# An analysis of female academic entrepreneurship in Bangladesh

AHSAN, Ramjanul and CULLEN, Ufuk Alpsahin

# An analysis of Female Academic Entrepreneurship in Bangladesh

**Ramjanul Ahsan** *ramjanul.ahsan@gmail.com*

*Sheffield Business School*

*Sheffield Hallam University*

*Sheffield, S1 1WB, United Kingdom*

**Dr Ufuk Alpsahin Cullen** *cullenu@edgehill.ac.uk*

*Edge Hill University Business School*

*Edge Hill University*

*Lancashire, L39 4QP, United Kingdom*

**Abstract:**

This study critically analyses the micro, meso and macro level factors that influence the female academics to engage in academic entrepreneurship (AE). The extant literature, which seeks to understand the female academics engagement in AE, mostly revolves around a gender comparative lens, where women entrepreneurs are understood only in comparison with men. This study examines the association between female academic entrepreneurship and the level of asymmetry between the micro, meso and macro level factors (5M framework).

**Keywords**: Female academic entrepreneurship, 5M Framework, Bangladesh,

## 1. INTRODUCTION:

Universities adopt an entrepreneurial mission and encourage academics to create a wider impact through entrepreneurial value creation by disclosing their research findings and inventions to the universities and society (Guerrero et al., 2015). This represents universities' intention toward the entrepreneurship mission adoption, and when this disclosure of findings and inventions involves the commercial value are termed as academic entrepreneurship (AE) (Abreu and Grinevich, 2017). More specifically, AE is the individual-level initiative of academics directed toward the evaluation and exploitation of scientific knowledge to create economic value that may involve new business establishment or knowledge transfer through consultancy (Klingbeil et al., 2019; Miller et al., 2018; Uslu et al., 2019).

Research exerts that female academics appear less motivated toward academic entrepreneurial

activities and generating commercial value through academic entrepreneurship (Di Paola, 2020). Best et al., (2016) found out that only 10 percent of the female academic population in the selected German context was engaged in entrepreneurial activities, which supports the claim that academic entrepreneurship is a male-centric and male-dominated area (Aldridge and Audretsch, 2011; Bergmann et al., 2016; Tartari and Salter, 2015). Abreu and Grinevich (2013) and Tartari and Salter (2015) argue that female academics are less likely to be involved in academic entrepreneurial activities than their male counterparts, especially in the context of contract research and consultancy.

One explanation for this might be the gender-specific obstacles that female academics face in engaging in academic entrepreneurial activities, such as cultural barriers, gender stereotypes (Wang and Degol, 2017), hostile organisational culture, lack of time and financial resources, lack of human resources, lack of credibility and lack of entrepreneurial opportunity recognition and exploitation (Sinell et al., 2018) in this context. And yet, (Goel and Göktepe-Hultén, 2018) argue that gender is an insignificant variable in this equation. So, gender-effect in academic entrepreneurship is still a controversial issue.

Another explanation focuses on more individual factors around female academic entrepreneurship. Females' relatively lower level of engagement with commercial value creation through academic activities might stem from that they are less likely to hold senior positions and have limited prior experience in running a business which affects their credibility and resourcefulness negatively when engaging with commercialisation activities (Abreu and Grinevich, 2017; Giuri et al., 2013; Stuart and Ding, 2006). (Abreu and Grinevich, 2017) claim that females might make a deliberate and conscious choice not to engage in such activities. The authors do not elaborate on the reasons behind the choice.

This research paper aims to evaluate female academic entrepreneurship per se in its context instead of comparing academic entrepreneurial activities based on gender. Also, this research claims that females predominantly engage with informal academic entrepreneurship (IAE) instead of formal academic entrepreneurship (FAE), and it attempts to test this claim. Table 1 briefly explains both formal and informal academic entrepreneurial activities.

Table 1: Formal and informal forms of academic entrepreneurship

| Formal Academic Entrepreneurial Activities (FAE) | Informal Academic Entrepreneurial Activities (IAE) |
|---|---|
| *Spin-off* – formation of a new firm to exploit the scientific discoveries of the university research | *Consultancy* – a company has a problem and wishes for a known solution to be applied to the problem |
| *Start-ups* – formation of new firms by the university academics | Contract research – undertaking research with the university system to solve a problem for external firms |
| *Patent* - Government-sanctioned rewards to investors that come with some rules and norms for protecting embedded intellectual property | *Joint/collaborative research* – commercial and academics partner agree to work together to discover new knowledge or to propose solutions solving a problem |
| *License* – the right of university-created knowledge transferred to a firm and protected either by an academic partner or a commercial | *Shared facilities* – a university and a commercial partner join together to invest in the development and operation of a facility or piece of equipment |

<table>
<tr><td>partner</td><td></td></tr>
<tr><td>Research Joint venture – universities are invited to partner with the industry to stimulate and foster research and development</td><td>Secondment – when an academic present for a period of time in another organisation</td></tr>
<tr><td rowspan="2">Invention disclosure – researchers disclose the inventions within the university or to the industry and do not come with promises of intellectual property protection</td><td>Training and development – companies keep their professional knowledge up to date with new developments delivered by academics.</td></tr>
<tr><td>Student placement and projects – transfer of a graduate into a company</td></tr>
</table>

(cf. Abreu and Grinevich, 2013; Alexander and Childe, 2013; Link et al., 2007)

FAE are activities that occur via commercial transactions and are centred around technological inventions protected via formal IP, for instance, spin-offs, licences, patents, and start-ups (Abreu and Grinevich, 2013). In addition, IAE includes consultancy, contract research, joint/collaborative research, shared facilities, secondments, training and continued professional development, student placements and student projects (Miller et al., 2018). These activities also have commercial aspects but are more tacit knowledge centred; therefore, they cannot be protected via formal IP (Abreu and Grinevich, 2013).

Previous studies focus mainly on FAE, such as spin-offs, patenting and licensing (Tartari and Salter, 2015). This paper addresses this gap in the literature by bringing female academics with IAE (Di Paola, 2020). Tartari and Salter (2015) argued that gender-based obstacles towards AE can only be evaluated accurately if the evaluation is performed from the perspective of female academics. Similarly, (Hmieleski and Powell, 2018) argue the need to identify what it means for academics to engage in entrepreneurial activities and how being a female academic effects this meaning (Abreu and Grinevich, 2017; Hmieleski and Powell, 2018).

This paper aims to evaluate female academic entrepreneurship from the institutional perspective as the subject matter is believed to be a context-dependent variable (Philpott et al., 2011). Especially in developing countries, organisational support mechanisms might fail to generate enough support for female academic entrepreneurs to flourish. Furthermore, the cultural climate might also prevent females from undertaking entrepreneurial activities in the broader context, as discussed in the following chapters. And therefore, this paper aims to identify the gender-specific barriers toward AE and females' responses to those barriers.

## 2. LITERATURE REVIEW

### 2.1. Academic Entrepreneurship

Etzkowitz (2003) uses the term "entrepreneurial university" to define those institutions committed to regional economic development. Academics and policymakers have adopted it to describe universities that effectively deliver on their third mission (Miller et al., 2021). Developing a more entrepreneurial culture is essential for universities to become effectively involved in economic development (Etzkowitz and Klofsten, 2005; Shane, 2004). Consequently, universities are adopting entrepreneurship in addition

to teaching and research (Audretsch, 2014; Guerrero et al., 2015). Governments worldwide have introduced policies and programs to promote research commercialisation (Fini et al., 2019; Rasmussen, 2008) which is expected to have improved the meso environmental conditions in favour of females towards undertaking academic entrepreneurial endeavours (Giuri et al., 2020).

AE refers to the commercialisation of university research through various entrepreneurial value creation paths such as the formation of new companies (Abreu and Grinevich, 2017; Cantu-Ortiz et al., 2017), consultancy or contract research (Abreu et al., 2016; Wright, 2018). Theoretically, any activity, formal and informal (see Table 1), serves as a source of revenue for the university and the academic (Grimaldi et al., 2011; Siegel and Wright, 2015) and can be categorised as AE.

Researchers (Abreu and Grinevich, 2013; Alexander and Childe, 2013; Link et al., 2007) have differentiated these activities based on property rights, legality, visibility, and easily quantifiable and economic impact into formal and informal AE. As stated previously, most research (Abreu and Grinevich, 2013; Grimaldi et al., 2011) to date focuses on the FAE, exploring spin-out companies, licences, patents, and start-ups. These activities occur via commercial transactions and are centred around technological inventions protected via formal IP (Abreu and 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 et al., 2018). These activities also have commercial aspects but are more tacit knowledge centred. Therefore, it cannot be protected via formal IP (Abreu and Grinevich, 2013). These activities can contribute to society and the economy. However, they tend to occur ‘under the radar’ (Abreu and Grinevich, 2013, p. 409). And yet, an involvement in IAE transcends universities’ internal knowledge and leads to engagement in FAE (Wadhwani et al., 2017). Often knowledge from the university is conveyed to most industries through consulting and informal communication than through formal activities (Cohen et al., 2002). It is argued that when academics interact with industries, they want to promote their research rather than create a wider impact through knowledge sharing (D’Este and Perkmann, 2011). Therefore, it is imperative to understand the faciliating factors of IAE (Wright, 2018).

### 2.2. Theoretical background

The institutional context draws on the concept of formal and informal institutions as “rules of the game,” introduced by (North, 1990). Formal institutions are political and economy-related rules which create or restrict opportunity fields for entrepreneurship, such as laws and regulations for market entry and exit or private property regulations. Informal institutions include the norms and attitudes of society, such as the value society generally puts on entrepreneurship or the roles of women in a society that might restrict the nature and extent of their entrepreneurial activities. The institutional context helps to determine the process of gaining legitimacy, which is critical for entrepreneurs to overcome the liabilities of newness (Stinchcombe, 2000) and increase survival prospects (Bruton et al., 2010). The term legitimacy commonly refers to the right to exist and perform an activity in a certain way (Suchman, 1995), with ventures having to prove their value by demonstrating that they engage in legitimate activities. Therefore, entrepreneurs need to behave desirably or appropriately within a socially constructed system or face sanctions for deviating from accepted norms (Suchman, 1995), constraining

nascent entrepreneurs' range of strategic options [41]. The application of institutional theory has proven to play a significant role in helping to explain the forces that shape entrepreneurial success (Bruton et al., 2010; Bruton and Ahlstrom, 2003).

One application of institutional theory has produced a framework entitled "The 3M Framework", which helps us to make sense of the main building blocks of value creation through entrepreneurship. 3Ms framework is organised around three fundamental building blocks of business viability: market, money, and management (Bates et al., 2007). An entrepreneur needs to have access to markets (Schumpeter, 1934; Shane, 2003), money (Bruno and Tyebjee, 1982; Penrose, 1959) and management (Aldrich, 1999) in order to launch a venture. Market encapsulates the opportunity, management refers to the human and organisational capital, and money refers to financial capital (Brush et al., 2010). (Bates et al., 2007) advocate that the 3Ms are central to the foundation of any business.

As mentioned previously, this paper attempts to adopt a gender-aware perspective, and therefore it applies a gender-aware framework to explain and evaluate female academic entrepreneurship. The gender-aware framework is known as the 5M Framework. The 5M framework is rooted in the premise that entrepreneurship of any form is socially embedded (Davidsson, 2003), and therefore it draws on institutional theory (Brush et al., 2010). The 5Ms framework extends the scope of the 3Ms through the inclusion of further dimensions, namely "motherhood" and the "meso" and "macro" environment, to consider any uniqueness of the female gender (Brush et al., 2009, p. 9). Both motherhood and the meso-macro environment mediate women's entrepreneurial activity differently. *Motherhood* is a metaphor representing the household/family context which can help explain economic and social differences and thus draws attention to the fact that family/household contexts might have a larger impact on women than men (Jennings and Mcdougald, 2007). Brush et al. (2009) advocated that the invisible internal family dynamics, such as gendered power relations and inequalities, should be examined to have an enlightened understanding of female entrepreneurship.Furthermore, studies highlight the importance of operationalising family and households for women's businesses' survival (Aldrich and Cliff, 2003; Carter and Ram, 2003). Brush and Manolova (2004) posited that the motherhood facet of the framework focuses on the role of the household as a foundation for resources and social support for female entrepreneurs. *Macro structures* frame gender roles and responsibilities within society and is typically defined as the national level policies, culture, laws and economy. *Meso environment* refers to regional support services and industries (Pitelis, 2005), occupational networks, regional culture, business associations and the like. Figure 1 shows the interconnectedness of the 5M Framework elements (Berger and Kuckertz, 2016).

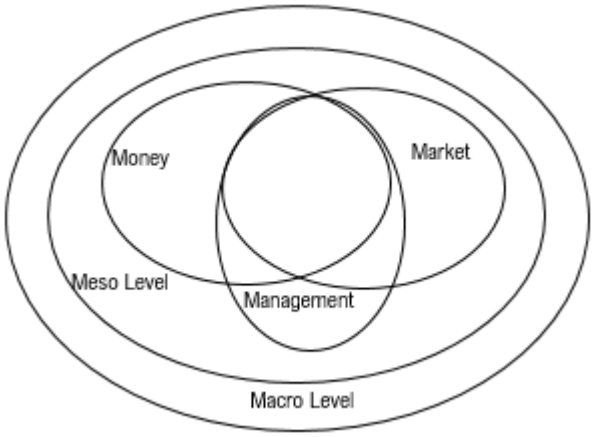


Figure 1: The interconnectedness of the 5M Framework elements (adapted from Berger and Kuckertz (2016))

The meso and macro environment can limit the exercise of choice for women entrepreneurs, which can be accepted as a manifestation of the explicit acknowledgement of the vital importance of the institutional environment on female enterprises. Therefore, this paper looks into female AE from the perspective of the gender-aware framework elements, namely, motherhood and meso/macro-environmental factors, to evaluate the individual, organisational and cultural factors affecting female entrepreneurial activities within universities.

The implementation of the 5M framework within the context of this study is shown in Table 2.

**Table 2: The Application of 5M Framework**

| 5M Framework Constructs | Context | Case-Specific Indicators & Measures |
|---|---|---|
| Market | Demand for AE | Interview Data |
| Money | Financial resources available for AE | Interview Data |
| Management | Social capital<br>Human capital | Interview Data |
| Motherhood | Family support<br>Family roles | Interview Data |
| Macro environment | National culture (Globe Project)<br>Formal institutions<br>Women's status | Globe Culture Project Data<br>Interview Data |
| Meso environment | Support mechanisms for females' academic entrepreneurship<br>Networking<br>Industry partnerships | Interview Data |

Previous studies show that female academics have limited social capital and fewer bridging ties outside their local work contexts than their male counterparts (Tartari and Salter, 2015). Moreover, they lack business skills in market development (Cullen, 2019). And yet, in its nature, IAE is more tacit knowledge-centric (Abreu and Grinevich, 2013) which increases the importance of human capital. Prior experience and role models in the context are proven to be the facilitating factors of entrepreneurship. in our

academic context, prior entrepreneurial experience helps academics build relationships with industry actors and engage in entrepreneurial activities (Hmieleski and Powell, 2018). However, female academics have limited access to role models, business mentors and related networks (Tartari and Salter, 2015).

Needless to say, access to affordable funds is crucial for entrepreneurial success (Bates et al., 2007), especially at the start-up stage. Our research shows that a technology transfer office (TTO) within the university facilitates to access funding opportunities and creates a solid foundation to protest intellectual property rights. Consequently, TTOs contribute to developing an entrepreneurial organisational culture within universities (Goel et al., 2015; Hayter, 2016). However, research shows that female academics are less likely to engage and benefit from TTOs due to a lack of connections with the industry(Merluzzi and Burt, 2020). Seemingly female academics' lack of industry experience and engagement creates a barrier to obtaining necessary resources for AE (Sinell et al., 2018; Tartari and Salter, 2015).

The characteristics of the meso environment (by being supportive or obstructing) are also determinants of AE for females. The meso environment relates to the regional support, initiatives, and organisations, and can include the industries. These include university policies, support, and industry requirements (Berger and Kuckertz, 2016; Brush et al., 2009). Universities formulate policies and programs to foster entrepreneurial activities and technology transfer within and between the academic and the industry (Qian et al., 2018). For this purpose, universities 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 and Grinevich, 2013). Universities provide continuing professional development (CPD) programmes for businesses (Davey et al., 2016), and businesses contribute to teaching through visiting/guest lecturing (Etzkowitz, 2017). Businesses are one of the sources of finance for innovation and technology projects within universities (Fischer et al., 2018). And therefore, academia-industry partnership possesses various opportunities for academic entrepreneurs (Fischer et al., 2018).

Different dynamics and support mechanisms for academic entrepreneurship occur when expanding the context to include the wider context, such as national-level policies, laws, cultural norms and social expectations [51], [57]. Governments formulate different policies and programs to enhance entrepreneurship within the country. Some of these efforts connect academia with the industry (Cunningham and O'Reilly, 2018). And yet, the government's support is criticised for prioritising supporting the existing businesses rather than enhancing innovation and encouraging more people to pursue entrepreneurial endeavours (Wright, 2014). On the academic side, it is observed that national policy fosters FAE such as patents, licensing agreements, start-ups, and spin-offs (Gosens et al., 2018; Grimaldi et al., 2011; Hayter et al., 2018) and often overlooks the influence of these policies on the IAE. And therefore, IAE becomes trapped under the radar of governments and businesses. Wood claims that the existing policies to promote academic entrepreneurship undermine IAE through the lack of supporting mechanisms and recognition for these activities. Inevitably, academics hesitate to take part in AE and stay within the realm of teaching and teaching-related endeavours.

(Cullen, 2019) advocates that although gender equality is protected by law, governments tend to strengthen patriarchal values in society and challenge this provision by reintroducing women as

domestic workers and mothers who need to stay away from the labour market. Similarly, (Berger and Kuckertz, 2016) claim that governments fail to provide equal and even support for females and males in their entrepreneurial endeavours in favour of males. The authors highlight the importance of developing gender-sensitive and gender-aware policies to provide entrepreneurial and technological training and education tailored for females so that more females can access the job market. (Wang and Degol, 2017) indicate that even the American cultural norms dictate that women should avoid any entrepreneurial attempt until they fulfil their domestic responsibilities first. In another setting in Turkey, the government introduces motherhood as the main career of young women [58]. Seemingly, the concept of gender roles is a culture-independent phenomenon as the same attitude of seeing women as domestic creatures are observed in different cultural contexts. And yet, these added responsibilities, due to the cultural pressure and personal choices, make it difficult for female academics to allocate the time necessary to keep up with the latest knowledge and remain competitive within the field (Wang and Degol, 2017).

Since we are aware that any entrepreneurial activity requires a collaborative and favourable institutional setting, namely favourable micro, meso and macro environmental factors, we aim to understand, first, if the institutional factors are favourable for female AE and second, how these factors influence female academics to engage in entrepreneurship through which path: FAE or IAE. To Achieve this goal, we will apply the 5M Framework to our academic context. Concretely, (Berger and Kuckertz, 2016; Brush et al., 2009; Cullen, 2019) apply this framework to analyse the environmental factors that condition female entrepreneurship.

Our research is original with its context in two ways. First, in the myriad of research aim to describe a supportive entrepreneurial environment for female entrepreneurs (Abreu and Grinevich, 2017; Di Paola, 2020; Tartari and Salter, 2015) in the business context, our research taps onto the academic context. Second, our research has been conducted in Bangladesh, a relatively untapped area for female entrepreneurship in academia. A significant contribution of our study is that we have adopted a gender-aware framework, namely the 5M Framework, to evaluate the institutional factors as facilitators or impediments towards female entrepreneurship.

### 2.3. Female Academic Entrepreneurship

Consistent with the findings of female entrepreneurship research in the business industry context to date, female academics tend to less engage with AE activities and are more active in IAE than FAE (Abreu and Grinevich, 2013; Moraes and Laurindo, 2013). Although the definition of “informality” is different in the academic context than that of the wider economic context, we are still encouraged to approach IAE as an informal entrepreneurial activity due to its less visible nature. Literature has recognised that participation in informal entrepreneurship results from multiple personal and contextual factors that produce various outcomes in different socio-spatial contexts (Williams, 2006)(Williams, 2006).

### 2.4. The Country Context: Bangladesh

Bangladesh, a developing country in Asia, has been selected for this study since its recent emphasis on innovation, entrepreneurship, and economic growth (World Bank, 2016). Secondly, it is argued that

the institutions in developing countries have different effects on academic entrepreneurial intentions than those in developed countries (Urban and Chantson, 2019). Thirdly, Bangladesh is moving toward a knowledge economy as the government incentivises university graduates to engage in entrepreneurship (World Bank, 2016).

National education policy 2010 put importance on bringing women into the economic development in Bangladesh, as women make up half of the population (Ministry of Education Bangladesh, 2010, p. 39). Although the government developed different policies and programs to provide an equitable education to females, the number of female academics in the university is often found at a lower level (Bangladesh University Grants Commission, 2018a, 2019a, 2020). Female academics who undertake the entrepreneurial paths are rare (Di Paola, 2020). The National Innovation and technology policy 2011 of Bangladesh recognises the importance of bringing gender equity in science and technology, as it indicates 'promote the empowerment of women in all science and technology activities and ensure their full and equal participation' (Ministry of Science and Technology Bangladesh, 2011, p. 6). Although these initiatives are to include female academics in research, technology and innovation, several alarming issues are identified at the policy level. As the national science and technology policy highlights, "…shortage of skilled manpower in many areas, inadequate research facilities and skill development programmes, lack of coordination among scientific organisations….dependence on foreign technology, brain drain and emigration of trained manpower and poor social consciousness of the role of science and technology in national development" (Ministry of Science and Technology Bangladesh, 2011, p. 3).

The culture of society is understood as a set of attitudes, values, and social conventions belonging to that society that influence the entrepreneurship decision of an individual both positively and negatively (Noguera et al., 2015). The female academic entrepreneurs are part of the larger Bangladeshi culture and are embedded in the social environment (Maas et al., 2014). The perception of taking the entrepreneurial decision differs depending on the gender of the entrepreneur (Noguera et al., 2015). Hence, the cultural and social norms and expectations influence female academics to engage in entrepreneurial activities. In Bangladesh, the patriarchal social norms restrict female empowerment (Ahmed and Hyndman-Rizk, 2020), and women's entrepreneurship is less desirable than men's (Islam et al., 2019). As for higher education, there has been an increased number of universities and students in higher education in the last decade in Bangladesh (Table 1).

Table 1: Evolution of universities in Bangladesh 2009-2018

| Year/University | | Number of universities | Number of Teachers | | | Number of students | | |
|---|---|---|---|---|---|---|---|---|
| | | | Male | Female | Total | Male | Female | Total |
| 2009 | Private | 51 | 4,009 | 1,701 | 5,710 | No information available | No information available | 200,939 |
| | Public | 31 | 6,507 | 1,656 | 9,163 | | | 1,382,216 |
| 2018 | Private | 103 | 13,352 | 4,722 | 16,074[2] | 247,177 | 114,615 | 361,792 |
| | Public | 40 | 10,877 | 3,679 | 14,556 | 2,230,721 | 1,862,525 | 4,094,345[1] |

Source: Bangladesh University Grants Commission (2018, 2019, 2020)

Notes: Student Number include students from the affiliated colleges under the public universities, whereas only in public universities in 2018 the male and female students are 504,070 and 312,771 respectively. Private university teachers include both full-time and part-time.

Finally, to reduce the gender gap in academia (Rahman et al., 2019), the government has formulated different policies to increase female participation in higher education, but the number of women coming into the labour force is in decline (Ahmed and Hyndman-Rizk, 2020). Hence, it is important to explore how Bangladesh's institutional and contextual dynamics influence female academics to become academic entrepreneurs.

### 2.5. Gender Status in Academia in Bangladesh

It is argued that female academics are less likely to hold senior positions (Abreu and Grinevich, 2017; Giuri et al., 2013; Stuart and Ding, 2006). In Bangladesh, this is also apparent (table 2a, 2b and table 3). Table 2a shows the number of professors, associate professors, assistant professors, and lecturers from 2016 to 2018, but there is no information regarding the gender composition of each role; instead, the total number of males and academics is available. The percentage of female academics ranges from 23.26 to 25.27. The percentage slightly increased in 2018, but the rise is negligible.

Table 2a: Number of academics by gender, position in public universities from 2016 to 2018

| Year | Professor | Associate professor | Assistant professor | Lecturer | Others | Total Male Academics | Total Female Academics | Grand total | % of female academics |
|---|---|---|---|---|---|---|---|---|---|
| 2016 | 3,725 | 2,148 | 4,431 | 2,798 | 172 | 10,287 | 3,087 | 13,274 | 23.26 |
| 2017 | 3,906 | 2,175 | 4,738 | 2,728 | 252 | 10,518 | 3,281 | 13,799 | 23.78 |
| 2018 | 4,160 | 2,320 | 4,941 | 2,803 | 208 | 10,877 | 3,679 | 14,556 | 25.27 |

Source: (Bangladesh University Grants Commission, 2018a, 2019a, 2020)

Table 2b shows the number of professors, associate professors, assistant professors, and lecturers and the total number of male and female academics from 2016 to 2018 in private universities. Private university teacher includes both full-time and part-time, whereas part-time teachers are mainly from public universities (Rahman et al., 2019). Although data shows that the percentage of female academics increased in 2017, the number declined compared to the total number of academics. However, in 2018 the number and percentage of female academics increased. This indicates that the number of female academics in private universities has been consistent and stable in these years.

Table 2b: Number of academics by gender, position in private universities from 2016 to 2019

| Year | Professor | Associate professor | Assistant professor | Lecturer | Others | Total Male Academics | Total Female Academics | Grand total | % of female academics |
|---|---|---|---|---|---|---|---|---|---|
| 2016 | 2,363 | 1,407 | 3,346 | 7,842 | 613 | 11,099 | 4,472 | 15,571 | 28.72 |
| 2017 | 2,403 | 1,440 | 3,474 | 8,136 | 567 | 11,510 | 4,510 | 16,020 | 28.15 |
| 2018 | 2,165 | 1,407 | 3,658 | 8,452 | 392 | 11,352 | 4,722 | 16,074 | 29.38 |

Source: (Bangladesh University Grants Commission, 2018a, 2019a, 2020)

As there is no official list of vice-chancellors in public and/or in private universities (Ahad and Gunter, 2017). A data scoping and collection process has been adopted: first, annual reports of the university grants commission were accessed; second, based on this, a search of universities that are in operation

in 2018 identified that there was only one (1) female vice-chancellor in the 37 public universities. Of the 103 private universities, only four (4) have female vice-chancellors; of these four universities, one is a female-only university.

Table 3: Number of male and female vice-chancellors in public and private universities in Bangladesh in 2018

| University | No of universities | Total no of VCs | Male VCs | Female VCs |
|---|---|---|---|---|
| Public | 40 | 37 | 36 | 1 |
| Private | 103 | 86 | 82 | 4 (one is women-only university) |

Source: ugc.gov.bd/universities in Bangladesh

Note: Ten (10) universities have not started their operations by 2018

Although the pool of female professors is not available, the number of research leaders and vice-chancellors as organisational leaders remains small. Moreover, female participation in senior leadership positions is only 2.7 percent in public universities, and in the case of private universities, it is only 4.65 percent. This indicates that Bangladesh lags in representing females in higher education leadership positions.

### 2.6. Female academics entrepreneurial activities in Bangladesh

There is no complete list or official documents indicating the university academics' engagement in any entrepreneurial activities. It is often found that academics from public universities engage in different projects from the government and non-government sectors (Rabbani and Chowdhury, 2014). This information is not always available on the university website, and this information is scant in the case of a private university.

## 3. METHODOLOGY

This is qualitative research conducted through semi-structured and in-depth interviews with three participants. We adopted this approach to able to develop a deep understanding of the phenomenon studied and to obtain "individual perception and interpretation" information from female academics who engaged in IAE (Alvesson and Deetz, 2000; Cassell et al., 2018). The first connection was built at the management level. We contacted deans or head of academic departments to be able to identify research active academics, legitimise our research and to gain access to their staff. In the second stage, we identified suitable potential participants. We introduced the aim of the study and the data collection method. We got their consent (Archibald et al., 2019) by following the research ethics procedures of Sheffield Hallam University. Due to the COVID19-related restrictions, the interviews took place on Zoom. Zoom was used to maintain easy connection, user-specific authentication, the ability to record the conversation and stability (Archibald et al., 2019).

Each interview lasted 45 to 90 minutes in duration and was recorded. We kept our participants anonymous to improve the accuracy and validity of responses, prevent the employer from identifying the participant, and adopt the most fundamental rule of research ethics, namely do not harm. The recorded interviews were transcribed verbatim and entered into NVivo. The participants were coded to anonymise their identity by allocating them with a number (from 1 to the end) and a letter to indicate

their role (For instance, A for Academic). Using an inductive approach, the researcher uses thematic analysis following the step-by-step guidelines of [91], although it is considered a recursive process rather than a linear one. Themes are the key patterns identified in the data where the researcher inductively read the narratives repeatedly to find patterns from the data using NVivo, one of the widely used software to analyse qualitative data (Nishishiba et al., 2014). Upon these recurring patterns, the initial codes were generated and the relevant codes were then grouped as themes (Braun and Clarke, 2006).

The five elements of the model were taken as "themes"; therefore, five themes were developed from the analysis: market, money, management, motherhood, and meso/macro environment. To avoid manipulating the participants towards a certain direction, we asked gender-neutral questions and did not adopt "gender" as our perspective. We expected our participants to explain things from the gender perspective if that was their perception. For example, as we were talking about institutional support for AE, we did not emphasise support for female academics but included both genders. Under our primary themes, subthemes occurred, which are summarised in the findings chapter.

## 4. FINDINGS

The participants hold senior academic positions from professor to assistant professor. Their experience ranges from 7 to more than 20 years. Two participants are from a public university and STEM background, whereas one is from a private university and HASS background (Table 4). Regarding their engagement in AE, it was found that they were engaged in contract research, consultancy, and student placement. On this point, it is evident that academics from public universities are more involved with the industry than private university academics. Table 4a introduces the participants briefly.

Table 4a: Participant Information

| Participant coding | Highest level of Education | Current Job role | Academic experience | Industry Experience | University Type | Discipline | Form of AE | Previous work experience |
|---|---|---|---|---|---|---|---|---|
| A1 | PhD | Professor | 15-20 years | Yes | Public | STEM | Consultancy | Private sector: Business |
| A2 | PhD | Professor | >20 years | No | Public | STEM | Contract research, consultancy | No |
| A3 | Master | Assistant Professor | 5-10 years | Yes | Private | HAAS | Student Placement | No |

The findings indicate that the gender dimension is barely integrated qualitatively in the study of university academics, *'this area is totally different, this is my first-time experience doing interview on this topic and I really liked it'* (A1: interview excerpt).

As for the participants' engagement with AE, Table 4b and Table 4c show what kind of AE activities our participants have been engaging with.

Table 4b: Formal Academic Entrepreneurial Activities (FAE)

| Formal Academic Entrepreneurial Activities (FAE) | A1 | A2 | A3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| *Spin-off* – formation of new firm to exploit the scientific discoveries of the university research | No | No | No |
| *Graduates Start-ups* – formation of new firms by the university graduates | No | No | No |
| *Patent* - Government-sanctioned rewards to investors that come with some rules and norms for protecting imbedded intellectual property | Yes | Yes | No |
| *License* – the right of university-created knowledge transferred to a firm and protected either by an academic partner or a commercial partner | No | No | No |
| *Research Joint venture* – universities are invited to partner with the industry to stimulate and foster research and development | No | Yes | No |
| *Invention disclosure* – researchers disclose the inventions within the university or to the industry and do not come with promises of intellectual property protection | No | No | No |

Table 4c: Informal Academic Entrepreneurial Activities (IAE)

| Informal Academic Entrepreneurial Activities (IAE) | A1 | A2 | A3 |
|---|---|---|---|
| *Consultancy* – a company has a problem and wishes for a known solution to be applied for the problem | No | No | No |
| Contract research – undertaking research with the university system to solve a problem for external firms | No | Yes | No |
| *Joint/collaborative research* – commercial and academics partner agree to work together to discover new knowledge or to propose solutions solving a problem | Yes | Yes | No |
| *Shared facilities* – a university and a commercial partner join together to invest in the development and operation of a facility or piece of equipment | Yes | Yes | No |
| *Secondment* – when an academic present for a period of time in another organisation | No | No | No |
| *Training and development* – companies keep their professional knowledge up to date with new developments delivered by academics. | No | No | No |
| *Student placement and projects* – transfer of a graduate into a company | No | No | Yes |

### 4.1. Female Academic Entrepreneurship: Perceptions and Analysis from the 5M Perspective

Our research sheds light on AE within universities, facilitators and impediments towards female participation in academic research and entrepreneurship from the perspective of the 5M Framework. The participants emphasise the importance of a range of factors as impediments towards creating a wider impact through AE.

Female entrepreneurship research in developing countries reveals that entrepreneurial failure is predominantly attributed to individual factors - such as lack of entrepreneurial personality or skills to survive entrepreneurial endeavours - by females rather than pointing out the unsuitable institutional context as the hindrance. This partly stems from females' lack of understanding of the institutional contextual factors and their impact on their entrepreneurial success, as many cannot stay on the playground enough to thoroughly understand the market and the surrounding. As a result, female-owned enterprises survive significantly shorter than the male-owned ones. Our participants as

academic entrepreneurs demonstrate a different attitude to rationalise their lack of engagement with AE, although it is not a failure. They show a strong awareness of the impeding external factors towards their AE. Table 5 summarises the coded sentences from the narratives to summarise their perceptions around AE and the institutional context at the micro, meso and macro level.

Table 5: The Application of the 5M Framework to the Academic Context

| 5M Framework Constructs | Context | Coded Sentences From Narratives |
|---|---|---|
| Market | Demand for AE | – Lack of recognition of the impact of academic research<br>– Lack of interest by the business industry in engaging with universities<br>– Lack of credibility and reliability of universities as technology developers and innovators<br>– Lack of good examples of successful university-industry collaboration<br>– Research is not industry oriented but theoretical or not applicable to the business context |
| Money | Financial resources available for AE | – Inadequate funding of research projects<br>– Research is a self-supported action |
| Management | Social capital<br><br>Human capital | – Lack of know how on patenting and IP rights<br>– Lack of motivation toward research<br>– Lack of skills to conduct research<br>– Lack of awareness of impact through research<br>– Lack of interest in research<br>– Lack of entrepreneurial drive<br>– Lack of career ambition |
| Motherhood | Family support<br><br>Family roles | – The pressure to prioritise domestic responsibilities over professional ones<br>– Exclusion from research projects due to cultural and family restrictions<br>– Restricted social interactions and external engagement<br>– Maternity process<br>– Dependency on family support to maintain work-life balance |
| Macro environment | Formal institutions<br><br>Women's status | – Brain drain to developed countries<br>– Lack of government support for academic research<br>– Lack of government funding for research<br>– Lack of interest in the industry to engage with universities<br>– Lack of R&D orientation and culture in the country<br>– Inadequate and outdated patenting mechanisms<br>– Not inclusive patenting mechanisms unevenly focusing on particular areas such as ART only<br>– Lack of intellectual property protection regulations<br>– Lack of credibility and reliability of universities as technology developers and innovators<br>– Lack of industry-academy engagement<br>– Lack of monitoring research activities and impact in universities by the government<br>– Lack of successful university-industry success stories<br>– Patenting process is lengthy and time consuming<br>– Lack of valuing of scientific thinking and research nationally<br>– Cultural barriers against females' participation to research projects and mobility<br>– Lack of female participation in STEM<br>– Females' restricted social life<br>– The glass ceiling<br>– Institutional bullying of females |

| 5M Framework Constructs | Context | Coded Sentences From Narratives |
|---|---|---|
| Meso environment | Support mechanisms for females' academic entrepreneurship<br><br>Networking<br><br>Industry partnerships<br><br>Entrepreneurship culture within universities | – Generating additional income through extra teaching is easier and less time consuming than research<br>– Generating additional income through extra teaching requires less human capital than research<br>– Lack of entrepreneurial culture within universities<br>– Lack of research culture within universities<br>– Lack of recognition and credibility of researchers within universities<br>– Research does not generate practical outputs but mainly theoretical contributions<br>– Research offers a very little wider real-world impact<br>– Heavy bureaucracy of doing research and consultancy<br>– Research is not a promotional criterion<br>– Entrepreneurship is attributed to certain academic fields such as business and management<br>– IAE success is not recognised<br>– Tendency to publish rather than AE such as patenting<br>– Publishing promises a better recognition and visibility than AE<br>– Teaching is priority not research within universities<br>– Research is an individual effort not supported adequately by the university<br>– Lack of qualified researchers<br>– Lack of research collaboration between universities<br>– Inadequate support to promote PhD research<br>– No recognition and support outside of teaching -related activities |

### 4.2. Market

Our participants depict the existing market as an unsuitable environment to promote and "sell" their AE outputs. First of all, they think that universities in Bangladesh have not yet obtained a respected and recognised status as a source of technology, innovation and development. Universities per se do not recognise themselves as knowledge provider for the industry or government. The government identifies teaching as the most crucial mission of universities and indirectly pushes universities onto this domain by not adequately supporting research and AE.

A1: *"… the government also needs to support some funding for these (research and projects for the industry)"*

A2: "*The government has to have correct policies, enabling policies for all that it takes to carry out research in the country. If we have to import, import has to be made very easy. The comments should consider setting up a sandwich programs with the foreign countries which offers scholarships to our country. So, these are the issues with the government has to take up*."

And yet, the business industry does not give credit to academic research and AE. A1 states that:

*"So, industry people say that the academia are not much interested to work for them and in the opposite side academia claim that industry is not much enthusiastic to work in collaboration with the faculty members"*[Interview excerpt]

Similarly, A2 states that:

"*The industry doesn't have much faith in us (academics)*." "[Interview excerpt]

And therefore, academics either do not engage with AE-related activities and focus on teaching related activities only for a better financial return, or they emigrate to more developed countries to obtain better resources to pursue AE activities.

### 4.3. Money

For the participants, the government should design policies and regulations to support AE and allocate adequate resources for research and AE projects. So, lack of financial resources is one of the fundamental problems against AE. To overcome this difficulty, academics emigrate or seek grants and funding opportunities from abroad. In rare scenarios, female academic entrepreneurs (FAE hereafter) can generate income through AE in the long term. Otherwise, FAE is pull-type entrepreneurs motivated towards entrepreneurship by recognition, reputation, improving social and human capital, and creating wider impact and visibility.

### 4.4. Management

A1 and A2 reveal very little when it comes to the lack of social capital as an impediment to AE. A1 and A2 have a significantly more intense and long-term engagement with research and AE. And therefore, it is expected that they do not question their abilities and capabilities to pursue AE because they have already done it successfully. Also, because A1 and A2 are not money-driven academic entrepreneurs, they do not think that not being able to make money out of research and AE is something to do with their social capital levels. Instead, it is to do with the unsuitable and unsupportive cultural context. And yet, A3, the least engaged academic with AE, reports a range of obstacles towards AE stemming from her lack of skills, knowledge, or interest. The entrepreneurial process consists of several phases that individuals develop subsequently: motivation or intention, opportunity recognition, idea generation and opportunity exploitation (Cullen and De Angelis 2021). If the motivation does not exist, we cannot expect the following stages to be followed. And therefore, we can claim that the participant with the lowest AE motivation has the weakest engagement with AE, as expected. In line with the entrepreneurship literature, A1 justifies her lack of engagement with AE through her lack of entrepreneurial skills and motivation.

### 4.5. Motherhood

As stated previously, we stayed gender-neutral throughout the research to prevent any manipulation in the process of data collection. However, we did not want to establish the whole research around the culture's gender egalitarianism aspect either. We believe this attitude enabled us to have maintained better validity and accuracy and less bias in data.

A1 and A2 have not faced any gender-specific obstacle or restriction within the family throughout their career. In fact, they attribute their academic success partly to the support obtained from the extended family. A3 is different.

A3: *"… our parents do not allow us to be more focused on our own career. They want us (me) to focus more on the family….Family members also do not want me to do activities or projects like the World Bank or some other*

*sort of NGOs or the UN projects. This sort of project, they (family members) think that if we work there, we might have to go (travel) outside the country or within the country (as) there are lots of states and regions (in Bangladesh). So we have to work over there. If we have to collect some face to face interview, so they (my family) are not allowing us (me) to do so, and sometimes society also does not allow us to collect (data through) interviews door to door. They are feeling ashamed too, like they are talking with a woman who is taking the interview. I guess these are the basic problems."*

We asked A3 if being a mother created any problems or barriers.

A3: "*Sometimes it is (motherhood), creating a barrier because if you have a nursing baby, it is a problem. I have two children. But I had my maternity leave…? Also, I have some problem if I overstay at work research purposes. My family is not allowing that because there is no one in my home to look after my kids."*

### 4.6. Macro Environment

None of the participants depicts the macro environmental conditions suitable for academic research and AE. When we group the data under the common themes, five themes occur in the data. The first theme is resourcing. Universities are not resourced sufficiently to generate technology, innovation, and impact ahead of the industry. Yet, this gap is closed at the individual level, either through emigrating to another country or seeking alternative sources of money, industry engagement, or disengaging with AE and focusing on teaching-related activities. Under-resourced AE activities are introduced as the main reason for the brain drain from Bangladesh to a different countries. The second theme is partnership and collaboration. Seemingly, neither the government nor the business industry is keen to engage with universities for wider impact through academic research and AE. On the industry side, universities are not recognised as a source of innovation, R&D, management consultation and development. On the government side, universities' main mission is teaching and teaching relevant activities.

AE seems like a self-managed activity and individual passion rather than an impact creating activity and academic responsibility. The third theme is intellectual property. We can divide this theme into two sub-teams: patenting and IP rights. The patenting systems in our context seem like a significant obstacle to AE. Our participants call the existing patenting process outdated, inefficient, bureaucratic, time consuming and expensive. Also, one participant claims that the government adopts a biased and inequal approach when granting patents.

Furthermore, some academic fields are better supported in the patenting process, which has caused a differentiation in the patenting process across different academic fields. Consequently, FAE's tendency to avoid engaging with the patenting process risks the protection of their intellectual property rights by the policymaker and universities. The fourth theme is the value of science. Our participants believe that the country does not value scientific approach and outcomes, which undermines any activity that aims to produce scientific evidence. The fifth theme is gender. Our participants feel restricted, bullied and undervalued due to their gender. Similar to the emergence of "female sectors", seemingly, there is a concept of female academic subjects, and STEM is not one of them.

A1: "*So actually we know that especially in STEM, female participations are less with comparison to their male counterparts."*

A2: "*It has not been easy, always difficult, specially 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). So it is a juggling act. Unless you're very good juggler, you cannot ever be like balancing life and family and work… it is very difficult and I have had times…"*

A3: "*If I have to work (think) from a female side, then institutional bully, bully is there, you know… (this is ) the top management's mind set up. It is cultural. (Females) do not want to take so much risk (as opposed to our) male counterparts. If our family members from the very beginning, taught us how to fight, how to think yourself like your counter partner (a male), that would be more beneficial for us. Because ( what I am taught is that) I don't need that much focus on career OK. So, we (females)have also our mindset up problem as a female (stem from the cultural values and norms)."*

Altogether the existing macro environmental system does fail in promoting and supporting AE.

### 4.7. Meso Environment

Similar to the macro environmental climate, our participants think the meso environment is also unsuitable for AE to emerge and flourish. The themes that emerged from the data are impact, entrepreneurial culture, collaboration, and research culture.

Our participants perceive the impact of research on their career development as insignificant or even negative when there is no support in place. Especially from the financial benefit perspective, the logical choice is to undertake additional teaching responsibilities rather than investing time in research and AE, as they do not provide additional income, at least in the short term. Compared to AE, teaching is a much easier and quicker way of generating economic value. Furthermore, teaching requires much less human and social capital to be performed. As for the wider impact, due to the lack of support and resourcing, AE outcomes fail to produce a broader impact on the nation, the university, society, industry, and more general context.

It is widely accepted that the surrounding cultural climate is crucial for entrepreneurial success. That is why we try to understand institutional factors as determinants or facilitators of AE. And yet, the participants agree that universities in Bangladesh are far from supporting incubators of AE. It is partly because of the government's existing policies and partly because of the adopted mission of universities as teaching centres. The EY G20 Entrepreneurship Barometer Report (*The Power of Three Together, Governments, Entrepreneurs and Corporations Can Spur Growth across the G20*, 2013) describes the pillars that foster entrepreneurship and introduces "innovation and research culture" as a fundamental element to enhancing entrepreneurship. From this perspective, universities are missing one of the pillars of entrepreneurial culture and being entrepreneurial universities.

As we discussed above, the lack of collaboration hinders academics from obtaining resources from external organisations, places them within the walls of universities and affects the quality of AE outputs by being too theoretical and conceptual with a lack of applicability within a real-life context.

## 5. CONCLUSION

By exploring the female academics' engagement in academic entrepreneurship, the novel contribution

of this study is to move forward from the 3Ms that are predominantly concentrated on resources. The results indicate that the university and country's culture heavily influences academics' entrepreneurial engagement. Although the government is designing and promoting gender specific policies to increase the number of women into entrepreneurship, the benefits can only be reaped when these policies can be implemented. Therefore, government and the university need to work together to improve this entrepreneurship culture so that female academics can enjoy equal and identical support compared to other scholars.

By inquiring into the micro, meso and macro level of factors that affect female academics' engagement in academic entrepreneurship, this study provides an initial conceptual framework to conduct future studies to advance the prevailing knowledge significantly. However, the limitation of this study is that it is concentrated on the country's capital; hence, the exploration of female academics in other universities in other cities might yield different insights. Building upon the understanding of this study, the research question can also be explored in other developing economies or even in the western developed countries to discover the nature of factors (different micro, meso and macro level factors) influencing female academics to engage in academic entrepreneurship. This study focuses only on Bangladeshi female academics, which cannot be generalisable in other countries.

**Acknowledgements**: The author would like to thank the editor and anonymous reviewers for their helpful comments regarding the article's development. The authors also thank Sheffield Hallam University, as a PhD studentship of that university principally funds this study.

## 6. REFERENCES

Abreu, M., Demirel, P., Grinevich, V. and Karataş-Özkan, M. (2016), "Entrepreneurial practices in research-intensive and teaching-led universities", *Small Business Economics*, Vol. 47 No. 3, pp. 695–717.

Abreu, M. and Grinevich, V. (2013), "The nature of academic entrepreneurship in the UK: Widening the focus on entrepreneurial activities", *Research Policy*, Vol. 42 No. 2, pp. 408–422.

Abreu, M. and Grinevich, V. (2017), "Gender patterns in academic entrepreneurship", *The Journal of Technology Transfer*, Vol. 42 No. 4, pp. 763–794.

Ahad, L.R. and Gunter, H. (2017), "Women in leader roles within higher education in Bangladesh", *Management in Education*, Vol. 31 No. 3, pp. 135–140.

Ahmed, R. and Hyndman-Rizk, N. (2020), "The higher education paradox: towards improving women's empowerment, agency development and labour force participation in Bangladesh", *Gender and Education*, Vol. 32 No. 4, pp. 447–465.

Aldrich, H.E. (1999), *Organizations Evolving*, SAGE, London.

Aldrich, H.E. and Cliff, J.E. (2003), "The pervasive effects of family on entrepreneurship: Toward a family embeddedness perspective", *Journal of Business Venturing*, Vol. 18 No. 5, pp. 573–596.

Aldridge, T.T. and Audretsch, D. (2011), "The Bayh-Dole Act and scientist entrepreneurship", *Research Policy*, Vol. 40 No. 8, pp. 1058–1067.

Alexander, A.T. and Childe, S.J. (2013), "Innovation: A knowledge transfer perspective", *Production Planning and Control*, Vol. 24 No. 2–3, pp. 208–225.

Alvesson, M. and Deetz, S. (2000), "Critical Overview of Quantitative and Conventional Qualitative Methodology", *Doing Critical Management Research*, Sage Publications Ltd, London, pp. 49–80.

Archibald, M.M., Ambagtsheer, R.C., Casey, M.G. and Lawless, M. (2019), "Using Zoom Videoconferencing for Qualitative Data Collection: Perceptions and Experiences of Researchers and Participants", *International Journal of Qualitative Methods*, Vol. 18, pp. 1–8.

Audretsch, D.B. (2014), "From the entrepreneurial university to the university for the entrepreneurial society", *The Journal of Technology Transfer*, Vol. 39 No. 3, pp. 313–321.

Bangladesh University Grants Commission. (2018a), *Annual Report 2016*.

Bangladesh University Grants Commission. (2018b), *Higher Education Achievement in Bangladesh 2009-2018*.

Bangladesh University Grants Commission. (2019a), *Annual Report 2017*.

Bangladesh University Grants Commission. (2019b), "University Grants Commission of Bangladesh:

A Profile", available at: http://www.ugc.gov.bd/ (accessed 8 December 2019).

Bangladesh University Grants Commission. (2020), *Annual Report 2018*.

Bates, T., Jackson, W.E. and Johnson, J.H. (2007), "Introduction: Advancing research on minority entrepreneurship", *Annals of the American Academy of Political and Social Science*, Vol. 613, pp. 10–17.

Berger, E.S.C. and Kuckertz, A. (2016), "Female entrepreneurship in start-up ecosystems worldwide", *Journal of Business Research*, Vol. 69 No. 11, pp. 5163–5168.

Bergmann, H., Hundt, C. and Sternberg, R. (2016), "What makes student entrepreneurs? On the relevance (and irrelevance) of the university and the regional context for student start-ups", *Small Business Economics*, Vol. 47 No. 1, pp. 53–76.

Best, K., Sinell, A., Heidingsfelder, M.L. and Schraudner, M. (2016), "The gender dimension in knowledge and technology transfer – the German case", *European Journal of Innovation Management*, Vol. 19 No. 1, pp. 2–25.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 77–101.

Bruno, A. V. and Tyebjee, T.T. (1982), "The Environment for Entrepreneurship", in Sexton, D.L. and Vesper, K. (Eds.), *The Encyclopedia of Entrepreneurship*, Prentice Hall, pp. 288–307.

Brush, C.G., de Bruin, A. and Welter, F. (2009), "A gender-aware framework for women's entrepreneurship", *International Journal of Gender and Entrepreneurship*, Vol. 1 No. 1, pp. 8–24.

Brush, C.G., Bruin, A. De, Welter, F. and Allen, I.E. (2010), "Gender embeddedness of women entrepreneurs: An empirical test of the 5 'M' Framework.", *Frontiers of Entrepreneurship Research, Wellesley, MA: Babson College*.

Brush, C.G. and Manolova, T. (2004), "The household structure variables in the PSED questionnaire", in Gartner, W.B., Shaver, K.G., Carter, N.M. and Reynolds, P.. (Eds.), *The Handbook OfEntrepreneurial Dynamics: The Process OfOrganization Creation*, SAGE, Newbury Park, pp. 39–47.

Bruton, G.D. and Ahlstrom, D. (2003), "An institutional view of China's venture capital industry: Explaining the differences between China and the West", *Journal of Business Venturing*, Vol. 18 No. 2, pp. 233–259.

Bruton, G.D., Ahlstrom, D. and Li, H.L. (2010), "Institutional theory and entrepreneurship: Where are we now and where do we need to move in the future?", *Entrepreneurship: Theory and Practice*, Vol. 34 No. 3, pp. 421–440.

Cantu-Ortiz, F.J., Galeano, N., Mora-Castro, P. and Fangmeyer, J. (2017), "Spreading academic

entrepreneurship: Made in Mexico", *Business Horizons*, Vol. 60 No. 4, pp. 541–550.

Carter, S. and Ram, M. (2003), "Reassessing Portfolio Entrepreneurship", *Small Business Economics*, Vol. 21 No. 4, pp. 371–380.

Cassell, C., Cunliffe, A. and Grandy, G. (2018), "Introduction: Qualitative Research in Business and Management", *The SAGE Handbook of Qualitative Business and Management Research Methods: Methods and Challenges*, pp. 1–13.

Cohen, W.M., Nelson, R.R. and Walsh, J.P. (2002), "Links and Impacts: The Influence of Public Research on Industrial R&D", *Management Science*, Vol. 48 No. 1, pp. 1–23.

Cullen, U. (2019), "Sociocultural factors as determinants of female entrepreneurs' business strategies", *Journal of Entrepreneurship in Emerging Economies*, Vol. 12 No. 1, pp. 144–167.

Cunningham, J.A. and O'Reilly, P. (2018), "Macro, meso and micro perspectives of technology transfer", *The Journal of Technology Transfer*, Vol. 43 No. 3, pp. 545–557.

D'Este, P. and Perkmann, M. (2011), "Why do academics engage with industry? The entrepreneurial university and individual motivations", *The Journal of Technology Transfer*, Vol. 36 No. 3, pp. 316–339.

Davey, T., Rossano, S. and van der Sijde, P. (2016), "Does context matter in academic entrepreneurship? The role of barriers and drivers in the regional and national context", *The Journal of Technology Transfer*, Vol. 41 No. 6, pp. 1457–1482.

Davidsson, P. (2003), "The domain of entrepreneurship research: some suggestions", in Katz, J. and Shepherd, D. (Eds.), *Cognitive Approaches to Entrepreneurship Research. Advances in Entrepreneurship, Firm Emergence and Growth*, Elsevier/JAI Press, Oxford, pp. 315–372.

Etzkowitz, H. (2003), "Research groups as 'quasi-firms': The invention of the entrepreneurial university", *Research Policy*, Vol. 32 No. 1, pp. 109–121.

Etzkowitz, H. (2017), "Innovation Lodestar: The entrepreneurial university in a stellar knowledge firmament", *Technological Forecasting and Social Change*, Vol. 123, pp. 122–129.

Etzkowitz, H. and Klofsten, M. (2005), "The innovating region toward a theory of knowledge-based regional development", *R and D Management*, Vol. 35 No. 3, pp. 243–255.

Fini, R., Rasmussen, E., Wiklund, J. and Wright, M. (2019), "Theories from the Lab: How Research on Science Commercialization can Contribute to Management Studies", *Journal of Management Studies*, Vol. 56 No. 5, pp. 865–894.

Fischer, B.B., Schaeffer, P.R., Vonortas, N.S. and Queiroz, S. (2018), "Quality comes first: university-industry collaboration as a source of academic entrepreneurship in a developing country", *The Journal of Technology Transfer*, Vol. 43 No. 2, pp. 263–284.

Giuri, P., Grimaldi, R., Kochenkova, A., Munari, F. and Toschi, L. (2020), “The effects of university-level policies on women’s participation in academic patenting in Italy”, *The Journal of Technology Transfer*, Vol. 45 No. 1, pp. 122–150.

Giuri, P., Munari, F. and Pasquini, M. (2013), “What Determines University Patent Commercialization? Empirical Evidence on the Role of IPR Ownership”, *Industry and Innovation*, Vol. 20 No. 5, pp. 488–502.

Goel, R.K. and Göktepe-Hultén, D. (2018), “What drives academic patentees to bypass TTOs? Evidence from a large public research organisation”, *Journal of Technology Transfer*, Vol. 43 No. 1, pp. 240–258.

Goel, R.K., Göktepe-Hultén, D. and Ram, R. (2015), “Academics’ entrepreneurship propensities and gender differences”, *The Journal of Technology Transfer*, Vol. 40 No. 1, pp. 161–177.

Gosens, J., Hellsmark, H., Kåberger, T., Liu, L., Sandén, B.A., Wang, S. and Zhao, L. (2018), “The limits of academic entrepreneurship: Conflicting expectations about commercialisation and innovation in China’s nascent sector for advanced bio-energy technologies”, *Energy Research and Social Science*, Vol. 37, pp. 1–11.

Grimaldi, R., Kenney, M., Siegel, D.S. and Wright, M. (2011), “30 years after Bayh-Dole: Reassessing academic entrepreneurship”, *Research Policy*, Vol. 40 No. 8, pp. 1045–1057.

Guerrero, M., Cunningham, J.A. and Urbano, D. (2015), “Economic impact of entrepreneurial universities’ activities: An exploratory study of the United Kingdom”, *Research Policy*, Vol. 44 No. 3, pp. 748–764.

Hayter, C.S. (2016), “Constraining entrepreneurial development: A knowledge-based view of social networks among academic entrepreneurs”, *Research Policy*, Vol. 45 No. 2, pp. 475–490.

Hayter, C.S., Nelson, A.J., Zayed, S. and O’Connor, A.C. (2018), “Conceptualising academic entrepreneurship ecosystems: a review, analysis and extension of the literature”, *The Journal of Technology Transfer*, Vol. 43 No. 4, pp. 1039–1082.

Hmieleski, K.M. and Powell, E.E. (2018), “The Psychological Foundations of University Science Commercialization: A Review of the Literature and Directions for Future Research”, *The Academy of Management Perspectives*, Vol. 32 No. 1, pp. 43–77.

Islam, M.A., Jantan, A.H., Hunt, A., Rahman, M.F. and Abdullah, M.M. (2019), “Exploration of barriers faced by female graduate entrepreneurs in Bangladesh”, *Entrepreneurship and Sustainability Issues*, Vol. 7 No. 2, pp. 1000–1014.

Jennings, J.E. and Mcdougald, M.S. (2007), “Work-family interface experiences and coping strategies: Implications for entrepreneurship research and practice”, *Academy of Management Review*, Vol. 32 No. 3, pp. 747–760.

Klingbeil, C., Semrau, T., Ebers, M. and Wilhelm, H. (2019), “Logics, Leaders, Lab Coats: A Multi-Level Study on How Institutional Logics are Linked to Entrepreneurial Intentions in Academia”, *Journal of Management Studies*, Vol. 56 No. 5, pp. 929–965.

Link, A.N., Siegel, D.S. and Bozeman, B. (2007), “An empirical analysis of the propensity of academics to engage in informal university technology transfer”, *Industrial and Corporate Change*, Vol. 16, pp. 641–655.

Maas, J., Seferiadis, A.A., Bunders, J.F.G. and Zweekhorst, M.B.M. (2014), “Bridging the disconnect: how network creation facilitates female Bangladeshi entrepreneurship”, *International Entrepreneurship and Management Journal*, Vol. 10 No. 3, pp. 457–470.

Merluzzi, J. and Burt, R.S. (2020), “One Path Does Not Fit All: A Career Path Approach to the Study of Professional Women Entrepreneurs”, *Entrepreneurship: Theory and Practice*, available at:https://doi.org/10.1177/1042258720936987.

Miller, K., Alexander, A., Cunningham, J.A. and Albats, E. (2018), “Entrepreneurial academics and academic entrepreneurs: a systematic literature review”, *International Journal of Technology Management*, Vol. 77 No. 1/2/3, p. 9.

Miller, K., Cunningham, J. and Lehmann, E. (2021), “Extending the university mission and business model: influences and implications”, *Studies in Higher Education*, pp. 1–11.

Ministry of Education Bangladesh. (2010), “National education policy 2010”.

Ministry of Science and Technology Bangladesh. (2011), “National Science and Technology Policy 2011”, available at: https://most.portal.gov.bd/sites/default/files/files/most.portal.gov.bd/policies/2303afd3_6664_4a38_957e_6e35f1d7f0bf/National Science & Technology Policy - 2011 English.pdf (accessed 17 April 2019).

Moraes, R. de O. and Laurindo, F.J.B. (2013), “Maturity and performance in information technology project management”, *Journal of Technology Management and Innovation*, Vol. 8 No. SPL.ISS.2, pp. 25–37.

Nishishiba, M., Jones, M. and Kraner, M. (2014), “Qualitative Data Analysis”, *Research Methods and Statistics for Public and Nonprofit Administrators: A Practical Guide*, Sage Publications Ltd, London, pp. 281–296.

Noguera, M., Alvarez, C., Merigó, J.M. and Urbano, D. (2015), “Determinants of female entrepreneurship in Spain: an institutional approach”, *Computational and Mathematical Organization Theory*, Springer New York LLC, Vol. 21 No. 4, pp. 341–355.

North, D.C. (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge University Press.

Di Paola, N. (2020), “Pathways to academic entrepreneurship: the determinants of female scholars’ entrepreneurial intentions”, *The Journal of Technology Transfer*, available at:https://doi.org/10.1007/s10961-020-09824-3.

Penrose, E. (1959), *The Theory of the Growth of the Firm*, Wiley, New York.

Philpott, K., Dooley, L., Oreilly, C. and Lupton, G. (2011), “The entrepreneurial university: Examining the underlying academic tensions”, *Technovation*, Vol. 31 No. 4, pp. 161–170.

Pitelis, C.N. (2005), “On globalisation and governance: some issues”, *Contributions to Political Economy*, Vol. 24 No. 1, pp. 1–12.

Qian, X.-D., Xia, J., Liu, W. and Tsai, S.-B. (2018), “An Empirical Study on Sustainable Innovation Academic Entrepreneurship Process Model”, *Sustainability*, Vol. 10 No. 6, p. 1974.

Rabbani, G. and Chowdhury, S. (2014), “Quality of Higher Education in Bangladesh: Governance Framework and Quality Issues”, *Beykent University Journal of Social Sciences*, Vol. 7 No. 1, pp. 78–91.

Rahman, T., Nakata, S., Nagashima, Y., Rahman, M.M., Sharma, U. and Rahman, M.A. (2019), *Bangladesh Tertiary Education Sector Review: Skills and Innovation for Growth*, available at: www.worldbank.org.

Rasmussen, E. (2008), “Government instruments to support the commercialisation of university research: Lessons from Canada”, *Technovation*, Vol. 28 No. 8, pp. 506–517.

Schumpeter, J.A. (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge.

Shane, S. (2003), *A General Theory of Entrepreneurship*, Edward Elgar Publishing.

Shane, S. (2004), “Encouraging university entrepreneurship? The effect of the Bayh-Dole Act on university patenting in the United States”, *Journal of Business Venturing*, Vol. 19 No. 1, pp. 127–151.

Siegel, D.S. and Wright, M. (2015), “Academic Entrepreneurship: Time for a Rethink?”, *British Journal of Management*, Vol. 26 No. 4, pp. 582–595.

Sinell, A., Müller-Wieland, R. and Muschner, A. (2018), “Gender-Specific Constraints on Academic Entrepreneurship and Engagement in Knowledge and Technology Transfer”, *Technology Innovation Management Review*, Vol. 8 No. 2, pp. 15–26.

Stinchcombe, A.L. (2000), “Social structure and organisations”, in Baum, J.A.C. and Dobbin, F. (Eds.), *Economics Meets Sociology in Strategic Management*, Vol. 17, Emerald Group Publishing Limited, pp. 229–259.

Stuart, T.E. and Ding, W.W. (2006), “When Do Scientists Become Entrepreneurs? The Social

Structural Antecedents of Commercial Activity in the Academic Life Sciences", *American Journal of Sociology*, Vol. 112 No. 1, pp. 97–144.

Suchman, M.C. (1995), "Managing Legitimacy: Strategic and Institutional Approaches", *Academy of Management Review*, Vol. 20 No. 3, pp. 571–610.

Tartari, V. and Salter, A. (2015), "The engagement gap: Exploring gender differences in University – Industry collaboration activities", *Research Policy*, Vol. 44 No. 6, pp. 1176–1191.

*The Power of Three Together, Governments, Entrepreneurs and Corporations Can Spur Growth across the G20*. (2013), *The EY G20 Entrepreneurship Barometer*, available at:https://doi.org/10.1038/509414a.

Urban, B. and Chantson, J. (2019), "Academic entrepreneurship in South Africa: testing for entrepreneurial intentions", *The Journal of Technology Transfer*, Vol. 44 No. 3, pp. 948–980.

Uslu, B., Calikoglu, A., Seggie, F.N. and Seggie, S.H. (2019), "The entrepreneurial university and academic discourses: The meta-synthesis of Higher Education articles", *Higher Education Quarterly*, No. May, pp. 1–27.

Wadhwani, R.D., Galvez-Behar, G., Mercelis, J. and Guagnini, A. (2017), "Academic entrepreneurship and institutional change in historical perspective", *Management and Organizational History*, Vol. 12 No. 3, pp. 175–198.

Wang, M.-T. and Degol, J.L. (2017), "Gender Gap in Science, Technology, Engineering, and Mathematics (STEM): Current Knowledge, Implications for Practice, Policy, and Future Directions", *Educational Psychology Review*, Vol. 29 No. 1, pp. 119–140.

Williams, C. (2006), *The Hidden Enterprise Culture: Entrepreneurship in the Underground Economy*, Edward Elgar Publishing.

World Bank. (2016), "Bangladesh Strengthens its Higher Education to Thrive in the Knowledge Economy", available at: https://www.worldbank.org/en/news/feature/2016/10/10/bangladesh-strengthens-higher-education-thrive-knowledge-economy (accessed 24 February 2020).

Wright, M. (2014), "Academic entrepreneurship, technology transfer and society: where next?", *The Journal of Technology Transfer*, Vol. 39 No. 3, pp. 322–334.

Wright, M. (2018), "Academic entrepreneurship: the permanent evolution?", *Management & Organisational History*, Vol. 13 No. 2, pp. 88–93.