them a sense of achievement • AE involvement is considered a way to improve connections • Enjoy working in IAE

This thesis reveals a diverse comprehension regarding the concept of AE among participants. Although most participants understood the activities associated with AE, many remained unaware of its underlying entrepreneurial nature. Interestingly, this lack of complete understanding did not impede their engagement in AE. Their motives for engaging in AE were primarily linked to practical learning, gaining insight into local business dynamics and cultural influences, and the intention to contribute to industries and government entities through IAE. While some participants held patents, these often remained unlicensed to Bangladeshi firms, prompting a reliance on IAE to transfer knowledge to industries. Several participants established spinoffs or startups to translate research-based knowledge into practical applications, extending their academic expertise beyond traditional boundaries.

Bangladesh's prevailing culture and mindset were pivotal in shaping participants' decisions regarding AE. On the one hand, establishing firms as part of academic endeavours remained unconventional, leading to hesitancy among several participants. On the other hand, IAE activities aligned well with societal expectations due to their research and teaching nature, contributing to broader participation. While familial responsibilities posed challenges for some female participants, their involvement spanned various FAE and IAE activities (see Table 4.2a 4.2b). Certain participants reported self-imposed standards that occasionally hindered their entrepreneurial commitment – such as a reluctance to patent due to potential increased costs. Attitudes varied among private and public university academics, with concerns over a lack of clear direction for AE in private universities. Some public university participants were hesitant to reveal their academic entrepreneurial identity. The perception of more AE opportunities in public universities was linked to their size, network, and reputation, though this dynamic is evolving as industries prioritise academic qualifications and university types.

The identification and utilisation of AE opportunities correlated with participants' ambidexterity. Prior industry and entrepreneurial experiences aided in understanding industry requirements and identifying potential AE avenues. Research funding opportunities from the government and other sources also played a role. University support centres played a significant role in identifying and exploiting AE opportunities, albeit with variation across institutions. Public university support centres generally provide more aid than private ones, stemming from factors such as size, age, accessibility, and resources. Additionally, personal networks were leveraged to identify and pursue opportunities, sometimes independent of support centres.

Disciplinary influences were evident, with participants from applied sciences often finding more AE opportunities than those in natural sciences. The latter struggled due to limited perceived applications of their knowledge in the local business context.

Motivations for AE engagement varied and included both extrinsic and intrinsic factors. IAE involvement notably improved class performance, student engagement and placement, and academic publications. Financial benefits and enhanced university reputation were also cited. Spinoff founders emphasised financial gains and community recognition. Intrinsic motivations encompassed capability enhancement, skill development, problem-solving for societal issues, networking, satisfaction from contributions, and a sense of achievement. These intrinsic drivers were broadly consistent among participants, regardless of position or affiliation. Early career academics highlighted capability development, while senior academics emphasised addressing social problems. These findings provide insights into the motivating factors influencing AE engagement among academics in Bangladesh.

CHAPTER EIGHT: OVERALL DISCUSSION

8 OVERALL DISCUSSION

8.1 Introduction

Chapters five, six, and seven focus exclusively on presenting the findings. Therefore, this chapter delves into the discussion and interpretation of these findings, particularly addressing why academics engage in AE and how the different levels of actors interact to influence academics' AE engagement using the lens of institutional theory. This objective is further elaborated upon through the following research objectives:

- *To explore key stakeholders' roles and interactions in academic entrepreneurship,*
- *To identify the facilitators and inhibitors of academic entrepreneurship.*
- *To understand what motivates academics to engage in AE and*
- *To develop a framework for academic entrepreneurship.*

This thesis revealed a triadic involvement of actors at three distinct levels: government (macro), university (meso) and individuals (micro), all contributing to academics' commitment to AE (Figure 8.1). This thesis uncovers that academic commitment can manifest either FAE, IAE, or both. This chapter offers a comprehensive discussion of the findings and contributions of this thesis.

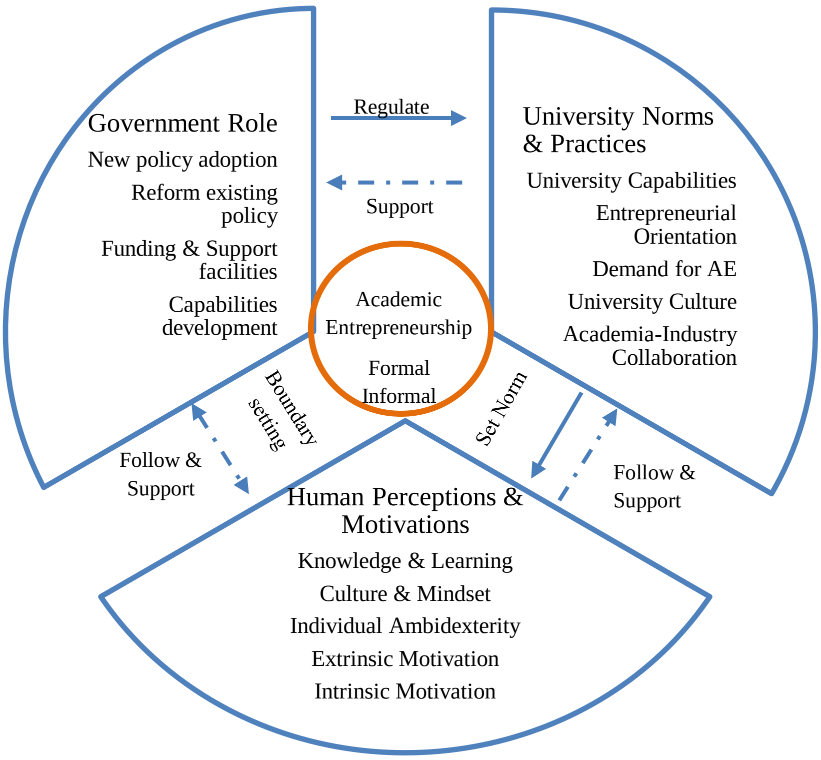

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Figure 8.1: A Multilevel View of AE

Direct effect   Indirect effect

8.2 Multilevel View of AE

Considering the findings of this study, a multilevel view of AE (Figure 8.1) has been formulated to offer a comprehensive outlook on academics' engagement in AE, guided by the institutional theory lens. This also helps answer the research question, how do these different levels interact to influence AE in Bangladesh? This model is an elaboration of the AE model represented in Figure 4.9. Similar to Figure 4.9, Figure 8.1 shows that academic entrepreneurial engagement is influenced by three categories of actors: government, university, and academics. However, this multilevel model (Figure 8.1) elucidates the interrelationships among these actors, with fluid, blurred, and interconnected boundaries and responsibilities. The unique attributes of each actor and the dynamics between them collectively impact the success or failure of academic involvement in entrepreneurial pursuits.

This thesis uncovers that academics participate in IAE activities like consultancy, contract research, and secondment, as well as FAE activities like patents, spinoffs, and startups. It discloses that the government shapes universities and establishes higher education and entrepreneurship regulations. While a direct influence of the government on academic activities was not explicitly identified, the government can exert its influence on academics indirectly through university norms and practices.

Moreover, this thesis reveals that the government's decision-making predominantly employs a top-down approach. Consequently, academics exert limited influence from the bottom up on the policy development process for academic entrepreneurship in Bangladesh. This is why academics are often unaware of the specific policies and regulations established by the government. While academics are expected to adhere to university norms and practices, they also possess perceptions and motivations shaping their commitment to AE. These features facilitate or inhibit academics' entrepreneurial engagement, as explained below. The multilevel framework is used to structure the discussions in the next section.

8.3 Government Role

The government's role does not significantly influence academic entrepreneurship (AE) in Bangladesh. As demonstrated in Figure 8.1, the government can promote AE by adopting new policies, reforming existing policies, funding and support facilities, and capability development.

Bangladesh is one of the world's largest manufacturing hubs (The World Bank, 2021). Operating as a factor-driven economy, it competes based on primary factor conditions like low-cost labour. Previous studies highlighted various barriers to entrepreneurship in Bangladesh, including limited access to finance, weak legal framework, political instability, cultural and mindset constraints, and inadequate support services (Jaim, 2021; Mair & Marti, 2009; The World Bank, 2022). Despite these barriers, government policies have recently emphasised the need for a transition towards a knowledge economy to foster a culture of innovation, entrepreneurship, and economic growth (The World Bank, 2016). However, knowledge and technology transfer processes are less mature than those in developed economies. This underdevelopment does not discount the necessity of adopting a knowledge-driven perspective. The government acknowledges the importance of innovation by formulating policies like the National Innovation and Intellectual Property Policy and the National Science and Technology Policy. Additionally, it has established technology transfer offices (TTOs) and incubators (see section 5.2) to facilitate collaboration among stakeholders, including universities and industries, in the technology transfer process. This perspective presented in this thesis aligns with the findings of Kirby and El Hadidi (2019), who observed a similar emphasis by the government on encouraging universities' involvement in the technology transfer process within the Egyptian context.

Extant literature has consistently highlighted the role of legal and institutional factors in shaping entrepreneurship across different contexts (Guerrero, Urbano, Fayolle, et al., 2016). The Bangladesh government has adopted different policies (see Table 5.1) to promote innovation and entrepreneurship, consistent with prior research (e.g., Etzkowitz, 2003a; Jung & Lee, 2014; Mok, 2015). Although comprehensive policies specifically focused on AE are absent in Bangladesh, some of these policies cover aspects relevant to AE. The assumption is that these policies could encourage academics to engage in informal AE (IAE) and formal AE (FAE). However, it has been argued that these policies often fall short of effectively involving a larger number of entrepreneurs in the national entrepreneurship and innovation process (Wright, 2014). This study reinforces this viewpoint by presenting the perspectives of academics engaged in AE. Furthermore, this study reveals that the design and implementation of these policies are usually confined to specific policy departments, with minimal or no coordination among stakeholders. These findings echo the observation of Ács et al. (2014), underscoring how a lack of coordination among the stakeholders can hinder the successful implementation of government policies.

Even though a mix of policies can increase the complexity of implementation and understanding of the various actors involved, it can concurrently mitigate the intricacies of relying solely on a single policy instrument, rendering policies more effective (Gan et al., 2021). Indeed, a one size fits all approach to the technology transfer model is unrealistic due to the organisational needs and distinct characteristics of each context (Guerrero & Urbano, 2019; Sánchez-Barrioluengo & Benneworth, 2019; Wright et al., 2008). However, this study identified a notable trend where academics from both public and private universities generally exhibited limited awareness of the government's recent policy adoption. This lack of understanding is likely to reduce academic entrepreneurial engagement.

Another reason for the reduced impact of adopting these policies is the lack of proper arrangements, procedures, and structures for industry-academia collaboration (see section 5.2.1). It is argued that the Bayh Dole Act in the US context (Aldridge & Audretsch, 2011) and the Employees' Invention Act in the German context (Cunningham, Lehmann, et al., 2019) were not sufficient to accelerate entrepreneurial innovation from the university to the industry. This means the structural gap keeps the academics confused and impedes their entrepreneurial engagement, reflecting this coordination problem between the actors (Ács et al., 2014). Moreover, this thesis reveals that the Bangladesh University Grants Commission (UGC) is the apex body for implementing policies relevant to higher education. However, they were yet to enforce the policies to create a bridge between the industry and academia. Additionally, this thesis found that academics were unaware of the government's new policy adoption. Hence, lack of awareness and such structural gaps hinder academics' entrepreneurial activities, even though new policies related to AE would enable academics to engage in entrepreneurial activities because it gives legitimacy to their entrepreneurial activities outside of their academic responsibilities (Cunningham, Lehmann, et al., 2019; Fini & Toschi, 2016). These results support the findings of Van Horne and Dutot (2017). Another reason for the limited impact of these policies is the replication of initiatives that are felt to be successful elsewhere without providing the resources and understanding of the embedded heterogeneous context as the government is trying to implement the Bayh-dole type act for technology commercialisation (Bangladesh University Grants Commission, 2018c). These findings concur with the results of Aldridge & Audretsch (2011).

Private universities are found by this study to be constrained by the UGC in their commercial or entrepreneurial endeavours (See section 5.2.2). At the same time, it is perceived that private universities are more commercially orientated than public universities (Berbegal-Mirabent et al., 2015). These private universities cannot engage in any entrepreneurial activities, and by entrepreneurial activities, the participants mean setting up a business (spinoff or start-up) that the UGC imposes. Private universities are yet to offer doctorates in Bangladesh and need to gain permission from UGC to do anything new. This offering of a PhD is crucial for the university to create new knowledge that can be transferred to industry. This finding is in line with Sarkar and Hossain (2018), who disclosed that public and private universities offer higher education with the permission of UGC. However, participants from public universities disclosed that the UGC has minimal control over these institutions, as they function based on their regulations, except for funding allocation. This allocation determines which areas this fund would be used and can sometimes reduce the scope to be employed in other areas such as commercialisation. Previous studies (e.g., Donina & Paleari, 2019) illustrate that increasing the authority of the university boards and allowing them to make the decisions performed by the Education Ministry and UGC would increase the universities' involvement in decisions regarding structural/strategic planning and budgetary allocation. Hence, this control of UGC impedes these public and private universities' research and entrepreneurial endeavours and reduces the opportunity to commercialise the research outputs.

This thesis uncovers that the government provides funding for public universities, while private universities do not receive any funding from the government and operate through their funds (see section 5.2.3). Although the government has increased the budget for research, it recently asked the universities to mobilise resources from the private sector. It is also found that this fund is allocated more to STEM projects than HASS projects. Although this shows results similar to those of O'Shea et al. (2005) that there is higher federal funding in science and engineering, unlike their findings, this study does not find any evidence that this funding increases or decreases the number of spinoffs. However, this thesis finds that through Startup Bangladesh, the government provides investment in equity, convertible debt and grants in pre-seed, seed, and growth-stage start-ups to support technological innovation (*Startup Bangladesh Limited*, 2022). Therefore, to get this fund, anyone needs to bring innovative ideas or technology that can be commercialised through setting up a firm, which is not the case with the participants in this study. Several participants indicated that their government funds were inadequate to finish a project. The effect of government funding to promote FAE and IAE was inconclusive, and it found that government funding enables consultancy for the government, patents, and start-ups. This result is similar to the findings of Hooi and Wang (2020), who argued that government funding has a positive effect on patents and consulting but has no impact on spinoff creation or future patents.

Some of the government's initiatives towards funding and support services for innovation and entrepreneurship could bring positive results for AE. However, it is still not creating much impact as these initiatives were taken recently, and most participants are unaware of this support provided by the government. This finding is also supported by the assertion that funding and support services significantly affect the level of commercialisation income of the university found in other emerging (Belitski et al., 2019) and developed countries (J. Faria et al., 2019; Grimaldi et al., 2011). Although the support and funding do not bring the stipulated outcome in the Bangladeshi context, they show the trajectory for future development.

This thesis also discloses that some of the existing policies hinder the entrepreneurial endeavours of academics. For instance, the current tax policy does not recognise any income generated from the AE activities as tax exempted, and scholars have to pay more tax on this additional income. This structural barrier reduces academics' interest in being involved in AE. In a recent study in 53 countries, Darnihamedani et al. (2018) found that higher corporate and personal income taxes have a deterring effect on innovative entrepreneurship (Civera, Meoli, et al., 2020) found that in the context of Italy, academics are given tax exemption and fiscal deductions to involve in AE. A study in emerging economies found that tax policies adversely impact firms (Boozer, 2021). Moreover, several studies (e.g., Acs et al., 2016; Rybnicek & Königsgruber, 2019) illustrated that tax incentives facilitated industry-academia collaboration. Haufler et al. (2014) explored how tax policies affect the entrepreneurs' appetite to take the risk to commercialise the innovation through market entry (e.g., spinoff) or sale (e.g., patent, licence, consultancy). Hence, this structural facilitator would increase the academic's propensity to engage in AE. In addition to tax policy, this study reveals that the higher education structure of the country is complex (see section 5.2.2) as there are different departments involved, and various regulations divert the government's focus on innovation and entrepreneurship. Similarly, it has been argued that the education system requires to be more application-orientated for the knowledge and technology to be commercialised, which aligns with the previous research (Etzkowitz, 2003a; Vaz de Almeida et al., 2019; Ylijoki et al., 2011).

Although the government implements different initiatives to promote innovation and entrepreneurship in Bangladesh, several participants have alleged corruption in various government offices. This is the view of the respondents with limited independent corroboration and no interviews with government officials. However, the corruption perception index supports this assertion. Bangladesh ranks 147 out of 180 countries (Transparency International, 2023). They also perceive that this corruption reduces the efficiency of these offices. This inefficiency was evident through the prolonged patent process illustrated by some participants. Although there was a rise in the patent application, the number of local patents accepted was insignificant. Previous studies showed adopting new public policy may facilitate patent registration (Cunningham, Lehmann, et al., 2019; Grimm & Jaenicke, 2012). Still, professional expertise in patenting, funding and organisational support is essential in reducing the time and increasing the number of patents. Therefore, these structural problems mitigate the implementation of policies adopted to promote innovation and entrepreneurship. Moreover, this study demonstrates that universities face political interference (Bangladesh University Grants Commission, 2018c), which is in line with previous studies that in developing countries, higher education has been seen to be subject to political interference (Davari et al., 2018; Urban & Chantson, 2019). This political interference is detrimental to AE as it could reduce the performance of the universities in terms of research.

In summary, the government has initiated promoting innovation and entrepreneurship. Although the government has provided funding and support services, these seem to play a limited role in influencing academic engagement in AE. On one hand, some of these initiatives facilitate the AE culture, such as intellectual property rights (IPR). On the other hand, some policies hinder the advancement of AE, such as the tax policy. Moreover, structural gaps and coordination issues within government entities undermine the effective implementation of these policies to advance AE. Therefore, this thesis addresses the research questions concerning macro-level factors and the interactions between different stakeholders, revealing that the macro-level factors, including structural gaps, lack of coordination, and tax policy, negatively influence the AE ecosystems. However, IPR, funding and numerous support services facilitate the AE culture. Although the government does not directly influence academics, it exerts substantial control over universities and academic activities. Nevertheless, the university also implements policies related to AE; therefore, it is essential to comprehend the norms and practices of the university.

8.4 University Norms and Practices

Although the government formulates different policies related to AE, the university follows and carries out these policies to increase research commercialisation (Alessandrini et al., 2013; Belitski et al., 2019). This study uncovers that public and private universities are subject to government regulations in Bangladesh. However, the control over private universities is greater than that over public universities. Kirby and El Hadidi (2019) argued that universities need to move away from close government regulations to optimise their entrepreneurial capability.

This thesis discloses that the university norms and practices (Figure 8.1) are essential for the AE process. These norms and practices are reflected through university capabilities, entrepreneurial orientation, demand for AE, university culture and academia-industry collaboration.

This thesis discovers that the VC plays a crucial role in policy adoption and implementation. Similarly, the previous studies identified that the strategic goals are set by the university managers who set the university's strategic directions and the internal implementation of new policies to promote technology transfer and foster the entrepreneurial and innovative capacity of universities (Civera, Lehmann, et al., 2020; Cunningham, Menter, et al., 2019). A university's success depends on securing the resources to achieve its entrepreneurial missions (Benneworth & Jongbloed, 2010). However, this study observed differences between public and private universities regarding their capabilities. The public universities (A and B) are large and bureaucratic, and introducing new policies took a long time. In contrast, private universities (C and D) can adopt changes quickly. Even though the more prominent university has the greater capacity to produce research outputs (Berbegal-Mirabent & Sabate, 2015), implementing AE policies determines the academic entrepreneurs' IAE and FAE involvement. Hence, this thesis reveals that university size does not significantly explain the creation of IAE or FAE, which also aligns with the previous study (Algieri et al., 2013).

Another university capability is the availability of funding allocation for research, and this study noticed a difference in research funding allocation in private and public universities. Private universities allocated more research funds than public universities (see section 6.2.1). This finding also aligns with the previous studies that the funding determines entrepreneurial and strategic actions linked to research commercialisation (Cunningham, Lehmann, et al., 2019; Davey et al., 2016). This thesis uncovered that research fund allocation emphasises the initiative of private universities for research. However, in contrast to their public university counterparts, private university academics demonstrate a lack of AE engagement. Cunningham and Link (2014) argue that there will be less academia-industry collaboration concerning collaborative research and development due to the lack of university funding. Although participants from private and public universities exhibited differing opinions regarding the adequacy of funding, they agreed about the inefficiency in utilising research funds, which creates a barrier to AE engagement.

Another crucial resource for universities is the recruitment of appropriate human resources. This thesis reveals a shortage of academics with doctoral degrees, which is essential as this degree enables academics to engage in research and adapt to the shifting expectations of stakeholders, reflecting the findings of Bienkowska et al. (2016). Moreover, the quality and capability of academic entrepreneurs determine the extent of the impact of research projects and the appeal of innovations to the market (Del Giudice et al., 2017). Notably, Benneworth and Jongbloed (2010) demonstrated that knowledge resides within people and can be transferred through its relevance to the context. However, this thesis uncovers that some participants with doctorates abroad could not effectively transfer their knowledge to Bangladesh. The participants in this study illustrated that one of the reasons for this issue is the recruitment policy of the universities. This thesis observed that entry-level recruitment does not require a doctorate, and priority has been given to candidates with an excellent educational background. Moreover, one of the policy documents demonstrated the absence of a 'staff development programme' in the universities (Bangladesh University Grants Commission, 2018c, p. xvi), which is reflected in the AE performance of the university. This is why previous studies (Civera, Lehmann, et al., 2020; Fini & Toschi, 2016; O'Shea et al., 2005) have emphasised investing in human resources to enhance universities' AE output.

Social networks are another capability of the university that plays a significant role in resource accumulation. The participants perceived their university's reputation as crucial to their AE engagement. Moreover, due to the large size of these universities, there is a significant number of alumni. As a result, these universities focus on collaborating with industries and involving alumni in the research process to accumulate the necessary resources for research. In addition, a strong alumni base facilitates the university's access to firms, as several participants demonstrated that their entrepreneurial opportunities come through their students. This finding is consistent with previous studies that highlight how strong networks and alliances attract industry funding and grants and enhance academia-industry collaboration (Cunningham, Menter, et al., 2019; Diánez-González & Camelo-Ordaz, 2019; Fini et al., 2017).

This thesis discovers that these universities collectively demonstrate entrepreneurial orientation through their activities, which aligns with previous studies (Gosens et al., 2018; Grimaldi et al., 2011). The majority of participants took part in either IAE, FAE, or both. This engagement of academics brings commercial benefits for them and the university. This study also uncovers that universities collaborate with other universities, and within universities, there is collaboration between departments to foster research activities. This type of collaboration between departments provides academics with the opportunity to build interdisciplinary teams by bringing together disparate knowledge, which aligns with the findings of D'Este et al.

(2019), enabling them to recognise and respond to entrepreneurial opportunities and increasing entrepreneurial engagement (Boni et al., 2009; De Silva, 2016; Libaers, 2012). Therefore, this collaboration between departments, universities, and industry facilitates academic engagement in AE.

Although some participants lack awareness of the universities' adoption of an entrepreneurship mission, university managers and support centre managers illustrated some attempts of these institutions to adopt an entrepreneurship mission by incorporating some AE-related policies. However, the primary focus of these universities is to promote student entrepreneurship. Public universities also promote research commercialisation through academics' entrepreneurial engagement in consulting, contract research, secondment, training and development, patents, and spinoffs. Adopting entrepreneurship is crucial for universities as it helps set the strategic direction to become entrepreneurial (Cunningham, Menter, et al., 2019). Additionally, this thesis found that the university's commitment to adopting an entrepreneurship mission increases the entrepreneurial intentions of academics, similar to the finding of Feola et al. (2019). However, this study found that adopting a university mission does not significantly influence academic entrepreneurial engagement. One reason for this lack of significant influence is the participants' limited engagement in the entrepreneurship mission adoption process and their lack of awareness. Another explanation for this limited influence is related to their perceptions and motivation (see Chapter Seven). Interestingly, although macro-level policies constrain these private universities, their intent and orientation to become more entrepreneurial have facilitated the adoption of entrepreneurship-related policies. Furthermore, to foster entrepreneurship within the university, these institutions have recently established support centres, including incubators, TTO, innovation and entrepreneurship centres.

Although private university support centres primarily promote student entrepreneurship, public university support centres focus on supporting academics and student entrepreneurship. One reason this study discovers this difference between public and private universities is the recent strategic emphasis towards entrepreneurship. Another reason highlighted by the participants is the human resources of these support centres. Since these centres have been established recently, universities are still allocating resources to them. Moreover, the decisions made by the managers in these centres are influenced by their characteristics, which is also supported by Clarysse, Tartari, et al. (2011) and Fini et al. (2017). While Belitski et al. (2019) found that university support centres bridge academia with industry in a transitioning economy, the evidence in this study is mixed. This can be attributed to the early stage of development of these centres, but it nevertheless sets the trajectory for their growth. Some centres collaborate closely with industry, while others, particularly in private universities, are still formulating policies related to the functions of these centres. Establishing these support centres underscores the entrepreneurial orientation of these universities, which might contribute to the higher potential for both IAE and FAE among academics (Backs et al., 2019; Fini et al., 2017). Although it might be assumed that these support centres would enhance academics' continuous involvement, the participants did not demonstrate significant engagement. This aligns with the argument that support centres may neither be effective facilitators nor promoters of knowledge transfer and spillover from the university (Belitski et al., 2019). One reason several participants illustrated is the lack of awareness about these support centres, as university support centres are a relatively new phenomenon in Bangladesh.

This study demonstrates that there is limited demand for university technology commercialisation mechanisms. This finding is consistent with Gan, Hong and Hou (2021) conclusions, which indicated that university technology commercialisation mechanisms are limited in developing countries. One possible reason could be the emergent stage and legitimacy of these support centres, which affects participants' confidence, potentially causing them to bypass them (Belitski et al., 2019). Another explanation highlighted by some participants for this limited facilitation of these support centres is the inadequacy of human resources, presenting a challenge for these centres to realise their entrepreneurial potential. This finding is also supported by Fischer et al. (2019). Another explanation could be that these support centres operate within an entrepreneurial and industrial landscape that lacks opportunities for boundary-spanning collaborations (Drivas et al., 2018). In many developing countries, universities are situated within weak entrepreneurial ecosystems (Belitski et al., 2019; Gan et al., 2021). Initially, these support centres aimed to promote university knowledge and critical technologies to the industry. However, they may fall short of effectively facilitating collaboration between industry and academia.

Despite demonstrating some entrepreneurial orientation by these universities, this study observed that the demand for AE within the university system remains low among university managers and academics (see section 6.2.3). The demand signifies that commercial needs influence the research conducted by university scientists and any eventual technology transfer (Li & Tan, 2020). In other words, the more importance a university places on AE, the greater the likelihood that academics can leverage university knowledge to create entrepreneurial value. The emphasis on incentivising the AE endeavours or increasing knowledge commercialisation income would determine the demand or need for AE in the university. Most informants indicated that these universities prioritise teaching, research publications and administrative work for promotion. As a result, the focus often falls on publishing. Participants also emphasised the significance of publishing for the university's reputation. This aligns with the findings of Blind et al. (2018) and Davey et al. (2016). While Belitski et al. (2019) found that in a transitioning economy, high quality publications target national peer-reviewed journals and have little association with research commercialisation, participants in this study mentioned that they publish in high-quality journals. AE engagement facilitates achieving excellence in research activities (De Silva, 2016). However, this study reveals that involvement in AE is not recognised in promotion decisions. One reason for this dependence on publications and the lack of recognition of AE in promotions is due to the universities' existing recruitment and promotion policies (Bangladesh University Grants Commission, 2018c). This thesis uncovers that young academics prioritise teaching and publishing for career growth more than their senior colleagues, corresponding to the findings of Zhao et al. (2020). Another reason could be the nascent stage of AE in these universities. While IAE is encouraged, sometimes the establishment of spinoffs is discouraged. The prospective reason elucidated by some participants is that spinoffs are seen as risky and require more time to manage. Moreover, AE regulations would clarify and formalise the conditions under which academics may pursue entrepreneurial activity (Muscio et al., 2016).

The salary structure is another factor influencing academics to engage in AE is the salary structure; some participants illustrated it as "*insufficient*". This salary policy is essential because it determines the academics' societal position (Derrick & Bryant, 2013). Similarly, Bernasconi (2005) argued that higher salaries outside academia are not sufficiently reflected in academic compensation. Some participants at public universities mentioned that they received similar incentives irrespective of the relative importance or higher impact of their publications. Hence, this thesis discloses that within these universities' structure, the demand for AE is low, which poses a barrier for academics to engage in AE. As a result, Bernasconi (2005) stressed that instead of having a uniform salary structure for all academics, universities need to consider the "relative scarcity of qualified academics in the field, salary levels outside academia, and the salary range for professors of the same rank elsewhere in the university" (p.260).

Similarly, this thesis unfolds that these universities emphasise teaching more than research. However, some universities are progressively enhancing their research focus alongside teaching. Therefore, the importance of the research atmosphere is identified in institutional goals concerning research, support for research, and the setup. This thesis observes that there is no clear institutional goal focused on research. However, private universities emphasise research much more than public universities. One reason for this increased emphasis identified in this thesis is to overcome the belief that public universities are more research-intensive. Although this research atmosphere is not directly correlated with research commercialisation, a supportive research environment would likely augment the propensity to conduct high-quality research, which can subsequently be commercialised (Bernasconi, 2005).

Conversely, a recent study (Fischer et al. 2019) conducted in a developing country indicated that public universities exhibit more robust research activity and that such activity negatively impacts AE. Surprisingly, this thesis reveals that public universities were more exposed to AE than private universities. This counterintuitive finding can be attributed to public universities' reputation, practice, and higher social contributions. This also differs from the findings of Berbegal-Mirabent et al. (2015), which suggested that private universities are more active and efficient in technology transfer and commercialisation initiatives. One reason for this discrepancy found in this study is the macro-level implementation barriers that hinder the initiatives of these private universities. Another factor could be the private universities' initial focus on teaching focus and their lack of entrepreneurial orientation. This finding also diverges from the findings presented by Fischer et al. (2019), which suggested that academics in teaching-led universities would be more inclined to engage in entrepreneurial activities. As private universities prioritise teaching, their primary income comes from student fees, aligning with Berbegal-Mirabent et al. (2015). Consequently, private universities may struggle to diversify their income due to macro-level barriers.

This thesis reveals that the universities' focus on teaching and research increases the workload of academics. Due to this workload, several participants struggle to balance their work and personal life. In addition to their teaching and research responsibilities, engaging in AE would further impact their academic duties, potentially requiring compromises in their personal life. While senior academics have fewer teaching responsibilities than junior academics, their workload is augmented by research and administrative tasks. This increased workload reduces the senior academics' opportunity to engage in AE. Bernasconi (2005) highlighted the need for workload policies to be defined by the department, as they can vary significantly across the university. However, Baldini (2009) demonstrated no significant correlation between universities with heavier teaching and administrative duties and fewer patents generated. This thesis discovers that engagement in AE does not lead to adjustments in teaching and research responsibilities. Additionally, academics in this study prefer IAE over FAE due to the flexible allocation of work time. One reason for the lack of workload adjustment could be the insufficient emphasis on AE as a conduit for knowledge transfer (Wright et al., 2018). Another explanation for this problem with the work time allocation problem is the universities' overemphasis on teaching and research while neglecting other forms of engagement by academics within the university system. Consequently, the challenges posed by workload and the struggle to maintain work-life balance hinder academics' engagement in AE within these universities. Existing literature highlights the significance of adaptable leave-of-absence policies, established pathways for faculty interested in starting new ventures, specialised offices to facilitate the entire process, incubators for early-stage businesses with shared resources, and subsidised resources to manage the workload of academic entrepreneurs (e.g., Balven et al., 2018; Fini et al., 2011).

Even though some academics manage to balance their workload and engage in AE, they are required to share a portion of their AE income with the university. This income sharing varies among these universities. Participants mentioned that they are obligated to share a part of their AE earnings for utilising the university's resources and contributing to its development. This finding is also supported by Zhao et al. (2020). The income distribution from AE engagement between academics and their universities is crucial as it defines their roles. This thesis uncovers that while participants have not expressed discomfort with income sharing, they expect more support from the university for their AE engagement. Universities' supportive policies (regarding income distribution), which provide different supports in exchange for income, would facilitate AE engagement (O'Shea et al., 2007). This thesis reveals that university culture hinders the AE engagement of the academics, which is diverging from the finding that the institutional culture can promote entrepreneurship (Cantu-Ortiz et al., 2017).

This thesis finds that the participants attach significance to industry-academia collaboration for AE engagement. Although there might be a perception that academia and industry are not interested in cooperation, numerous sources indicate that academia and industry have expressed intentions to collaborate for innovation and economic growth. As highlighted in a policy document (Bangladesh University Grants Commission, 2018c, p. 49), establishing an "appropriate legal framework" is one reason for this. However, participants pointed out several factors contributing to the lack of academia-industry collaboration (see section 6.2.5). One perceived factor is a knowledge gap between academia and firms. This gap arises from the argument that knowledge generated in an academic environment differs from the tacit knowledge cumulated in corporations (Clarysse, Tartari, et al., 2011). This thesis reveals that despite various initiatives universities and firms take, both parties often lack awareness of each other's efforts. Another reason, as stated by the informants, is the absence of policies within firms to incorporate full-time academics into their systems, a finding consistent with D'Este et al. (2019). Another perspective participants have is that the knowledge generated in university is often more generic, also supported by Clarysse, Tartari, et al. (2011), making businesses less inclined to patent and license technology originating from universities. Despite the significant impact, firms often rate universities' contributions to their innovation poorly (Howells et al., 2012).

This study also reveals that industries prefer established and tested technology from abroad over utilising local expertise from universities. This preference is attributed to firms' lack of awareness regarding the quality of local innovations and the contradiction between the university and business cultures. Internal control systems for for-profit firms might not be directly applicable to typical non-profit-oriented universities (Davey et al., 2016; Good et al., 2020). Another explanation for this lack of confidence could be the lack of goal specificity between universities and firms (D'Este et al., 2019). Goal specificity refers to precise performance standards to be achieved by the actors involved in a collaboration. Kirby and El Hadidi (2019) argue that conflicts between academia and industry collaborations arise from universities' goal to publish findings while industry aims to keep them confidential. One potential collaborative avenue is enhancing research and development (R&D) (Cunningham et al., 2014). However, this study finds limited evidence of firms investing in R&D and minimal participation of universities in business R&D (Bangladesh University Grants Commission, 2018). Interestingly, this thesis unfolds that the industry-academia interaction is evident through the academics' personal relationships and social capital, aligning with the findings of Al-Tabbaa and Ankrah (2019) and D'Este et al. (2019).

In summary, these four public and private universities have distinct capabilities. Differences can be observed in decision-making, financial resources, and the presence of social and human capital. Some practices of these universities facilitate AE, while others create barriers. For example, due to the large size and bureaucratic nature of public universities, they may encounter challenges in swiftly embracing new decisions and changes compared to private universities. However, it is surprising that these public universities are currently in the process of adopting several policies related to AE. Even though private universities confront regulatory challenges from the UGC and currently lack guidelines concerning AE, two private universities have embarked on initiatives towards entrepreneurship. While these universities display intent and take steps towards AE adoption, it is early to speculate that they have fully embraced an entrepreneurial culture. This thesis also unveils that academics within these universities collaborate with businesses to transfer knowledge through consultancy, contract research, and student placement. This academia-industry collaboration leaves a positive impression on academic AE engagement. Conversely, a lack of communication, perceived absence of incentives and rewards, and work-life imbalance have been identified as negatively impacting academics' AE engagement. These meso-level factors are essential for transmitting the university entrepreneurship mission to the individual level.

8.5 Human Perceptions and Motivations

The general entrepreneurship literature emphasises that entrepreneurs determine the success of any entrepreneurial endeavours (Fini et al., 2018). Although general and academic entrepreneurs have similarities, academics' cognitive and perceptual factors to engage in entrepreneurship differ from general entrepreneurs (Freel et al., 2019). This thesis reveals that the participant's (such as academics, university managers, and university support centre managers) perceptions and cognition influence their AE commitment, and this is also supported by Mcadam et al. (2010) and Miller et al. (2018). This commitment varies based on knowledge and learning, culture and mindset, individual ambidexterity, and extrinsic and intrinsic motivation influencing their AE engagement (Figure 8.1).

Although the participants are purposively selected based on their FAE and IAE involvement (see section 7.2.1), it is found that they are unaware of the term 'academic entrepreneurship'. Their lack of understanding of AE does not hinder their AE involvement. One of the reasons for this counterintuitive result is their perceived understanding of the importance of these activities (such as consultancy, contract research, and secondment) to their practical knowledge and grasp of local problems. However, the participants perceive FAE as a mode of knowledge transfer instead of a conduit of learning. This is also supported by the view that learning motivation is positively associated with higher industry engagement through IAE (D'Este & Perkmann, 2011; Davey et al., 2016). Another reason for using IAE over FAE is the less complex process and rules requiring IP protection to engage (Abreu et al., 2016). It is argued that IP regulations constrain the entrepreneurial engagement of academics (Abreu et al., 2016). Most participants illustrated their universities' teaching focus, supporting the argument that academics in teaching led universities to engage highly in problem-solving activities (e.g., Abreu et al., 2016; D'Este & Perkmann, 2011; De Silva, 2016). These problem-solving activities enable academics to learn and understand the local problems and, consequently, offer solutions to these problems. However, in this study, informants do not demonstrate any engagement in international problem-solving activities.

In these universities, academic FAE involvement was limited. No evidence is found of licence. Although some participants demonstrated doing patents and establishing spinoffs and start-ups, it is still low. One of the reasons for this reluctance to set firm is that it is perceived to be inappropriate by academics. The participants grow this perception with the effect of the national culture (see section 7.2.2). However, IAE activities are accepted within society. One of the reasons for this belief is that these activities are considered research and teaching-related activities and are not seen separately from their academic responsibilities. Therefore, the national culture gauges the entrepreneurial behaviour of academics (Del Giudice et al., 2017). In addition, a gendered mindset prevails in academia in Bangladesh (Ahsan & Cullen, 2022). It is commonly perceived that women are responsible for looking after domestic tasks. In this study, the female participants demonstrated that this familial responsibility poses a challenge for the women academics to their AE involvement. However, they showed resilience and engaged in FAE and IAE activities. This finding differs from the existing argument that gender does not affect the decision to become an entrepreneur (Aldridge & Audretsch, 2011), and male scientists are likelier to start a company (Aldridge et al., 2014). One of the reasons for this difference is that there are fewer female academics in academia, and those in academia have a strong motivation to demonstrate their capability and desire for independence and autonomy (Ding & Choi, 2011). Another reason for female academics' AE engagement is the support they receive from their spouses (Ahsan & Cullen, 2022). However, the number of involvements the female academics illustrated is less than the male counterparts, and hence there is a gender gap. This also supports the findings of Abreu and Grinevich (2017). The difference is not due to the entrepreneurial intention of the female academics but the mindset and structural problem within the country that hinders female academics' entrepreneurial engagement (Ahsan & Cullen, 2022).

It is found that some scientists develop a business mindset while some preserve the scientific mindset, concurring with Kirby and El Hadidi (2019). Similarly, some participants illustrated that their self-imposed standards and fear (see section 7.2.2) inhibit their entrepreneurial commitment. Some participants do not patent because they believe that patenting the research would increase the cost of the invention. Therefore, these academics publish their research instead of patenting. Previous research suggests that academics may be reluctant to patent out of concern for how it could impact their professional advancement. However, this study found that academics tend not to patent due to their standards. Some participants also indicated fear of disclosing their entrepreneurial identity to the university. Recent studies show that fear influences entrepreneurial action and prevents academics from AE involvement (Davey et al., 2016; Van Gelderen et al., 2015). However, some respondents in this study expressed concerns about their identity disclosure due to the fear of job loss and the potential impact on career progression. Although this was evident in the private universities, some public university participants also demonstrated similar concerns, given that job security is higher in public universities compared to private universities. One of the reasons for this constant fear is the level of acceptance of AE by society. Another explanation for this concern could be the lack of guidelines from the university.

Another perceived difference the informants had was that the industry prefers public universities for academia-industry collaboration. However, the evidence also indicates that this scenario is changing, and public and private universities cooperate with firms. This perception that the university affiliation of the academics determines the AE engagement is detrimental to their capability development and consequently to their AE engagement. However, it is found that businesses are not only considering the academics' university affiliation, but they are also looking into the quality of the academics. This finding concurs with the previous studies that a relationship exists between university type and AE engagement (Abreu et al., 2016; Berbegal-Mirabent et al., 2015).

It is found that this identification and exploitation of entrepreneurial opportunities depend on the academics' previous industry experience, entrepreneurial experience, and discipline. Moreover, it is found that the IAE opportunities are more than the FAE, and some participants are risk averse and prefer teaching-based IAE to research-based IAE or FAE. It is argued that the cognitive ability of entrepreneurs to find opportunistic situations (Link & Sarala, 2019) and the ability to identify and exploit opportunities are highly influenced by the environment in which they operate (Davey et al., 2016; Shane, 2000). It is found that academics are oriented with industry practice through industry experience. This industry experience helps academics understand the industry environment and develop commercial and industrial skills that can complement their scientific knowledge (Abreu et al., 2016; Civera, Lehmann, et al., 2020) and without the knowledge of business as well as application of theory create barriers for the academics AE engagement (Davey et al., 2016). This previous industry experience would orient the academics with insights into what would be commercially valuable and the opportunity to produce inventions that can be patented, licenced, or enable a spin-off (Hooi & Wang, 2020).

Similarly, some participants with previous AE experience and entrepreneurial experience outside academia helped them identify AE opportunities. Previous collaboration also allows academic entrepreneurs to develop internal capabilities and signal potential future collaboration (Hewitt-Dundas et al., 2019). This previous entrepreneurial experience enables academics with entrepreneurial knowledge. It provides an understanding of the entrepreneurial processes and networks from which to draw resources and expertise to understand the requirements of IAE. It can address the lack of knowledge and entrepreneurial skills. It is in line with the findings of previous studies (Aldridge & Audretsch, 2011; Balven et al., 2018; Clarysse, Tartari, et al., 2011; Klingbeil et al., 2019) that the probability of academics being involved in AE activities is higher when they have been engaged in entrepreneurial activities before. Moreover, the entrepreneurial experience of the university leaders empowers them to provide meaningful support to their researchers' entrepreneurial endeavours (Klingbeil et al., 2019). Similarly, this study found that the university manager's previous entrepreneurial experience enables them to take initiatives to support AE.

The current research demonstrated that support centres were formed to promote knowledge transfer and entrepreneurship. Although the support centres are nascent, these university support centres offer limited support exploit identifying and exploiting the AE opportunity. In the AE literature, the university support centres play a significant role in the AE opportunity recognition and exploitation (e.g., Colombo et al., 2019; Franco & Pinho, 2019; Guerrero et al., 2019). It is argued that the unawareness of the commercialisation potential of the researchers inhibits their AE involvement (Holley & Watson, 2017) and sometimes the industry does not find the right person to contact, which reduces the collaboration between industry and academia (Davey et al., 2016). One of the reasons for the higher importance of these centres is that they act as a bridge between academia and industry (Bolzani et al., 2021) and help academics identify future AE opportunities (e.g., Bercovitz et al., 2001; Bolzani et al., 2021). It was found that some participants received support from these support centres to engage in IAE, and only one piece of evidence was found for FAE. The possible explanation would be that these support centres started supporting FAE recently, and academics are still unaware of the support. Another reason could be that these support centres do not improve the likelihood of scientists beginning a firm, similar to the findings of Belitski et al. (2019). Hence, there are mixed findings regarding these support centres to identify and exploit entrepreneurial opportunities, which is also supported by the existing literature (Belitski et al., 2019; Clarysse, Tartari, et al., 2011).

However, some participants circumvent the university support centres using their network to exploit the AE opportunity. One of the reasons to use their network would be a reluctance to change the existing practice. As a result, academics have built and controlled their social capital for AE opportunities (Aldridge et al., 2014). Another possible explanation for using their network for IAE is the relative importance of these support centres towards FAE (Abreu et al., 2016) and student entrepreneurship. Moreover, the network with industry and other individuals belonging to the same network helps academics interact more closely with firms and encourages them to become entrepreneurs (Feola et al., 2019). The other reason for academics to use their network is to identify and exploit the possible entrepreneurial opportunities that the networks would enable them to access particular resources, for instance, provide the information, advice, and emotional support for their entrepreneurial engagement (Fernández-Pérez et al., 2015).

This study found variations across disciplines regarding AE opportunity identification and exploitation, in line with previous studies (e.g., D'Este & Perkmann, 2011; Fini et al., 2020). It is found that three academics from biomedical and microbiology backgrounds have a patent, establish spinoffs, do consultancy, contract research and train. The ten academics from engineering and science backgrounds focus on patent, contract research, consultancy, training, contract research, and secondment and give lectures outside the university, but did not find any evidence of commercialising the research through establishing a firm. Moreover, eleven academics from the HASS (humanities, arts, and social science) background demonstrated that they were mainly involved in consultancy, contract research, secondment, training, and student placement. However, one of the business academics set up a firm. Although these findings are derived from a small purposive sample, they align with the idea that technology transfer from engineering and biomedical fields is more effective in generating spinoffs and patents.

In contrast, in the social sciences, knowledge is transferred through personal contacts and labour mobility (Bekkers & Bodas Freitas, 2008). However, there is a difference found that the academics from STEM not only engaged in FAE (patent, spinoff) but were also involved in IAE (consultancy, contract research, secondment). It is found that STEM receives more funding compared to HASS (see Table 5.5). Disciplines that attract more external funding will likely engage in AE activities (Fini et al., 2020). This difference demonstrates that although discipline affects academic entrepreneurial activities, the availability of opportunity makes them engage in these activities. Notably, engagement with industry differs based on the scientific disciplines that determine the nature of entrepreneurial opportunities that could emerge (Fini et al., 2020). Hence, the more the applicability of the knowledge across disciplines, the higher the propensity to create both IAE and FAE (Abreu & Grinevich, 2013).

The present study demonstrated that the participants attach extrinsic motivation to their AE engagement, similar to previous studies (Balven et al., 2018; Blind et al., 2018; Lam, 2011). The informants illustrated that they are involved in AE to improve class performance, get recognition from colleagues and the university, place students in the industry for jobs, and generate financial gains, publications, and new research ideas. It is found that these motivators vary depending on the career status. Here, the young scientists attach more importance to improving class performance and generating financial gains than the senior academics. These extrinsic motivators are vital for young scholars due to the constant pressure to strive for career success (Ylijoki et al., 2011). Another explanation for putting value to financial gains is young academics' salary structure (Tartari & Salter, 2015). Galati et al. (2020) argued that academics create spinoffs to supplement their relatively low remuneration.

On the other hand, senior academics signified recognition, publication, and placement of students and attached less importance to financial gains. One of the explanations for this would be the established position of the senior academics in the university (Ylijoki et al., 2011), which would increase the academic reputation (Hossinger et al., 2020). Another explanation for this weight by the senior academics is their higher explanatory power of the researched phenomena (Fini et al., 2009). However, this thesis found no differences between 13 male and four female academics regarding these extrinsic motivators. This is because both male and female academics showed similar Meso-level contexts (such as salary structure and workplace environment), which also corresponds to the findings in Tartari and Salter (2015).

The participants also affixed weight to intrinsic motivators, similar to the previous studies (Balven et al., 2018; Lam, 2011; Skute et al., 2019). This thesis reveals that informants see involvement in AE as the conduit to develop their capabilities and opportunity to contribute to society through solving problems, improving the networks and giving them a sense of achievement. These intrinsic motivators vary depending on the career status. It was found that early career participants value mental satisfaction and network building more intrinsically than any other factors. The senior academics see this AE (especially IAE) engagement as a learning opportunity to gain new insights and capabilities and contribute to society. This pursuit of new knowledge and commitment to exploration demonstrates the academic entrepreneur's career focus and the supplementing nature of AE towards teaching and research (Bercovitz & Feldman, 2008; Hahn et al., 2019).

Moreover, industries are part of society, so transferring knowledge directly to the industry is beneficial to all (Mendoza et al., 2020). The possible explanation for this difference towards intrinsic motivation is that early career researchers focus on improving their capabilities through building networks and gaining a sense of achievement by doing what they like (Chen et al., 2006). Similarly, recent empirical evidence suggests that academics are more motivated by academic accolades than pecuniary rewards (Hmieleski & Powell, 2018). Knowledge transfer is derived from intrinsic motivations instead of external rewards (Rajaeian et al., 2018). On the other hand, senior academics feel responsible for professing and contributing to society by solving social problems (Safavi & Håkanson, 2018). Moreover, due to their career status, senior academics have more academic freedom to research any area without fear or constraint and to discover and promulgate new ideas no matter how controversial (Jarernsiripornkul & Pandey, 2018). Therefore, the early career participants give more value to these extrinsic motivators, while the senior academics weigh the intrinsic motivators, concurring with Blind et al. (2018). The researcher found no gender effect on this intrinsic motivation.

In summary, this thesis contends that the participants do not consider IAE as an entrepreneurial activity, and most are unaware of these activities. However, due to the learning and knowledge transfer opportunities, the participants attach importance to IAE (consultancy, contract research, secondment). Some participants have patents but are not licenced to Bangladeshi firms. Therefore, IAE is found to be a mode of transferring knowledge to the industry. The culture and mindset of the participants influence this involvement in IAE or FAE. As IAE is well accepted in society and academia, academics can engage in IAE. FAE (patent, licencing) is considered a research-based activity and is acknowledged widely. However, academic involvement in FAE (spinoffs or start-ups) is not taken for granted. This inhibits the academics from spinoff their research. Sometimes academics fear disclosing their identity as academic entrepreneurs due to the vagueness of what is accepted and rejected by the university or society. Academic entrepreneurs' self-standard also acts as a barrier to patents. It is also found that the previous industry and entrepreneurial experience helped the participants to identify and exploit the AE opportunities. The participants also indicated the importance of discipline to get funding and AE opportunities. It is found that senior academics attach more importance to intrinsic motivators, while young academics attach more significance to extrinsic motivators. Table 8.1

demonstrates the critical factors concerning the enablers and barriers of academic entrepreneurship in Bangladesh.

Table 8.1 Factors that Facilitate or Inhibit AE in Bangladesh

Factors	Facilitators/Influencing Factors	Inhibitors
Macro level	– Government's knowledge, innovation, and entrepreneurship focus – Government funding for innovation and entrepreneurship – Government's initiatives to incorporate different policies to foster innovation and technology. – Establishment of support institutions	– Academics unaware of the government's initiative – A lack of proper arrangements, procedures, and structures for collaboration – UGC's implementation barrier and control over private universities – Long patent process – Inadequate budget for research – The inefficiency of government offices hinders the AE
Meso Level	– University's recent focus is to redefine its missions. – Availability of support centres to promote both IAE and FAE – Encourage research and provide research funding. – Universities are building linkage with other universities, industries, and alumni to accumulate necessary resources. – Setting up of support centres to aid with IAE and FAE	– University recruitment policy is uncongenial to AE. – Inadequate research funds – Workload – Discourage FAE involvement. – Lack of academics with a PhD – The knowledge gap between academia and industry – AE is not recognised in the promotion policy
Micro level	– Active participation in IAE and FAE – Involvement in IAE is well accepted. – AE involvement increases the university's reputation. – Previous industry and entrepreneurial experience facilitate identifying and exploiting the AE entrepreneurial opportunities. – Available IAE opportunities for academic entrepreneurs – IAE is perceived as a learning conduit	– Culture inhibits AE involvement. – Academic fear and self-belief reduced their AE engagement. – Hesitant to share an entrepreneurial identity. – Academics are risk-averse

The following section concludes this study, where the contributions to knowledge, practice and policy implications are discussed. This thesis subsequently addresses the limitations and outlines directions for future research.

CHAPTER NINE: CONCLUSIONS

9 CONCLUSIONS

9.1 Introduction

This thesis aimed to understand why academics engage in AE and how different level of actors interact to influence academics AE engagement. This chapter concludes the thesis by revisiting the objectives and presenting the original contributions to knowledge and practice. These are considered about the objectives of the research – namely, to explore key stakeholders' roles and interactions in academic entrepreneurship, to identify the facilitators and inhibitors of academic entrepreneurship, to understand what motivates academics to engage in AE and to develop a framework for academic entrepreneurship. Additionally, this chapter discusses the theoretical contributions and implications for practice and policy, limitations, and direction for future research. This thesis makes three key contributions: first, it contributes to the implementation of the multi-level AE ecosystem framework (Belitski et al., 2019); second, it develops a holistic framework for AE from developing country perspectives (Farrell et al., 2022) and third, it identifies the behaviours and motivators that influence academics to engage in AE (Cunningham & O'Reilly, 2018).

9.2 Context and AE Framework

This study suggests the need for new theories of AE in the context of developing countries. For example, Farrell et al. (2022) focus on AE's characteristics, attributes, behaviours, enablers, and barriers in Higher Education Institutions in low- and middle-income countries. These authors emphasise the importance of considering the differences in entrepreneurial objectives and activities in resource-constrained environments of developing countries compared to developed countries like the US. In Bangladesh, the institutional context differs from that of developed countries, where informal AE (IAE) is well-established in universities, while formal AE (FAE) is still in its early stages. Conversely, in developed countries, IAE and FAE are well-established (Abreu & Grinevich, 2013; Fini et al., 2017; Siegel & Wright, 2015).

Analysis of government policy documents reveals that academics in Bangladesh can transfer their research through patents. However, there is a need for academics to have a clearer understanding of the process of setting up new firms, such as spinoffs or startups, based on their research outcomes. It is essential to recognise that national contexts are not simply distinct institutional settings but are intertwined with culture and cognition (Scott, 2004). This indicates the necessity for more contextually sensitive research and the adoption of an appropriate AE model from developing countries (Farrell et al., 2022). This study contributes to this by presenting a multilevel view of AE (Figure 8.1) that provides a holistic view of AE from a developing country perspective. The framework incorporates three spheres: government roles (macro), university norms and practices (meso), and human perceptions and cognitions (micro). It is important to note that industry is considered a sub-component of university practices within this framework. This embeddedness within the meso-level does not diminish the importance of the industry's role in AE; instead, it highlights the significance of the industry-academia collaboration. Additionally, industry initiatives to foster AE are limited and are embedded within university practices.

One notable addition to this framework is the inclusion of human perceptions and motivations in the AE ecosystem in Bangladesh. Including these individual level characteristics extends existing AE models (Cantu-Ortiz et al., 2017; Feola et al., 2019; Wood, 2011) where human perceptions and cognitions were not considered. Previous studies focused on formal, informal, and internal environmental factors, corresponding with this study's macro and meso-level factors. They also considered internal factors where humans are considered resources but did not explore the behaviours and perceptions of individuals. These models assumed that formal, informal, and internal factors interacted to determine AE engagement, with academics following university norms and practices.

However, this study illustrates that human perceptions and cognitions significantly influence academic entrepreneurial engagement and do not exhibit a linear relationship. In other words, university practices can increase and decrease academics' engagement in AE. Sometimes, academics conform to university norms and practices, while others deviate from them. For instance, academic involvement in FAE (spinoffs or start-ups) may be perceived as unacceptable. However, this research demonstrates that some academics engage in FAE without disclosing their identity or assuming a behind-the-scenes role. This highlights the importance of academics' mindset and cognition in AE engagement.

A few examples of these perceptions: some academics believe that engaging in AE brings financial benefits. In contrast, others view it as a means to contribute to society or increase workload. By integrating micro-level factors in the AE model, this study improves our understanding of the relationship between macro and meso-level factors and individual perceptions and cognitions in the AE engagement process. This is a significant contribution to understanding academics' AE involvement because while external environmental factors determine the level of support they receive, the decision to engage in any entrepreneurial role ultimately stems from the perceptions and motivations of the individual academics. The incorporation of these individual level perceptions and cognitions contributes to the objective of developing a framework for AE in Bangladesh. Therefore, this study adds to the growing body of literature that emphasises the role of context in stimulating and shaping various entrepreneurial activities. It illustrates how academics perceive macro and meso-level factors and how they interact to form individual perceptions and cognitions, ultimately impacting entrepreneurial outcomes (Farrell et al., 2022; Galati et al., 2020; Orazbayeva et al., 2020).

9.3 Key Findings

9.3.1 Interactions among the Key Stakeholders in the AE Ecosystem

Against the backdrop of recognising the relevance of individual factors in explaining the entrepreneurial behaviour of academics (Hossinger et al., 2020), it is evident that AE involvement is influenced not only by micro-level factors but also by meso and macro-level factors. This study demonstrates the involvement of stakeholders at three levels – macro, meso and micro – in the AE process within these four universities.

At the macro level, government and regulatory agencies, including the education, innovation, planning, and technology ministries/divisions in Bangladesh, set rules, regulations, and policies related to innovation, technology, and education, which impact the AE ecosystem. However, it is at the meso level where university systems and industry come into play. University managers, Vice-chancellors (VC), Pro-VCs, Deans, and the Board of Trustees are responsible for implementing these rules and regulations and fostering an entrepreneurial mission within the university. Additionally, managers of university support centres, such as incubators, TTOs, and entrepreneurship centres, work closely with university managers to establish the relevant policies for IAE and FAE and communicate these policies to various stakeholders.

It is worth noting that the government's role does not directly influence academic activities. However, instead, the government can exert its influence through university norms and practices. While some academics may contribute to policy development, the decision-making process is often top-down, with limited bottom-up impact on developing AE policies in Bangladesh. This differs from the practice in many developed countries, where governments and universities actively seek academic input to shape AE policies (e.g., Dodgson & Staggs, 2012). Furthermore, various initiatives have been undertaken by the government and universities in Bangladesh to promote entrepreneurship and innovation. However, it is surprising that academics often lack awareness of the rules and regulations the government or university sets. This interaction sheds light on the understanding of how the multi-level entrepreneurial ecosystem actors complement each other in university technology transfer mechanisms and processes (Belitski et al., 2019; Dolan et al., 2019; Hossinger et al., 2020; Meoli et al., 2019). It also supports the objective of this study to explore the roles and interactions of critical stakeholders within Bangladesh's AE ecosystem.

9.3.2 Facilitating and Inhibiting Macro-, Meso- and Micro-level Factors

It has been observed that certain macro-, meso- and micro-level factors either facilitate or hinder academic entrepreneurial engagement. At the macro level, government policies, funding, and support facilities that foster entrepreneurship and innovation play a significant role. At the meso level, factors such as universities' entrepreneurial orientation, support centres promoting IAE and FAE, increased funding from private universities, and collaboration between departments, universities, and industry have an impact. At the micro level, academics' social networks, existing salary structure, and extrinsic and intrinsic motivation influence their AE engagement.

On the other hand, there are barriers to academic entrepreneurial commitment that arise from coordination problems among actors, replication of policies without contextual understanding, and control exerted by the UGC at the macro level. These macro-level barriers highlight the structural and coordination issues within the AE ecosystem in Bangladesh. At the meso level, challenges include a shortage of academics with doctorates, a lack of staff development programmes, recruitment and promotion policies, the embryonic stage of support centres, and a need for more awareness among university managers about AE. Academic workload, self-perception, and risk aversion impede AE engagement at the micro level. These inhibiting factors sometimes offset the benefits provided by the facilitating factors.

For instance, some academics believe that patenting their research would increase the cost of technology and, therefore, choose not to pursue patents. In such cases, government and university policies, funding, and patent support may only yield fruitful results if academics intend to patent. Therefore, to fully harness the benefits of these facilitators, it is crucial to reduce these barriers and increase awareness among actors in the Bangladeshi AE ecosystem. This contributes to another objective of this study: identifying the facilitators and inhibitors of AE in Bangladesh.

9.3.3 Academics' AE Engagement Motivations Vary

The academic entrepreneurs in this study have reported various extrinsic and intrinsic factors that motivate their engagement in AE (see sections 7.2.4 and 7.2.5). The study reveals that academics emphasise several extrinsic motivators that drive their involvement in AE. These motivators include enhancing academic performance, promoting student engagement and placement, obtaining monetary rewards, and receiving recognition. The knowledge and experience gained through AE involvement are shared with students in the classroom, allowing academics to connect theory with practice. The research conducted during AE involvement also leads to the publication of findings, demonstrating that academics can utilise AE as a platform for generating knowledge that can later be disseminated through lectures and research publications. Hence, AE involvement positively impacts academic performance.

Some participants who have spun off their research also value the financial gain and recognition they receive from the community. Despite a central office for student placements, other participants leverage their connections to place students in the industry. Academics recognise the need to involve students in different projects to enhance their capabilities. These motivations may vary depending on the form of AE. IAE provides financial benefits and enhances the reputation of both academics and the university. However, most participants did not report any external benefits from their involvement in FAE, except for a few who mentioned the possibility of financial gain through patent licencing, which they did not pursue. The study identified a few differences in motivation between respondents based on their position or affiliation. Early-career academics emphasised financial benefits, while senior academics emphasised publishing research stemming from their IAE engagement.

In addition, academic entrepreneurs attach great significance to intrinsic motivations such as capability improvement, mental satisfaction, self-actualisation, solving social problems and building networks. Academics believe that engagement in AE increases their capabilities, including entrepreneurial knowledge and the development of social capital. They also view AE involvement as a means to solve social problems. The opportunity to contribute to the economy, solve social problems, and fulfil responsibilities beyond academia provides academics with mental satisfaction and self-actualisation. These intrinsic motivating factors were consistent among most participants, regardless of their positions or affiliations to public or private universities. However, early-career academics prioritised developing their capabilities, while senior academics considered solving social problems more significant. In this line of departure, the theoretical implications of this study are discussed in further detail.

9.4 Theoretical Implications

As a result of multiple interviews and document analysis, this exploratory study makes valuable contributions in various fields. These contributions are discussed in the following section.

9.4.1 *Contributions to the Academic Entrepreneurship Literature*

This study contributes to the AE literature. *First,* this study developed an AE framework from the developing country perspective that incorporates three spheres: government roles (macro), university norms and practices (meso), and human perceptions and cognitions (micro). It contributes to implementing the multilevel AE ecosystem framework (Belitski et al., 2019). It also contributes to developing a holistic framework for AE from a developing country perspective (Farrell et al., 2022). The existing AE models incorporate three actors: government, industry, and university (Etzkowitz et al., 2000; Feola et al., 2019; Fini & Grimaldi, 2017; Leydesdorff & Etzkowitz, 1996; Wood, 2011). These frameworks are developed in Western countries, where the industry is more proactive in industry-academia collaboration (Galán-Muros & Plewa, 2016). However, in Bangladesh, this collaboration is limited and embedded within university practices. Hence, the industry role is embedded within the meso-level in this framework. Furthermore, while the existing model considers formal, informal, and internal environmental factors, it does not explore individual behaviours and perceptions.

It is perceived that academics are embedded in the university and would follow the norms and culture of the university, implying that there is no difference between the goal of the university and the academics (Etzkowitz, 1998). This perspective discounts the idea that academics could have different plans, cognition, and perception. Universities allocate resources to commercialisation and enhance their reputation. In contrast, academics engage in AE to exercise autonomy and maximise their contributions to society (Abreu et al., 2016; Siegel & Wright, 2015). This research asserts that academics engage in activities that give them the freedom to transfer their knowledge and, at the same time, get recognition and financial rewards. Academics also highlight that universities impose restrictions that require permission from the university to engage in any activities outside of academic duties. It is not accepted by the university norm that academics establish any business. Due to the micro-level characteristics (see section 8.4), academics often take on entrepreneurial roles outside of university norms, with several participants establishing their firms without disclosing their entrepreneurial identity or not being the frontline person of the business. This raises the question of whether the university's favourable environment would help them disclose their identity. Although it is argued that the favourable environment in which academics work is an essential factor for strengthening their feelings and beliefs about their ability to be creative (Kalar, 2020), academics' self-belief, cognition, and capabilities lead them to bend their Mertonian norms, and seek monetary gains, keep the knowledge away from their colleagues, and engage in entrepreneurial activities (Mendoza et al., 2020). This framework extends the existing AE model (Cantu-Ortiz et al., 2017; Feola et al., 2019; Fini & Grimaldi, 2017), where human perceptions and cognitions are not considered and contribute to the call of Farrell et al. (2022). This integration of micro level factors in the AE model improves the understanding of the relevance of the macro and meso-level factors to micro-level factors in the AE engagement process. This is a significant contribution to academics' AE involvement because the external environmental factors determine the level of support they get. Still, the decision to engage in any entrepreneurial role comes from the perceptions and motivations of the academic.

Second, this study sheds light on the effectiveness of public policies on AE (Audretsch et al., 2019; Audretsch & Link, 2019; Guerrero & Urbano, 2019) in the Bangladeshi context. Previous studies have shown mixed results regarding incorporating public policies to promote research commercialisation and university technology transfer (Aldridge et al., 2014; Cunningham, Menter, et al., 2019). This study demonstrates that despite the government's adoption of different policy frameworks, structural and implementation barriers (see discussion 8.2) hinder academics' engagement in AE. For example, private universities face restrictions on pursuing new initiatives, academics are not encouraged to establish firms, and they lack awareness of government support. These findings challenge the assumption that incorporating public policy related to technology transfer would enhance research commercialisation in universities. However, academics emphasise that policies should align with local industry needs instead of relying solely on development agencies' prescriptions to address local problems. Therefore, the study argues that when implementing institutional changes to foster an entrepreneurial focus, the government and universities need to consider contextual and institutional factors such as university capabilities, academics' perceptions and cognitions and more. This research enhances existing theories by recognising the significance of regulative, normative, and cognitive institutional factors as fundamental contextual foundations for AE in Bangladesh. However, it should be noted that the entrepreneurial ecosystem in developing countries is weak (Belitski et al., 2019). Thus, these findings shed light on the effectiveness of technology transfer policies and legislation in a non-US context (Guerrero & Urbano, 2019), specifically Bangladesh. Consequently, it adds to our understanding that the effectiveness of

AE public policies depends on formulating context-relevant policies and facilitating their implementation (Audretsch et al., 2019; Davey et al., 2016).

Third, this study contributes to the discussion on the role of different actors in the AE ecosystem (Good et al., 2019, 2020). This study reveals that universities play a crucial role in transmitting the macro-level rules and regulations and meso-level norms to the micro-level in the Bangladeshi context. Regulative and normative institutions shape the supportive environment within which academics operate, conforming to regulations and practices related to teaching and research. However, some academics venture beyond these rules and norms by establishing their firms, which is counterintuitive given the normative expectations (the norm that academics would not establish a firm). Nevertheless, some academics were found to have a propensity to start new firms, a phenomenon well-accepted in developed countries (Civera, Donina, et al., 2020; Fini et al., 2017). This involvement reflects the role of the micro level in explaining academics' entrepreneurial engagement. Moreover, entrepreneurship is influenced by micro-level features and the interconnectedness between domains (Fini & Toschi, 2016). The literature lacks consideration of how the macro-dimensions impact the cognitive foundation of entrepreneurship (Fini & Toschi, 2016). Thus, this study enriches our understanding of how the multi-level social structures in which academics are embedded help explain the interaction among various entrepreneurial ecosystem actors and how they complement each other in university technology transfer mechanisms, processes and the entrepreneurial ecosystem as a whole (Audretsch et al., 2019; Belitski et al., 2019; Dolan et al., 2019; Hossinger et al., 2020).

Fourth, this study contributes to understanding why academics engage in FAE and IAE (Cunningham et al., 2018; Freel et al., 2019; Siegel & Wright, 2015; Wright, 2018) and identifies the antecedent factors that shape individuals' perspectives and behaviours in engaging in AE (Cunningham & O'Reilly, 2018). This puzzle can be understood by exploring the role of micro-level institutions in fostering entrepreneurial activities. While the general entrepreneurship literature emphasises that entrepreneurial endeavours are determined by entrepreneurs' cognitive characteristics and skills (Fini et al., 2018), academics' cognitive and perceptual factors in entrepreneurship differ somewhat from those of general entrepreneurs. One key difference is that academic entrepreneurs have a constant income source, whereas general entrepreneurs establish ventures to ensure income generation (Shane, 2000). This research highlights the difference in perceptions and motivations of academics regarding IAE and FAE (see section 8.4). Although academics emphasise income generation as a reason for their engagement in AE, their dominant motivations for IAE involvement are learning and knowledge transfer. Furthermore, IAE involvement enhances their teaching and research outcomes. This emphasis on knowledge and learning is derived from the Mertonian norms (Ahsan et al., 2020; Stuart & Ding, 2006). However, academics also associate commercialisation logic with this Mertonian logic (Perkmann et al., 2021; Tartari et al., 2014).

On the other hand, academics' involvement in FAE, such as patents, spinoffs, and startups, demonstrates their desire to contribute to society and achieve self-actualisation despite the challenges of identifying opportunities, establishing a firm, and fearing failure. Notably, some participants mentioned that their continuous income from their job provides stability. These findings illustrate similarities and differences in the focus of general and academic entrepreneurs despite facing fear, risk-taking, and recognising and exploiting entrepreneurial opportunities. Consequently, this study explains why academic entrepreneurs gravitate more towards IAE than FAE (Freel et al., 2019).

Finally, this study contributes to the discourse on the university incentive system, particularly about promotion and academics' entrepreneurial engagement (D'Este et al., 2012; Mendoza et al., 2020). The study illustrates that although academics value the university incentive system for entrepreneurial engagement, the absence of explicit promotion criteria for AE does not deter their involvement in entrepreneurial activities. This finding is counterintuitive, as it is commonly believed that incentives would facilitate such engagement. Extant literature has argued that incentives facilitate academics' entrepreneurial activities (Athreye et al., 2023; Markman et al., 2004). In Bangladesh, even though AE engagement is not considered a criterion for promotion, academics' entrepreneurial experiences indirectly influence their promotion and incentive decisions. Academics can leverage their entrepreneurial experiences to enhance their teaching and publish the outcomes of their AE involvement, which can be incorporated into promotion criteria. Moreover, academics can utilise their AE experience to contribute to society, which is also valued in promotion decisions. Therefore, this study expands the understanding of the importance of incentives and academics' entrepreneurial engagement (Athreye et al., 2023) by highlighting that, despite the absence of explicit incentives, academics can still benefit indirectly through publications and improvements in teaching as outcomes of their AE activities. This study also contributes to the institutional theory literature, which will be discussed in the next section.

9.4.2 *Contributions to Institutional Theory*

It is argued that institutions facilitate or inhibit entrepreneurship (Chowdhury et al., 2019; Maurer et al., 2022), which is also prevalent in academic entrepreneurship (e.g., Fini et al., 2017, 2020; Giuri et al., 2020). As this study explored academic entrepreneurship in a developing country context through an institutional theory lens, the empirical findings confirm and extend previous literature on institutional theory. This study proves that the normative dimensions reinforce the behaviour of academics in the university setting (Etzkowitz, 2003b; Link et al., 2007; Mosey et al., 2012). For instance, it is accepted in Bangladeshi universities that academics engage in IAE and research-based FAE (patent, invention disclosure). Engagement in FAE (setting spin-offs or startups) is not accepted. Most academics comply with these norms, and evidence of IAE engagement is more substantial than FAE (setting business) engagement.

It also confirms that the government mimic the regulations related to research commercialisation (DiMaggio & Powell, 1983; Friedland & Alford, 1991; Scott, 2014). The regulative pillar of institutional theory illustrates that government and other regulatory agencies formulate formal rules, regulations, and laws (Scott, 2008a). The government of Bangladesh has adopted different policies to foster innovation, technology, and entrepreneurship. In line with their policy-making initiatives, the government of Bangladesh is planning to adopt the Bayh-Dole Act of the USA (Bangladesh University Grants Commission, 2018c) to facilitate technology commercialisation in Bangladesh. The proponents of institutional theory (DiMaggio & Powell, 1983; Scott, 1995) argue that this imitation of such policies is due to the need for more information and legitimacy challenges (Pitsakis & Giachetti, 2020). Legitimacy is essential because it affects their ability to attract resources and support from stakeholders (Scott, 2014). This enactment of policies such as the Bayh-Dole Act in Bangladesh practices indicates the taken-for-granted approach without considering the contextual predicaments.

Although this imitation of the Bayh-Dole Act was successful in other countries (Grimaldi et al., 2011), it was unable to deliver the subsequent result in some other countries (Cunningham, Lehmann, et al., 2019; Dalmarco et al., 2018) as this does not consider the contextual need and expectations. This study asserts that the government of Bangladesh enacts (or imitates) the Bayh-Dole Act and research commercialisation activities such as establishing TTOs as prescribed by the development agencies. The assumption is that the development agencies have the best knowledge of development and can efficiently transmit it to the developing world (Ellerman, 2002). Due to this perception, the suggestion from the development agencies is deemed legitimate even if the propositions do not consider the local context. This is somewhat different from what is regarded as legitimate decision-making by the government in Western countries, where the degree of social consensus determines legitimacy (Scott, 2014). This study finds that late adopters, such as Bangladesh, mimic the early adopter's structures and practices, enact regulations regarding AE, and are considered legitimate (Adams, 2020; DiMaggio & Powell, 1983). However, this study shows that local expectations must be incorporated with these policies and practices to get the desired results.

Another regulatory dimension is the pressure from the regulator, a barrier to the entrepreneurial culture. Universities need permission from the UGC and the Ministry of Education in Bangladesh to introduce anything new (such as entrepreneurship courses across disciplines or establishing entrepreneurship support centres). It is argued that the entrepreneurial culture allows individuals and firms to think and act independently despite following the norms and institutions (Welter, 2011). Hence, pressure from government agencies can also be detrimental to AE. Although the Private University Act allows private universities to commercialise the research generated from the university, there is a barrier to setting up firms. Private universities are not permitted to offer PhD programmes. Developing basic and applied research that can be commercialised is essential. This study demonstrates that regulatory institutions intensify or hinder university norms and academics' cognitive dimensions. While the universities comply with this regulative restriction, this constraint on setting up spinoffs and start-ups and creating new knowledge through PhD programmes propelled the academics to engage in IAE (consultancy, secondment, contract research). This demonstrates that when there is pressure or restrictions from the regulators, individuals tend to find an alternative, for instance, IAE (Benneworth & Jongbloed, 2010). This is important because restrictions from the regulators may hinder the universities from becoming entrepreneurial and lead to the failure of the academics to be involved in spin-offs or start-ups. It corroborates the notion that the macro-level institutional structures can significantly explain AE engagement (Balven et al., 2018; Klingbeil et al., 2019). Consequently, it contributes to the discussion on how regulative institutions reinforce or undermine normative and cognitive institutions (DiMaggio & Powell, 1983; Scott, 2014).

Switching from these macro dimensions, the meso level (university) can shape the university's structures, practices, norms, and behaviours concerning AE. This also explains the processes of institutional changes (Sendra-Pons et al., 2022) within these universities to adopt entrepreneurship missions and how different actors play their roles in the university's entrepreneurial endeavours (Fini et al., 2017). It is found that in the university, the institutional change to entrepreneurial orientation influences the academics to engage in AE activities even more. Although these universities focus mainly on fostering student entrepreneurship, some also consider AE in the university's mission. Moreover, universities established different support centres to promote IAE and FAE, initially launched with government support. This change signals academics to identify, get help and engage in AE activities. However, little evidence was found that the academics get support from these support centres. Hence, the change in institutional frameworks to increase AE activities is more symbolic than substantive (Fini et al., 2017, 2020), and AE practice differs in these four universities.

Although these universities have different initiatives to adopt the entrepreneurial mission, the competing logic of teaching and research with the entrepreneurship logic creates barriers to academics' AE involvement. This competing logic manifests differently in Bangladesh than in other developed countries. AE activities in Western contexts are deemed knowledge transfer activities. Based on knowledge transfer and entrepreneurial engagement, the academics' work allocation varies (Kallio et al., 2016; Lund Dean, 2018). However, in Bangladesh, academics manage their time to engage in AE in addition to their engagement in teaching and research. Thus, AE activities increase their workload. Due to this higher workload, academics had to balance their teaching, research, and AE involvement, even though it is evident that AE activities complement teaching and research. Moreover, teaching, research and service are deemed the primary promotion criteria in these universities, leaving the academics' entrepreneurial engagement out of consideration. It shows that teaching and research have a higher institutional demand than AE. These norms to carry out teaching and research by the academics lead them to pursue AE activities that are teaching-based (such as guest lectures and training) and research-based (such as consultancy, contract research, and patent), similar to the finding of De Silva (2016). Hence, these norms within these universities hinder academics from spinning out from their research output. This contributes to the discussion of how normative institutions reinforce the behaviour of the organisational members (Scott, 2014) and lead them to engage in teaching and research-based AE (Berbegal-Mirabent & Sabate, 2015; De Silva, 2016).

This study contributes to understanding how the micro-level context (processes and actions) of the academic entrepreneurs shape creating, maintaining and reproducing the institutional norms and structures (Klingbeil et al., 2019; Marzocchi et al., 2019; Zhai & Su, 2019). Sometimes academics conform to the institutional norms (teaching and publications), or occasionally they deviate from the university norms based on their perceptions, values and preferences (engagement in AE even though not recognised as a promotion criterion). Understanding this micro-level context is essential as it directly affects the entrepreneurs (Bruton et al., 2010). The perceptions and cognitions determine an academic's entrepreneurial behaviour. These intrinsic and extrinsic motivators are different across academic ranks. For example, senior academics emphasise intrinsic motivators such as recognition, learning and knowledge. In contrast, junior academics emphasise extrinsic motivators such as financial benefits and capability improvement for AE engagement. Their self-belief and perceptions towards AE sometimes act as inhibitors. For instance, only some academics believe that patenting the innovation would increase the cost of innovation and technology. This is why they prefer to publish and make the technology available to all. This demonstrates that although there is an opportunity to patent, the academic entrepreneurs' micro-level perception of the betterment of society refrains from patenting. Another aspect of this micro-level context (perception) is the fear of the academics being exposed to university managers as an entrepreneur (by setting up spinoffs or startups). This study reveals that academics establish firms by being involved as voluntary members or not disclosing their AE involvement. This demonstrates how cognition and perception shape academic entrepreneurial engagement preconsciously (Friedland & Alford, 1991; Scott, 1995). Hence, this study contributes to the discussion on how the micro-level context and the cognitive dimensions shape entrepreneurial activities (Klingbeil et al., 2019; Marzocchi et al., 2019; Zhai & Su, 2019). Although there are some regulations from the government and similar cultures in the public and private universities regarding research commercialisation, the academic's mindset and cognitions define the different courses of action, i.e., engaging in IAE or FAE or both. This additional support from the university can create a supportive environment for academic entrepreneurs, but the academics carry out the AE activities. Therefore, it is essential to determine how much they want to perform the entrepreneurial role in addition to their academic role of teaching and research. When academics seek flexibility, recognition, less risk, and financial benefits, they prefer IAE. On the contrary, when academics are urged to establish their firm, achieve self-actualisation, and contribute to the country's society and economic development, they get involved in spin-offs or start-ups. They consider a patent as a research outcome and a recognition of capability. Hence, this study contributes to the discussion on why different actors act differently within the same institutional context (Cardinale, 2018).

This research extends institutional theory by explaining how, in the AE ecosystem in Bangladesh, the different (such as regulative, normative, and cognitive) pillars interact (Maurer et al., 2022; Scott, 2014) and how the cognitive dimensions shape academics' entrepreneurial activities (Klingbeil et al., 2019). Entrepreneurial activity is indeed influenced by the social and university context in which the academics are embedded, and a supportive environment will impact scientists' propensity to engage in AE activity (Fini et al., 2017). The current study asserts that the government's regulations and control define the norms of the university (Figure 7.1). In other words, the institutional context shapes universities' entrepreneurial orientation and determines the innovation, knowledge, and entrepreneurship success of the university-focused technology transfer policies. Although the government recently adopted some policies to promote research commercialisation and technology transfer, it is still to gain social consensus and become the norm of the university. While governments and universities in developed countries craft and implement technology transfer policies that are feasible and coherent (Siegel et al., 2007), in developing countries, regulations of intellectual property rights and technology transfer are determined by the government. Moreover, this university's norms and culture outline academic activities such as teaching and research (Figure 8.1). Previous studies argued that these regulative-, normative-, and cognitive dimensions interact in a nested structure, where each level has a distinct influence on scientists' participation in entrepreneurship (Kenney & Patton, 2009; Rasmussen et al., 2014). Therefore, academics may consider whether the entrepreneurial activity is socially and economically rewarded before they engage in AE. Sometimes, based on the expertise of academics, the government consults for policy development. Likewise, universities are likely to consider societal, legislative, and financial pressures when prioritising entrepreneurial activities (Fini et al., 2017). In the Bangladeshi context, this interplay is often top-down instead of bottom-up. The government imposes rules and regulations on the universities, and universities conform to these regulations and develop policies to set the boundaries for academics. Hence, this study contributes to the interplay between how regulative institutions reinforce and sometimes undermine normative and cognitive institutions (Freel et al., 2019; Maurer et al., 2022). In sum, it is evident that the current study has made significant contributions to research within multiple theoretical fields. The following section will address the policy implications of this study.

9.5 Contributions to Policy

The increased importance of the university in the national innovation system means that the findings of the current study have potential implications for policymakers. The government of Bangladesh is promoting a five-helix approach and the Bayh-Dole type Act to foster innovation and technology (Bangladesh Planning Commission, 2020; Bangladesh University Grants

Commission, 2018c). Therefore, in Bangladesh, this study's findings have implications for the country's technology transfer and research commercialisation policy. This policy mix aims to enhance the university-industry collaboration for research and institutional arrangements to commercialise university research outcomes (Bangladesh University Grants Commission, 2018c).

However, attempting to replicate successful initiatives from other regions can often lead to disappointing results. This is due to the contextual and cultural differences between the countries; what is appropriate for one context may differ for another. This helps explain why higher education institutions in emerging economies, such as Brazil, struggle to adapt to the best practices observed in the United States and Europe (Dalmarco et al., 2018). Therefore, considering contextual and cultural differences, such as the needs and expectations of the stakeholders and acceptance of academic engagement in AE, increases the legitimacy and applicability of such policy enactment. However, the applicability of these policies depends on joint initiatives and close interactions among the actors (government, university, and academics). The findings of this research help us understand the relationship between these actors.

This thesis unfolds that various factors create barriers for AE in Bangladesh, including academics' lack of awareness of government policies, coordination issues among actors, replication of successful policies without contextual consideration, control by the UGC, universities' inefficiency in utilising research funds, shortages of doctorate staff and lack of staff development programmes, recruitment and promotion policies, embryonic stages of support centres, the workload of academics, and academics' self-perception. These findings will interest policymakers as they have potential implications for facilitating and implementing the technology transfer policies.

Structural barriers still exist despite the encouragement of joint initiatives and stakeholder collaboration. In Bangladesh's higher education sector, different departments are involved, leading to overlapping decisions, confusion, and conflicts in policy implementation (Bangladesh University Grants Commission, 2018c). Thus, concurring with Gan et al. (2021), addressing the structural barriers, acknowledging functional overlapping, and implementing relevant improvements with stakeholders to promote technology transfer and AE is significant.

To successfully implement technology transfer and commercialisation policies, the control and conflicting relationships among the actors need to be addressed. One way to address these issues is by increasing the authority of the university boards and empowering them to make decisions regarding structural/strategic planning and budget allocation. This would enhance their inclination to engage in entrepreneurial activities aligned with Donina and Paleari (2019). Furthermore, while granting the universities more autonomy and responsiveness to their markets, the Bangladeshi government should encourage them to incorporate the "third mission" into their core activities, making it a strategic objective and implementing initiatives to diversify income.

This research reveals that despite the government's support in fostering technology, entrepreneurship, and innovation through funding, TTOs, incubators and specialised industrial parks, these initiatives have had little impact. Most participants are unaware of the support provided by the government. Prior research has argued that such government support increases the extent of research commercialisation and innovation (Belitski et al., 2019; J. Faria et al., 2019; Grimaldi et al., 2011). Therefore, government offices have a role in coordinating these support facilities' activities to promote technology transfer and research commercialisation. It is also essential to ensure efficient governance of these offices.

Another key finding of this study is that university recruitment and incentive policies may discourage academics from engaging in AE activities. The emphasis on these policies leads academics to require more motivation. The study found that entry-level recruitment of academics does not need a PhD, and priority has been given to candidates with excellent results in their bachelor's and master's degrees. While it can be argued that many academics pursue PhDs to develop theory and enhance their careers rather than achieve impact on practice, a doctorate equips academics with the knowledge and skills to conduct research. Moreover, these universities primarily consider teaching, research, and support to the university, overlooking entrepreneurial engagement in promotion and incentive policies. Thus, policymakers need to include the criteria of a PhD in the recruitment policy and consider the entrepreneurial experience in the incentive and promotion policy. This would motivate academics to engage in AE activities and adapt to the shifting expectations of the stakeholders (Bienkowska et al., 2016).

The study also found that existing tax policies hinder academics' entrepreneurial endeavours. Like other developing countries (Farrell et al., 2022), the current tax policy in Bangladesh does not exempt any income generated from AE activities from taxation, and scholars have to pay more tax on this additional income. Additionally, if academics set up any spinoff and incorporate it under the Company Act, they are subject to corporate tax. Several studies (e.g., Acs et al., 2016; Rybnicek & Königsgruber, 2019) illustrated that tax incentives facilitated industry-academia collaboration. Haufler et al. (2014) explored how tax policies affect entrepreneurs' willingness to take risks in commercialising innovation through market entry (e.g., spinoff) or sale (e.g., patent, licence, consultancy). Hence, in line with Acs et al. (2016) and Rybnicek and Königsgruber (2019), providing tax incentives for AE could increase academics' propensity to engage in AE activities in Bangladesh. Along with the policy implications, this study has practical implications, which are discussed in the following section.

9.6 Contributions to Practice

The study's practical recommendations are presented and are specific to these four universities. The recommendations are grounded in theory and could have implications for any university involved in AE. They serve as foundational guidelines for interventions to enhance AE and ultimately foster successful commercialisation. These recommendations are as follows.

The participants have emphasised having specific internal rules on AE, both IAE and FAE, even though some of these universities have policies related to IAE in place. This importance suggests universities should establish specific regulations for their faculty members to increase the AE rate. Furthermore, these rules should encourage potential academic entrepreneurs to assess the viability of their entrepreneurial activities while reducing negotiation time with the university. Finally, the university's intellectual property regulations should outline how individual researchers and employers take equity in the resultant new ventures stemming from university research.

Although these universities took some initiatives, participants of this study highlighted the need for more commitment from the university to the entrepreneurship mission and building the capacity for the university to engage in this core (entrepreneurship) activity. Simultaneously, the university managers need to work with the government and contribute to the policy development towards technology transfer and research commercialisation. The promotion policy for academics in the country should acknowledge the importance of AE in addition to publication. The recruitment policy should emphasise having a doctorate and industry experience for academics, as these would increase the propensity of the faculty members to engage in AE. These recruitment and promotion policies would enable different academic career tracks using critical performance criteria such as teaching, research, entrepreneurial, or combination.

This study demonstrated that academics engaged more in IAE than FAE and are contributing to the universities through their IAE involvement. This illustrates an important implication for the adoption of the university's entrepreneurship mission. However, this study found that IAE is not considered an entrepreneurial activity but a service to society. Universities should highlight the importance of IAE involvement and need to denote IAE as 'entrepreneurial' as FAE. It was also found that involvement in IAE orients academics with the prospective FAE (patent, spinoff) opportunities and may lead them to engage in FAE (De Silva, 2016). This perception change would increase academics' propensity to engage in AE. Although there is some evidence of identity conflict regarding whether academics disclose their entrepreneurial identity, this development of narratives within the university would reduce the reluctance of the academics to identify themselves as 'academic entrepreneurs'. Further studies can explore whether the favourable environment of the university would instigate the academics to disclose their entrepreneurial identity.

To exploit entrepreneurial opportunities, academics collaborate with other academics from different departments, which offers important implications for university culture. To encourage entrepreneurial behaviour, managers should create a favourable environment that fosters creativity and innovation. To make a university more entrepreneurially oriented, managers should focus on initiatives such as encouraging collaboration with academic and industry partners, encouraging academics and scientists to collaborate across the disciplines so that theoretical and entrepreneurial knowledge can be shared, and defining a culture that values innovation and new ideas. This collaboration between academics would also increase their understanding of external information, including the available IAE or FAE opportunities and attract funding (Hahn et al., 2019). Thus, concurring with Kalar (2020) and the findings of this study imply that the university should encourage and appreciate scholarly work to enhance academics' beliefs in skills and ability, resulting in more significant entrepreneurial activity.

This study uncovers that these universities need more research planning, highlighting the need for clear and consistent goals over time regarding the core mission activities (Guerrero et al., 2015). Therefore, university managers should develop strategic plans containing the research plan highlighting the resources such as experts (academics or scientists), funds, information and networks required to carry out the research activities. This research plan can also outline the usage of funds, which is found to be a caveat for academics. This annual research plan will enable the university managers to allocate balanced workloads ensure the efficient use of resources and direct the activities of the academics.

This study also highlights the embryonic stage of university support centres and the limited service provided to academic entrepreneurs. To increase the support centres' engagement to enhance researchers' participation in commercialisation activities, universities should increase the support to these support centres, such as funding allocation and freedom to implement the decision. Moreover, the university support centre managers (USCM) must know how to promote research commercialisation. To initiate the efforts, USCM could undertake dedicated scouting endeavours to consistently connect with researchers through direct and in-person interactions to guide them during the initial commercialisation phases. Likewise, USCM could organise training programmes on technology transfer and research commercialisation topics to equip researchers with the essential competencies and facilitate their involvement in this field. Additionally, they could generate successful stories and role models to encourage academics in research commercialisation (Giuri et al., 2020).

Although the importance of industry-academia collaboration is highlighted, the study found limited collaborations and structural barriers to incorporating full-time academics within the industry. This has implications for the industry, as only a few academics illustrate the need for the industry to formulate policies to include academics within its workplace. Some participants also suggested potential solutions, such as funding universities' PhD programmes to address their issues, engaging in joint supervision of students' work, and undertaking consultation projects. This win-win situation for industry and academia would encourage collaboration between the two parties. The specificity of this goal affects the university's missions and entrepreneurial outcomes (Marzocchi et al., 2019).

The findings of this study suggest that academics sometimes adhere to university norms, while at other times, they deviate from these norms. However, individual perceptions and motivations impact research commercialisation more than government and university regulations and structures. Therefore, university managers need to understand and address these factors to increase the likelihood of academics engaging in AE. For instance, when universities provide incentives and recognition for AE involvement, early career academics become more interested in such activities. On the other hand, universities can create an environment that encourages academics to address social problems through AE, increasing their job satisfaction and reducing their apprehension. By developing a culture that addresses these perceptual factors, universities can enhance academics' engagement in AE and promote overall entrepreneurialism within the institution.

9.7 Limitations and Direction for Future Research

Like any other study, the present study has limitations. While it is argued that universities in similar institutional contexts or which are catching up in the field of AE or those with low R&D investments (as a percentage of GDP) may experience similar dynamics, the size and composition of the samples suggest caution in making generalisations. Although one limitation of this research is that it has been conducted in a single developing economy, the findings of this thesis are consistent with previous studies. For example, the study supports the notion that the normative dimensions influence the behaviour of academics in the university setting (Etzkowitz, 2003b; Link et al., 2007; Mosey et al., 2012) and leads them to pursue teaching-based AE activities such as guest lectures and training and research-based AE such as consultancy, contract research, and patent to name a few (De Silva, 2016). It also highlights notable distinctions from technologically advanced innovation-driven economies where technology research and development are more advanced, and industry values innovation from the universities. Future studies can show how the dynamics (macro, meso, and micro levels) prevail in universities in developed and developing countries to illustrate comparative research. Moreover, this study found that the regulative and normative institutions shape the cognitive dimensions. Future research could explore how cognitive institutions shape the construction and interpretation of regulative and normative institutions.

It is asserted that the organisational characteristics of the university, such as university type and departmental characteristics, assist the academics in accumulating resources and information and hence play a significant role in the research commercialisation of the academics (Fini et al., 2020). Another limitation of this study is that the researcher was unable to demonstrate the significance of department characteristics on the academic's entrepreneurial activities from the perspective of Bangladesh due to the sample size and structure. Therefore, the researcher welcomes future studies considering the department characteristics such as the department head's role, the department's variety of knowledge, the department's closeness to industry (networks of relations with industries), the department's access to information and financial resources on the academic's involvement in AE from a developing country perspective.

Although this study demonstrated academic entrepreneurs' perceptions and motivations towards AE, academics' motivations change over time (Jain et al. 2009). Another limitation of this study is that it does not capture the change in motivations over time. Future studies could use longitudinal studies to provide insightful evidence on how academics' entrepreneurial involvement (Giunti & Duberley, 2023) and these motivations change (Galati et al., 2020) as their careers progress. Even though this study suggests a difference in academic age and motivation to engage in AE, it cannot be generalisable due to the purposive and small sample. Hence, it would be interesting to explore the difference in motive based on academic age further with a larger sample.

This study uses the perspective of academics, university managers and support centre managers. It is recognised that industry plays a significant role in the AE (Albats et al., 2018; Ankrah & AL-Tabbaa, 2015). However, it should be noted that the lack of industry participation is another limitation of this study. Hence, future studies need to include participants from the industry to understand their perspectives of the businesses towards the industry-academia collaboration from the Bangladeshi context or any other developing country context. Another limitation of this study is that it only accesses those participants who are engaged or in the process of engaging in AE. It would be interesting to explore the academics not involved in the AE. This would demonstrate the difference in the academics' perception and the reason for their non-engagement. This understanding would give a holistic perspective of the factors that explain academic engagement in the AE in Bangladesh.

This study asserts that academics use industry collaboration to complement internal capabilities and external collaboration. Hence, exploring how the university and firms use this collaboration to substitute or complement these capabilities through external collaboration in the Bangladeshi context or in any other developing country perspective is essential. However, universities in developing countries still need to catch up in industry collaboration to access their internal resources and capabilities. Hence, it is essential that combining the different knowledge from academia with an analysis of complementarity or substitutability between firms' different knowledge sources would be a valuable extension of the current knowledge (Hewitt-Dundas et al., 2019).

Another inclusion would be to understand the perspectives of the industry regarding their collaboration interest with academia. There needs to be more clarity of goals between the industry and academia (Kirby & El Hadidi, 2019). Therefore, exploring how these conflicts are mitigated and instigating industry-academia collaboration would be interesting. It is argued that the cognitive and social proximity of the industry and university increases the mutual commitment of industry and academia (Lauvås & Steinmo, 2021). Although this study focuses on the previous experience of academics in entrepreneurial engagement, it would be interesting to explore how those who had university experience and currently working in the industry influence the industry-academia collaboration (Lauvås & Steinmo, 2021).

This current research revealed that it is a common perception that women's responsibility is to look after domestic tasks. This study found that this familial responsibility poses a challenge for the women academics to their AE involvement. Although a gendered mindset prevails in academia in Bangladesh (Ahsan & Cullen, 2022), the small number of women academics who participated does not allow this perspective to be explored in depth. Nevertheless, the female participants show resilience in engaging in IAE and FAE. It would be interesting to explore how female academics manage their workload and engage in an entrepreneurial role.

This study only considers the academics' entrepreneurial engagement. In contrast, the AE literature also incorporate student entrepreneurship (e.g., Kretz & Sá, 2013) under the AE discourse. It is found that academics engage their students in different projects to develop the student's capabilities. It would be interesting to get an insight into how the student's engagement in different projects with the academics leads them to become entrepreneurial in the future. This understanding would encourage the students to develop their skills, behaviour and capabilities, which can later catalyse them to engage in an entrepreneurial role.

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Appendix 1: Summary of Selected Studies in AE

Authors	Methods	Context	Sample	Implications	Future research direction
Abreu *et al.* (2016)	Quantitative Online Survey	UK	Individual data from 22,556 academics and institutional data provided by the Higher Education Statistics Agency (HESA)	University regulations have a relatively limited effect on academic entrepreneurial activities, making academics rely more on the normative and cognitive interpretations of the rules in research- and teaching-led universities.	Recommend looking into multi-level insights generated through institutional theory with qualitative and systematic research into selected universities across different national and institutional contexts.
Abreu and Grinevich (2013)	Quantitative Survey	UK	Individual data from 22,556 academics and institutional data provided by HESA	The institutions' greater weight on commercialisation has a positive effect on the formal form of AE but a detrimental effect on the IAE.	Recommends exploring the benefits of more informal entrepreneurial activities,
Athreye et al. (2023)	Quantitative Survey	Nigeria	298 academics from 79 departments in the university	Some entrepreneurially motivated academics overcome barriers and engage with external stakeholders in a weak institutional environment. Department orientation (incentive schemes) and support explains academic entrepreneurial engagement.	How the motivations and cognitions of academics vary due to the organisational support is missing.
Aydemir et al. (2022)	Quantitative National survey	USA	798 academic inventors	Academic entrepreneurs who identify market opportunities early, consider research commercialisation compatible with their role and are boundary spanners between university and industry will be more likely to engage with companies to convert patented inventions into commercial products and processes. A formal royalty distribution policy motivates academics to engage in commercial development with industry.	There may be additional university-relevant factors that were captured in this study that encourage and enable post-invention collaboration. Qualitative research to investigate the roles and contributions of academic researchers' variability in the post-patent commercialisation process
Barbieri et al. (2018)	Quantitative	Italy	221 academic entrepreneurs and 604 non-entrepreneurial academics	Spin-offs do not increase the transfer of technology to firms using co-publications. Such knowledge would have been transferred anyway to an existing firm. Researchers who become entrepreneurs, their academic activity fades.	It indicates qualitative investigations of the individual unobserved factors affecting the academic's decision to become an entrepreneur across different disciplines.
Belitski et al. (2019)	Mixed Method Online Survey Face-to-face interview	Belarus Kazakhstan Azerbaijan	Balanced number of private/public, medium and large 20 universities, junior and senior scientists, range of disciplines	The results demonstrate that research commercialisation is not associated with the existence and awareness of TTO or the establishment of commercialisation contracts via TTO but with the direct industrial funding of university research. Human capital, such as academic position and personal attributes of scientists, such as age and publication record, have little or no effect on commercialisation income.	It indicates the need to identify the prevalence and multi-level determinants of AE. Moreover, it raises the importance of knowing the organisational and ecosystem characteristics and scientists' capabilities to interact with the different actors involved in this process.

Cunningham, Lehmann, et al. (2019)	Quantitative Panel Data 15-year period 1998-2012	Germany	75 universities, citations per publication and number of patent applications.	Legislative change has an initial positive effect on universities as measured by start-ups and patents, yet it changes over time. It argues that policymakers and legislators need to consider the replication of policy and legislative instruments from other contexts along with the criteria used to measure success.	The influence of legislative and policy initiatives that support technology transfer takes countries with under-representations.
Cunningham and O'Reilly (2018)	Discussion & Literature Review			Identified macro, meso and micro perspectives of technology transfer. Over the last few decades, research into the different aspects of technology transfer has grown significantly and has explicitly taken a macro perspective.	Incorporate multilevel perspectives in different technology transfer mechanisms. Regarding the micro level, we need to examine the antecedent factors that shape individual behaviours to technology transfer.
Davey et al. (2016)	Quantitative Online survey	European Region 33 countries	University Rectors and University business cooperation managers (Technology Transfer Office (TTO)/ innovation office/ incubators directors)	There were different results for all these countries, with a significant difference in the university business cooperation barriers and drivers affecting the AE. The regional context plays a vital role in the extent of AE. More specifically, culture and funding act as inhibitors, whereas relationships and university mission are the most significant drivers.	Identify the need to conduct qualitative research on the academic motivations and intentions for AE, incorporating the perceptions of the national environment. In contexts where academics need more national and institutional resources for innovation and entrepreneurship.
Fini et al. (2017)	Quantitative Panel and firm-level data	UK Italy Norway	World Bank Database, Heritage Foundation, Eurostat Statistics Database, EUMIDA database, 185 universities and their 2323 spin-offs (878 from IT, 120 from NO, and 1325 from UK)	Changes in the institutional framework through changing IPRs at the national level and establishing TTO at the university level increase the number of spin-offs. However, the quality of these ventures decreases because the underlying commercial potential of the scientific research at the university remains the same. Universities receiving VC financing with a TTO produce fewer spin-offs than those without a TTO, and incorporating changes in IPR at the country level intensifies this adverse effect.	Exploring TTOs' role in improving academic ability, and motivation and securing external funding for the spin-offs. It also identifies the need to investigate a university's private or public legal status for research transfer activities.
Good et al. (2019)	Qualitative Case study	Denmark, Finland, Norway, Sweden	Technology transfer ecosystems of eight universities and their components	Develop three types of ecosystem typology, the introverted, externalised, and allied technology transfer (TT) ecosystems and find that within-ecosystem interactions differ significantly across the three types.	Identify how the national policies, traditions, history, culture, or incentives drive the TT ecosystem structure. Investigate TT ecosystems in countries where the role of public policy actors in ecosystems is less dominant.
Hayter et al. (2022)	Conceptual			Develops a conceptual framework to understand the identity-based micro-processes that provide insights into commercialisation behaviour among scientists.	Illustrate the evolution and interdependencies of intrinsic and extrinsic motivations and entrepreneurial identity.

Hossinger et al. (2020)	Literature review			Identify the drivers, barriers, and success factors of academic spin-offs. Individual-level factors significantly explain academic entrepreneurial behaviours. However, the venturing process and the success of spinoffs are influenced not only by micro-level factors but also strongly depend on meso and macro-level factors such as relationships with parent organisations and regional contexts.	Researchers should adopt a more integrated perspective, paying more attention to the interplay between the various levels of actors on AE. More attention should be given to the countries in Asia which are under-researched but rapidly developing.
Huyghe et al. (2016)	Quantitative Face-to-face interviews	Europe	31 TTOs, 2308 researchers and secondary data from annual reports	TTO awareness is more significant among researchers with entrepreneurial experience, who close many research and consulting contracts with industry partners, conducted research in medicine, engineering, or life sciences, or occupied postdoctoral positions.	Need to assess how different levels interact and influence TTO awareness. Investigate the effect of the university incentive system on research commercialisation.
Johnson et al. (2023)	Qualitative Narrative Interviews	US, UK, and Russia	47 academics, support centre managers & entrepreneurs	Individual agents illustrate role-identity conflict during science commercialisation. Individual agents are considered to develop knowledge capabilities, international knowledge spillover and social capital. University-centred entrepreneurial ecosystems (UCEE) agents violate rules and norms, avoiding the immediate UCEE to drive science commercialisation.	Further research should explore these different UCEE agents, perhaps developing psycho-social models of individual behaviour.
Karlsdottir et al. (2023)	Quantitative Survey	Iceland	183 Academics	Individual factors can better predict soft activities like community and external teaching and training. Openness influences participation in all third mission activities except for science communication. Organisational factors can better predict hard activities such as applied contract research and commercialisation. Academics with experience outside of academia are more likely to engage in applied contract research and commercial activities.	Collect qualitative data to gain insight into the reasons hindering third mission participation and academics' position towards third mission activities.
Klingbeil et al. (2019)	Quantitative	Germany	49 research institutes, 85 research group leaders and 254 researchers	Institution's commercialisation logic influences the researchers' entrepreneurial intentions. Leaders' track records of entrepreneurial behaviour and their entrepreneurial intentions – play a significant role in transmitting the organisational-level logic to the individual level.	Whether strong commercialisation logic impedes other science-related outcomes relevant in academia, such as publication output or grant applications.

				Internal motivations include a desire to further research by accessing modern laboratory facilities in industry sites, conducting experiments in the field, gaining new research ideas, improving the quality of teaching, and developing local innovation and regional development.	
Kuchumova et al. (2023)	Qualitative Interview	Kazakhstan	76 Faculty members from 8 public and private universities	Faculty engagement in industry research partnerships is limited, especially at private universities. Extrinsic motivations, such as receiving monetary benefits and gaining reputational and career rewards, dominated faculty members' engagement decisions. Insufficient organisational support, low domestic demand for innovation, inadequate research funding, and limited individual capacity in research and entrepreneurship hinder academic engagement decisions. Engagement differences exist between public and private universities.	University type was a much more important factor affecting faculty engagement, which needs exploration.
Meoli et al. (2018)	Quantitative Panel Data 1999 - 2015	Italy	85 universities and 1254 academic spin-offs	They argue that the number of spin-offs is unrelated to the university's research profile. Spin-off is a poor measure of technology transfer.	Investigate the impact of national policies on the different technology transfer mechanisms other than spin-offs.
Meoli et al. (2018, 2019)	Quantitative Panel data 1999 - 2015	Italy	66 universities and 1122 academic spin-offs	They have not found any relationship between regulatory change to appoint lay members to the board of directors mandatorily and the number of academic spinoffs. However, they see the background and number of lay members essential.	Whether the regulatory change, for instance, the appointment of a lay member, affects the university's entrepreneurial engagement needs investigation.
Urban and Chantson (2019)	Quantitative	South Africa	1500 academic and research scientists from 8 universities and CSIR (largest research organisation)	Results show that awareness of different aspects of entrepreneurship plays a vital role in shaping beliefs and attitudes towards AE. Perceived organisational support factors and institutional barriers do not significantly affect entrepreneurial intentions.	Indicate the need to use the multilevel lens to identify additional institutional and organisational factors affecting academic entrepreneurial intentions.
Yu et al. (2023)	Quantitative Survey	Canada & China	2735 academics for Canada and 2501 academics for China	Chinese academics who emphasise practically, commercially, or socially oriented research are likelier to engage in teaching-based and research-based entrepreneurial activities, similar to Canada. Entrepreneurial activities can occur when the researchers' research orientation matches the skills and competencies necessary for more valuable social activities.	Future studies should further explore these interactions and potential pathways of how organisational and institutional factors foster or hamper the effect of individual characteristics. Comparing trade-offs, costs, and benefits of entrepreneurial activities to academics, their

				Academics who perceived that their institution expected them to engage in entrepreneurial activities were more likely to do so. Context plays a vital role in academics’ entrepreneurial engagement.	institution, and the government.
Zhang et al. (2022)	FsQCA Survey	China	164 academics	Scholars can obtain more resources, attract more research funds and colleague resources, and provide students with employment opportunities to promote academic research. Openness to experience, external reputation, career rewards, and motivation influence academics AE. Scholars can communicate with peers engaged in AE to increase personal, academic, and social network relationships.	Other factors than the perspective of Big Five personality traits (extraversion, agreeableness, conscientiousness, emotional stability, oneness to experience) that influence AE could be studied in future research

Source: Author

Appendix 2: Four Approaches to Management Research

	Knowledge-constituting assumptions			
Modes of engagement in management research	Ontological status of human behaviour / action	Epistemology	Ontological status of social reality	Methodological commitments
Positivism	Determined	Objectivist	Realist	Quantitative methods to enable erklaren
Neo-empiricism	Meaningful – inter-subjective	Objectivist	Realist	Qualitative methods to enable verstehen
Critical theory	Meaningful – inter-subjective	Subjectivist	Realist	Qualitative methods to enable a structural phenomenology or critical ethnography
Affirmative postmodernism	Discursive – inter-subjective	Subjectivist	Subjectivist	Qualitative methods to enable deconstructions

Adopted from P. Johnson et al. (2006)

Appendix 3: Interview Guide for University Managers

1. Please tell me your full name and current role with the university.
2. Please describe your previous industry experience or entrepreneurial experience.
3. (if yes) How did your previous industry experience or entrepreneurial experiences help you in your current role?
4. How many academics and employees are employed in the university?
5. Have you encountered the terms entrepreneurial university and academic entrepreneurship? What do you understand by these terms?
6. What is your awareness regarding the level and nature of academic entrepreneurship in Bangladesh?
7. To what extent does your university adopt the entrepreneurship mission?
8. Why do you think adopting an entrepreneurship mission is important?
9. Which individuals or groups are important to this university's entrepreneurial mission adoption? Why are they important?
10. Do you think your previous experience has influenced this adoption of entrepreneurial mission? How?
11. To what extent does the university engage in entrepreneurial activities?
12. Why are these specific forms of entrepreneurial activities?
13. How does the university give recognition (regarding promotion and pay) to the academics engaged in these entrepreneurial activities?
14. Is it a requirement for academics to engage in entrepreneurial activities?
15. What are the important resources required to commercialise the university research? How do you rank their importance?
16. To what extent are these resources available in your university?
17. How do you support any academic engaging in these activities?
18. What are your suggestions for improving the university's commercialisation activities?

Appendix 4: Interview Guide for University Support Centre Manager

1. Please tell me your full name and current role within the university.
2. What are your responsibilities in this current role?
3. Before joining this role, please describe any previous industry experience or entrepreneurial experience.
4. How and when was the University support centre (USC, TTO, Incubator, Accelerators or other support mechanism) founded? How many people are working at USC?
5. What are USC's primary goals, objectives, and program outcomes for the organisation? What services does the USC provide?
6. What is your understanding of the university's mission?
7. How does the USC fit into the university mission? How do you implement the mission adopted by the university?
8. Which individuals and groups get support from USC and how?
9. How many projects has the USC supported? Can you please explain the types and nature of these projects?
10. Have you encountered the terms entrepreneurial university and academic entrepreneurship? What do these terms mean to you?
11. What is your awareness and understanding of academic entrepreneurship in Bangladesh?
12. (To what extent) Does the university adopt the entrepreneurship mission?
13. Why do you feel that?
14. To what extent does the university engage in entrepreneurial activities?
15. Why did they choose these forms of entrepreneurial activities?
16. Describe the types of commercialisation processes that you go through.
17. Who are the key decision-makers in adopting this university's entrepreneurial mission?
18. What are your suggestions for developing the university's commercialisation strategy?

Appendix 5: Interview Guide for University Academics

1. Please tell me your full name, title, and current role with the university.
2. When did you join this current role?
3. Can you please give some details of your educational and employment information?
4. Please describe any previous industry experience or entrepreneurial experience.
5. What do entrepreneurial universities and academic entrepreneurship mean to you?
6. How prevalent is it in Bangladesh, in your experience?
7. What is your understanding of the mission of your university?
8. To what extent does your university adopt the entrepreneurship mission?
9. Why do you feel that the university adopts this mission?
10. Who are the key decision makers for the university's entrepreneurial mission adoption? How did they contribute to the adoption of entrepreneurial mission?
11. To what extent does the university engage in entrepreneurial activities?
12. Why did the university choose this entrepreneurial activity (engagement) form?
13. Is research commercialisation joint in your disciplinary field?
14. In which of these activities are you involved?
15. Can you briefly describe why you chose this specific mode of engagement?
16. Why do you want to commercialise your research?
17. (If answered yes in 3) Do you think your previous industry experience or entrepreneurial experience helped you in your commercialisation of research? How?
18. How does your engagement in academic entrepreneurship impact your academic performance? Why do you think that?
19. How do you balance your academic duty and entrepreneurial activities?
20. How is your engagement in entrepreneurial activities recognised by the university (promotion, pay, etc.)?
21. Which resources are required to commercialise the university research? How do you rank their importance?
22. To what extent are these resources available in your university?
23. How frequently do you receive support from the university (support mechanisms to AE) regarding research commercialisation?
24. How has this pandemic influenced your research and entrepreneurial activities?
25. What challenges and barriers do you face as an academic entrepreneur? Can you please give details?

Appendix 6: Individual Tax Rate

Total income	Rate
Up to BDT 300,000	0%
BDT 300,001-BDT 400,000	5%
BDT 400,001-BDT 700,000	10%
BDT 700,001-BDT 1,100,000	15%
BDT 1,100,001-BDT 1,600,000	20%
Over BDT 1,600,000	25%

Source: National Board of Revenue (2022)