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University–industry collaboration in a factor-driven economy: The perspective of Egyptian industry

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Abstract

This is the fourth article in a series dealing with the role of universities in the innovation process in Egypt. The first three examined the topic from the perspective of academia. They revealed that there was relatively little university–industry collaboration. Hence, this article focuses on university–industry collaboration from the perspective of industry. It is based on a questionnaire survey of 237 firms located in different industrial zones in Cairo. The findings confirm the low level of university–industry collaboration, with no more than 6% of the sample claiming to have links with academia. The lack of collaboration is found to stem mainly from firms' perception that academic research is not relevant to them and from the mismatch between the interests and objectives of the two sectors. The article makes recommendations for what is needed if the situation is to change and focuses particularly on the role of government, the third actor in the Triple Helix.

Keywords

Egypt, factor-driven economy, industry perspective, university–industry collaboration

University–industry collaboration has become a characteristic feature of the 21st-century knowledge economy, particularly in the innovation-driven economies of the developed world where it contributes significantly to the innovation process (Perkmann and Walsh, 2007). Increasingly, also, it is recognized that universities act as an important driver of economic development (Yusuf, 2007) and that the benefits of university–industry collaboration can be seen in the factor and efficiency economies of the world (Brimble, 2007; Marotta et al., 2007). Accordingly, numerous studies of the phenomenon have been undertaken, usually from the university perspective and in the developed innovation-driven economies, pointing to the success of the partnerships. However, it remains the case that, as Bercovitz and Feldman (2006: 180–181) have recognized, ‘unfortunately, there are few studies that consider the firm, rather than the university, as the focal actor’, and this is particularly true in the factor-driven economies where the barriers to university–industry collaboration are particularly acute (Guimon, 2013: 5). While the challenges to university–industry collaboration have been researched in the developed world, relatively little is known about the developing and transition economies and, in particular, why industry does not collaborate with academia.

The aim of this article, therefore, is to go some way to rectifying this by examining the barriers to university–industry collaboration in the factor-driven economy of Egypt. Previous research by the authors (El Hadidi and Kirby, 2015a, 2015b, 2016) has examined the situation from the perspective of academia. These studies reveal that there is relatively little university–industry collaboration taking place in the country and, despite efforts on the part of academia, there appears to be only limited interest on the part of industry. As the reasons for this are unclear, the purpose of this article is to examine the issue in an attempt both to better understand the local context and to contribute to the existing, though limited, generic body of literature on the topic.

Literature review

With the increase in university–industry collaboration in recent years, it has been recognized that there are different forms of collaboration and that normally they address what refer to as:

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- knowledge commercialization (patenting, licensing, spin-off ventures, incubators, etc.) and
- academic engagement (research collaboration, contract research, consulting, etc.) between academics and industry.

It is also recognized that firms operating in different industrial sectors make use of different types of technological and market knowledge and attribute different levels of importance to accessing knowledge developed by universities (Levin, 1988; Marsili, 2001; Pavitt, 1984; Salter and Martin, 2001). Similarly, the level of economic development also has an impact: Herman (2013) observes that, in countries where the commitment to R&D is low, there is little incentive for firms to collaborate with universities and the firms that do are those with innovation strategies. As the economies and indigenous technological capabilities of newly industrialized countries (NICs) improve, national public research and education organizations (PREOs) are expected to become increasingly important in supporting indigenous firms to move into more dynamic and high-opportunity industries (Siegel et al., 2003a). However, the innovation environments in mature and emergent industries differ considerably in terms of their market and technology turbulence, their knowledge input characteristics, their main search strategies for innovation inputs, and the role of knowledge and collaboration in innovation development (Bruneel et al., 2010). Thus, the characteristics of collaboration with universities may depend on whether the industry partner(s) belongs to a mature or an emergent industry.

Furthermore, as Galan-Muros et al. (2017) have shown in the context of Europe, university–industry collaboration is not a natural occurrence, and government policymakers need to recognize this and to be aware that they have the power to stimulate and support it. Thus in accordance with the concept of the Triple Helix, in NICs, governments are focusing increasingly on fostering science–industry interactions and developing high-technology sectors (Gouva and Kassicieh, 2005; OECD, 2010a). At the same time, policymakers in both developed economies and NICs have been concentrating on designing policies to raise the quality of the research and training programmes of PREOs, so that their role becomes more entrepreneurial and of greater benefit to national economic development, supporting the growth of high-technology activities (Gouva and Kassicieh, 2005; OECD, 2010a).

When university–industry collaboration does occur, moreover, there are often clashes of culture (Siegel et al., 2003b): Frequently the primary motive of the firm is financial gain, whereas for the university scientist this is secondary to recognition in the scientific community through publication. Hence, speed to market is important for the firm whereas for the academic the focus is on publication. Because ‘firms typically do not want researchers to publish

their results and share information with colleagues and the general public’ (Siegel, et al., 2003b: 127), there are tensions between the two sectors, compounded by the bureaucracy and inflexibility that are typically present in universities and that slow down the transfer process. While university researchers operate in the realm of open science, where research results are freely published, firms often pursue proprietary strategies that involve secrecy and intellectual property protection (Murray and O’Mahony, 2007). In addition, academic science tends to be oriented towards long-term, curiosity-driven research, while firms are interested in short-term and medium-term outcomes. Additionally, according to Siegel et al. (2003b), firms tend to think that universities have unrealistic expectations and complain that ‘university scientists and administrators do not understand or appreciate industry goals/culture/constraints’ (Siegel et al., 2003b: 120). To overcome these difficulties, the researchers propose that firms should be proactive in their efforts to bridge the culture gap with academia, hire technology managers with university experience and explore alternative means of tapping into university–industry technology transfer social networks (e.g. by hiring university graduates, postdoctoral fellows or even academics on a sabbatical).

A second set of challenges relates to the organizational aspects of boundary-spanning activities between universities and industry. These may include rules and regulations imposed by universities or government funding agencies as well as processes in place to facilitate technology transfer. According to a large-scale survey of UK firms, these sets of challenges are perceived by firms as barriers to establishing university–industry collaboration (Bruneel et al., 2010). More than two-thirds of firms in the survey viewed the long-term orientation of universities and the lack of suitable government programmes as significant barriers, while more than half objected to the regulations and rules imposed by universities and governments and had concerns about confidentiality, intellectual property and the role of technology transfer offices.

The Egyptian context

As a ‘factor-driven’ economy, Egypt has a low level of economic development, competes on the basis of factor endowments (primarily unskilled labour and natural resources) and is characterized by low wages and low productivity. However, it does have a variety of measures and instruments to support innovation (Science and Technology Development Fund, 2012). Despite these efforts, however, its economic competitiveness appears to be deteriorating. According to the Egyptian Competitiveness Report for 2013 (Egyptian National Competitiveness Council, 2014) ‘the country’s overall competitiveness slid to 118 out of 148 in 2013–14, continuing the declining trend that began 4 years earlier . . .’, while the Global Innovation Index for 2016 (Dutta, et al. 2015) places Egypt 107th of 128 countries compared with

83rd of 139 in 2010–2011. The Egyptian Competitiveness Report for 2013 (Egyptian National Competitiveness Council, 2014: 12) recognizes this situation and concludes that the country's competitiveness and capacity for innovation is curtailed by 'a pronounced weakness in company spending on R&D, the modest quality of scientific research institutions and the absence of collaborative arrangements (in basic or applied research) between firms and universities'.

The university sector in Egypt comprises some 43 state and private universities and over three million students, but it is highly centralized and governed by the Ministry of Higher Education and the Egyptian Supreme Council for Higher Education, with the result that institutions have little autonomy or independence. Although transformations have taken place in the purpose and scope of Egyptian universities in recent years, public spending on higher education has declined (Reda, 2012) and the country's ranking in terms of the quality of higher education and training has deteriorated from 80 of 114 countries in 2005–2006 to 128 of 139 in 2010–2012. None of Egypt's universities is in the top 600 in the world, based on the World University Rankings and, with the exception of the American University in Cairo (ranked 348), only one (Cairo University) is ranked in the top 600 in the QS World University Rankings. Similarly, the global entrepreneurship monitor (GEM) study for Egypt (Ismail et al., 2016) places it last of the 62 countries studied by GEM in 2015 with respect to the contribution of education to the promotion of enterprise.

It has been recognized only relatively recently in Egypt that higher education is a means to foster economic growth, and there are now six entities concerned with facilitating university technology transfer to established firms.¹ However, there is no co-ordinated national technology transfer policy, and in 2012, the Science and Technology Development Fund acknowledged that industry–academic collaboration activity was still 'missing to a great extent in Egypt'. The reasons for this were believed to be:

- a lack of collaboration among the different initiatives,
- a shortage of technology transfer offices,
- a lack of support from senior university management,
- a lack of commercial and professional awareness,
- a lack of support for inventions that solve national problems and
- a lack of formal courses on technology transfer and commercialization.

Since then, Egypt has introduced further mechanisms to support university–industry collaboration,² but recent research by the authors (El Hadidi and Kirby, 2015a, 2015b, 2016) reveals that, as at 2015, Egypt's universities were neither producing creative graduates who could innovate nor transferring and commercializing knowledge, and few had strong links

with industry. In November 2015, however, the British and Egyptian governments signed a Memorandum of Understanding, the principal aim of which was to develop a new higher education funding and governance model for Egypt and to establish ongoing and significant dialogue policies and methods across the areas of research, innovation and education.

Aims and methodology

Against this theoretical and contextual background, this study examines university–industry interaction in Egypt from the perspective of industry, having examined the issue previously from the perspective of academia (El Hadidi and Kirby, 2015a, 2015b, 2016). To do this, we undertook a questionnaire survey of 300 Egyptian businesses located in different industrial zones in Greater Cairo, using a structured questionnaire comprising open and closed questions and developed from the relevant theoretical and empirical literature. The validity of the instrument was reviewed by a panel of five economic experts and pilot-tested ($n = 30$). The test–retest reliability method was used to assess the stability and reliability of the instrument over time and these proved to be high (0.78–0.95). The questionnaire was written initially in English (Appendix 1) before being translated into Arabic. To ensure the accuracy of the translation, it was independently translated back into English.

Of the 300 firms contacted, 26 declined to participate and 37 failed to complete the questionnaire. Thus, 237 usable responses were received, yielding a 79% response rate. The results show that 5% of the responding firms could be classified as small or medium-sized (fewer than 50 employees) and 95% as large (50+ employees). This compares with the results of the official 2012–2013 Economic Census, which showed that 99.7% of the 2.4 million establishments in the formal sector could be classified as small and medium-sized enterprises (SMEs) and only 0.4% as large. Thus, the sample is heavily biased towards the larger firm, although some 86.5% of the sample were Egyptian businesses and only 13.5% were multinational organizations. Ten industrial sectors are represented, including manufacturing and production (30%), retail and distribution (16%) and healthcare and pharmaceuticals (12%), but there is only weak representation of the knowledge/technology-based sectors (information technology – 4%; telecommunications – 6%). This low representation reflects the structure of a factor-driven economy. However, some 35% of the sample claimed to be engaged in R&D.

Findings

The findings reveal that only 6% of the sample ($n = 14$) had some sort of partnership with an Egyptian university and only one-third ($n = 79$) claimed to have knowledge of the concept of the Triple Helix University (Etzkowitz, 2003). Of these 79, however, only 36% ($n = 28$) identified

Table 1. Types of university–industry collaboration.

Type ^a	%
Partnership on teaching and learning	60
Offering internship for university students	45
Partnership on graduate recruitment	27
Partnership on research	68
Partnership on knowledge/technology transfer (consultancy and training)	73
Partnership on knowledge/technology commercialization (the commercial exploitation of intellectual property generated by academic research)	48

^aSums to more than 100% as more than one type of partnership may be chosen.

correctly that it was a university that worked in partnership with industry and government, indicating a clear lack of real understanding of the concept among the business community.

Of the 14 businesses that had links with a university, almost three-quarters had a knowledge/technology transfer partnership involving consultancy and training, while some 68% partnered on research and 60% on teaching and learning (Table 1). In contrast, only just over one-quarter collaborated with a university to recruit graduates and no more than 45% offered student internships. Just under half of the sample claimed that they partnered with universities to bring to market intellectual property generated from university research.

Such partnerships were perceived to create benefits for the industrial partners, of which the most important were a reduction in costs (35%) and access to new knowledge (25%). Other benefits identified were a reduction in risk (17%) and access to graduates (12%), with access to new research skills cited by only 9% of the sample. However, the partnerships were not without their challenges (Table 2). Chief among these was the mismatch between the universities and industry in terms of relevance, time horizons and expectations, cited by 37% of the respondents. When coupled with focus conflicts (7%), this concern accounted for almost half of the sample (44%). The second most frequently cited challenge related to the industrial partner's knowledge of the university and what it could offer. Some 23% of the respondents said they did not know what the university could offer because of a lack of information, while a further 14% complained about the quality of the information provided. Other problems arose from the low level of engagement with university partners (11%), resulting presumably from partnership with industry not being perceived as an institutional priority, and the issue of who was the 'dominant' partner in the relationship (8%), deciding on the partnership agenda.

When asked why they did not partner with universities in Egypt, over one-third (35%) of the 213 respondents claimed it was because they were too theoretical, while a further 35%

Table 2. Perceived challenges of university–industry collaboration.

Challenge	%
Mismatches in terms of relevance, time horizons and expectations	37
Lack of information about what universities can actually offer	23
Lack of quality of information provided by universities	14
Low level of engagement with universities as partners	11
Determining the upper hand on collaboration	8
Conflicting focus: research versus money	7

pointed to the potential conflict of interest between academia and industry. This was seen to result from the different objectives of the two, most notably academia wanting to (a) publish the findings of its research while industry wants them to be treated as confidential (22%) and (b) create knowledge whereas industry wants to create competitive advantage through the exploitation of knowledge (13%). In contrast, only 15% of the sample claimed that Egyptian universities were too expensive to collaborate with, while no more than 7% did not collaborate with them because their research was perceived as not sufficiently 'leading edge'.

In order to encourage university–industry partnerships, the respondents made a range of suggestions (Table 3). These included making university–industry collaboration a national strategic priority (19%) and a core or priority activity for universities (17%). To facilitate collaboration, joint steering groups were proposed by 18% of the sample and a further 13% suggested that the goals and benefits of partnering needed to be made clear for both parties. At the same time, it was recognized by 11% of the sample that the current reward system in universities did not encourage partnerships with industry and so it was proposed that, if academics were to develop and engage in such partnerships, they would need to be incentivized and rewarded for doing so. Linked to this matter is the issue of intellectual property ownership and the concern of the academic to publish the results of his or her research. This was recognized by a further 5% of the sample as a problem that needed to be resolved, presumably as part of the incentivization and reward process for academics. Finally, some respondents thought that the role of universities needed to change so that they could become more strongly oriented towards solving the scientific and technological challenges that companies encounter (8%) and could match their strengths with the core research competence of the company to identify promising opportunities for collaboration (9%).

Discussion

Having focused on the perspective of academia, previous research by the authors (El Hadidi and Kirby, 2015a, 2015b, 2016) has confirmed the conclusion of the Egyptian

Table 3. Suggestions for facilitating more university–industry collaboration.

Suggestions	%
Industry–university partnerships should become a strategic priority	19
Create a joint steering group including senior academics and company executives	18
Make industry–university partnerships a priority for the entire academic community	17
Make the goals and benefits of partnering clear for both parties	13
Incentivize university faculty to develop such partnerships	11
Assess the core academic strengths of the university and the core research competence of the company to identify promising opportunities for collaboration	9
University programmes need to be strongly oriented towards helping solve scientific and technological challenges that companies encounter	8
Resolve the problems of intellectual property	5

Science and Technology Development Fund (2012: 13) that industry–academic collaboration activity is ‘missing to a great extent in Egypt’. The aim of this article has been to examine the industry perspective on university–industry collaboration in the country. Accordingly, it addresses five main questions:

- To what extent does industry collaborate with academia?
- How does it collaborate?
- What are the problems encountered in collaboration?
- What prevents collaboration?
- What can be done to facilitate collaboration?

Our study reveals that no more than 6% of the sample population were collaborating with academia despite the various government interventions intended to encourage collaboration. Given the structure of the sample and its bias towards large firms, however, it is probable that even this estimate is somewhat high, as SMEs, which constitute some 99.7% of the industrial population in Egypt, are under-represented in the survey and are known generally to lack the knowledge, desire and understanding to carry out research, especially with universities. This problem of a lack of SME collaboration with higher education is not unique to Egypt (Bonner, et al., 2015), but it needs to be addressed if the country’s SMEs are to realize their potential and contribute fully to the innovation process (OECD, 2010a).

Where university–industry collaboration did occur, various benefits were identified, together with difficulties as the literature suggests. Primarily, the difficulties relate to the different objectives of the two sectors and/or the firm’s knowledge of what services the universities can offer. Such findings corroborate the literature on the topic and suggest

the need for closer dialogue between the two sectors to enable a better understanding of each other’s needs, modus operandi and the benefits to be gained from collaboration – as well as how to manage the relationship. In by far the majority of cases, however, our surveyed firms did not collaborate with universities in Egypt because they perceived academic research as too theoretical or not leading edge or because of the conflicting interests and objectives of the two sectors.

Clearly, changes need to be made in both sectors. Universities need to embrace the third mission and to be encouraged, if not required, to collaborate with industry. Inevitably, this will necessitate a change in mindset, with universities being seen as, and perceiving themselves as, part of the local community rather than as ‘ivory towers’ divorced from it. It will also require capacity building and staff development at all levels, including senior management: University managers will need to learn how to manage entrepreneurially, how to create a sustainable business venture and how to market their institution’s services more effectively (Kirby and Ibrahim, 2012). This will require the universities not just to be entrepreneurial but to develop systems that support and reward entrepreneurial activity.

At the same time industry needs to recognize that, while collaboration with universities can be problematic, the benefits can be significant for all parties, including the national/regional economy. Overcoming the challenges requires effort on the firm’s part, and firms need convincing of the benefits of cooperation through success stories. The larger firms should consider employing academic liaison officers who understand academia and can work with academics, building a relationship of trust. However, it is not just large firms that need to collaborate with academia: It is also important for SMEs. It has been found in Japan, for example, that smaller firms can achieve higher productivity through university–industry collaboration than larger firms (Motohashi, 2005). Accessing the SME sector is notoriously difficult, although it might be achieved by using the local large organization supply chain or via designated programmes intended to link SMEs with higher education and stimulate innovation.³

Conclusion

While corroborating the findings of much of the existing body of research on university–industry partnerships, this study is not without its limitations – not least the bias in the sample towards large firms rather than SMEs, and there remains a need for more in-depth research into this sector of the economy. Also, there is a need to examine the findings by industry sector rather than in aggregate. However, despite such limitations, the study’s findings do have considerable practical implications for Egypt and other factor-driven economies that rely on factor endowments rather than knowledge and new technology.

First, in Egypt as elsewhere, university–business collaboration does not happen naturally (Galan-Muros, et al., 2017) and there is an important role for government, in keeping with the concept of the Triple Helix (Etzkowitz and Leydesdorff, 2000; Etzkowitz, 2003). Thus university–business collaboration should not be confined to university and industry but should include government, with all three retaining their independence and working together to modernize the economy, promote collaboration and stimulate innovation.

Second, the government needs to set the strategy for the modernization of the economy by encouraging the creation of new growth-oriented knowledge-based and technology-based businesses. In addition, it needs to rethink the role of Egypt’s universities and to encourage them to become more entrepreneurial (Kirby and Ibrahim, 2016) by allowing them to be more autonomous and responsive to market needs, engaging in leading-edge research that can be brought to market, either in partnership with industry or as university spin-out companies. Inevitably, the latter will require a change in the law to permit universities to create new ventures (El Hadidi and Kirby, 2015a) and a change in the reward and promotion criteria for academic staff so that such third mission activities become integrated into the core activities of the country’s universities. To expedite the process, the government might encourage partnerships with international universities that embrace the third mission and/or permit the establishment of foreign branch campuses.

Finally, the government needs to establish university–industry collaboration as a national priority. This may involve providing fiscal incentives to industry in the form of tax incentives (El Hadidi and Kirby, 2015a) or innovation vouchers (OECD, 2010b), and/or the creation of ‘a permanent national academic–industry–government forum in which members can explore areas of mutual interest and benefit, together with opportunities for collaboration’ (El Hadidi and Kirby, 2015b: 302). This national forum should be replicated at the local or regional level, thereby integrating universities into their communities and enabling them to respond more closely to local market needs, which will include addressing scientific and technological challenges encountered by the companies in their catchment area.

Through such measures, Egypt will begin the process of transformation from a factor-driven economy to one that promotes innovation and the creation of new, growth-oriented, knowledge-based businesses. At the same time, the country’s universities will be strengthened – they will be perceived more favourably by Egyptian industry, will become more entrepreneurial and less dependent on state and government funding and will be more highly ranked in global university league tables.

While our results have specific relevance to Egypt, the study focuses on an aspect of university–industry collaboration that is relatively under-researched in the world’s

factor and efficiency economies where such collaboration is often only weakly developed and is particularly difficult. The challenges highlighted may therefore not be unique to Egypt, and our policy recommendations may have relevance for other economies at a similar stage of development. Economic systems differ, however, even at the same level of economic development, and further research is needed, particularly, as Guimon (2013: 9) has pointed out, into ‘the success of specific policy programs to support university–industry collaborations in developing countries’.

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Notes

1. These include the Academy of Scientific Research and Technology (Invention and Innovation Development Agency), the Ministry of Industry and Foreign Trade Technology and Innovation Centres, the National Research Centre Business and Investors Service Office, the Technology Innovation and Entrepreneurship Centre, Technology Transfer Offices at Alexandria University, The American University in Cairo, Assuit University, Cairo University and Helwan University and a virtual incubator for science-based business.
2. These mechanisms include the establishment of Technology Innovation and Commercialization Offices in 30 of the country’s 43 universities.
3. For example, the United Kingdom’s Knowledge Transfer Partnerships (ktp.innovate.org) or what was originally the Shell Technology Enterprise Programme (www.step.org).

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Appendix I

The questionnaire

In the modern knowledge economy that characterizes the 21st century, university–industry collaboration is of increasing importance. Accordingly, we are carrying out research into such collaboration in Egypt and would be

extremely grateful if you could complete this short questionnaire. It should take you no more than 10 min. Naturally your answers will be treated in the strictest confidence and analysed anonymously on an aggregate basis.

The quality and accuracy of all such research depends on your contribution so I urge you to participate fully, as we want the research to be of benefit to you and Egypt.

Thank you for your co-operation.

Dr Hala El Hadidi

Associate Professor in Economics, Department of Business Administration, The British University in Egypt

Q1. What type of company are you?

- Egyptian
- British
- Part of a multinational organization
- Other(specify).....

.....
.....

Q2. How many people do you employ?

- 1-4
- 5-49
- 50-99
- 100+

Q3. In which sector do you operate?

- Construction
- Distribution and retailing
- Energy
- Financial services
- Healthcare and pharmaceuticals
- Hospitality and tourism
- Information technology
- Manufacturing and Production
- Telecommunications
- Utilities
- Other (specify).....

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Q4. Does your organization engage in Research and Development (R&D)

- Yes, here in Egypt
- Yes, elsewhere
- No, not at all

Q5. Do you partner with any Egyptian universities?

- Yes (go to Q10)
- No (go to Q6)

If no,
Q6. Why not?

- Universities are too theoretical
- University research is not leading edge
- There is a conflict of interest between academia and industry (universities wish to publish their findings; industry wants to keep them confidential)
- Universities and industry have different objectives (universities want to create knowledge; industry wants to create competitive advantage)
- Universities and industry have different time horizons
- Universities are too expensive
- Other(specify).....

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Q7. What would be needed for you to partner with an Egyptian university? (specify).....

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Q8. Have you ever partnered with an Egyptian university?

- Yes (go to Q9)
- No (go to Q21)

Q9. Why did you stop? (specify).....

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Q10. Do you partner with any universities outside of Egypt?

- Yes (go to Q11)
- No (go to Q21)

If yes to 10, Q11. What are the benefits of partnering with a university?

- Risk reduction (reduced risk of failure)
- Cost reduction
- Access to new knowledge
- Access to research skills
- Access to graduate recruits
- Other (specify).....

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Q12. Do you partner on teaching and learning?

- Yes
- No

Q13. Do you offer student internships?

- Yes
- No

Q14. Do you partner on graduate recruitment?

- Yes
- No

Q15. Do you partner on research?

- Yes
- No

Q16. Do you partner on knowledge/technology transfer (consultancy and training)?

- Yes
- No

Q17. Do you partner on knowledge/technology commercialization (the commercial exploitation of intellectual property generated by academic research)?

- Yes
- No

Q18. Do you partner on other activities (specify)

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Q19. Are there any difficulties in collaboration?

- Yes (go to Q19)
- No

Q20. If yes, what are they?

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Q21. If you are part of a multinational organization, does your parent company collaborate with universities?

- Yes
- No

Q22. Have you heard of the concept of the Triple Helix University?

- Yes (go to Q22)
- No (go to Q23)

Q23. If yes, is it a university that

- Undertakes teaching, research and community service
- Works in partnership with industry and government
- Is part of an international consortium of universities.

Q24. Are there any other comments you would like to make (specify)

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Thank you for your assistance. Please return this by

Please provide a contact address if you would

- like a copy of the findings
- like to participate in a university–industry workshop

Be prepared to be interviewed in a little more detail.