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Developing entrepreneurial capabilities for the global labour market: A cross national study of IT students in the UK and Australia

Research report

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RMIT UNIVERSITY Edinburgh Napier UNIVERSITY

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Acknowledgements

Executive Summary

The overarching aim of this research was to investigate how universities are preparing IT students for the global labour market. The focus of this study was IT entrepreneurship which is now being given a higher priority in public policy. Fostering entrepreneurial activities that drive innovation is increasingly seen as the answer to rapid technological advances, global competition and rising graduate unemployment rates.

Current entrepreneurship initiatives in IT programs at RMIT University, Australia, and Edinburgh Napier University, Scotland, have been researched for this report. In particular the focus was on understanding how sociocultural factors (gender, class, cultural background) impact on the entrepreneurial intentions and practices among IT students. IT students were surveyed (n=264) and 23 interviewed and their responses analysed for this research report.

This research explains how universities in two distinct contexts are developing the entrepreneurship capabilities among IT students from diverse cultural and socioeconomic backgrounds and preparing them for increasingly challenging graduate labour markets globally. It finds that despite the low numbers of females enrolled in IT Programs (<20%) that a good proportion of them (30%), do aspire to become IT entrepreneurs. This is in a field dominated by males where 40% of the males surveyed aspire to IT entrepreneurship, and where the gender role models are predominantly male.

It brings together the findings from both Universities to identify the enablers and barriers to IT entrepreneurship, the key enabler being supportive families and the key barrier being finance. Conclusions are presented around what Universities can provide to support IT entrepreneurs and encourage such innovation into the future.

Main Report

Introduction

Very little is known about the entrepreneurial intentions of IT students and how universities are preparing IT graduates for increasingly challenging global work environments.

The overarching aim of this research study was to examine the extent to which IT students are engaging with the push towards innovation and considering entrepreneurship as a career pathway.

A key focus of this study was the impact of sociocultural factors such as gender, ethnicity, socioeconomic status on the entrepreneurial intentions of IT students in Australia and Scotland.

Despite the strong emphasis on entrepreneurialism in the IT discipline, little is known about how sociocultural factors such as gender, socio economic status and cultural background influence the development of entrepreneurial capabilities among students. Prior studies into the impact of gender and entrepreneurship indicate that while female participation varies across countries, female rates are nearly always less than those of males (Lim & Envick, 2013). While there is substantial literature about women in entrepreneurship generally (Ramadani et al. 2015) and by country (Verheul et al. 2007), there is little published research on gender and IT entrepreneurship. Some recent online material suggests growth in the female participation in the start-up and technology sector (Leadem, 2016). According to the Kauffman Startup Activity Index, which measures start up activity in the USA, the population of new female entrepreneurs has declined over the past decade from 43.7% in the 1997 Index to 35% (Feldman, Armitage & Wang, 2016). In Australia, female participation rates are slightly above the global average with women representing 24% of start-up founders, rising from 17% in 2015 (Startup Muster, 2017).

Bourdieu offers significant tools to conceptualise the role of universities in the production of a habitus of 'entrepreneurship' within the specific disciplinary field of IT (Bourdieu, 1987). This study aimed to draw on feminist scholars who built on Bourdieusian scholarship by reworking the interpretation of capital to deepen understanding of the relationship between gender and capital (Reay, 2004; Huppatz, 2009). Bourdieu's contribution to social theory lies with the introduction of the notion of 'cultural capital', which refers to the collection of qualities such as skills, tastes, postures, clothing, mannerism, material belongings, credentials, and alike, that one acquires by being part of a social class. These qualities are sometimes mistakenly attributed to individuals when they may be culturally developed from an early age. For example, willingness to take risks is often attributed to one's personality, however, preference for risk taking can be the result of growing up in an environment where risk taking was valued and has shown to be advantageous.

Bourdieu also argues that cultural capital can either help or hinder one's social mobility. For example, some of the qualities of entrepreneurship are risk taking, creativity, competitiveness, and autonomy, which are characteristic of individualist cultures. Thus, students from a collectivist culture who are more likely to pursue the goals of a larger group as opposed to their own personal goals, may be less likely than students from an individualist culture to pursue entrepreneurship as a career.

Research Questions

This study aimed to answer the following two research questions:

1. To what extent is 'entrepreneurship' considered a career pathway among IT students in Australia and Scotland, and in that consideration, what are the perceived barriers and enablers to pursuing an entrepreneurial career pathway?

2. Are there sociocultural differences (gender, class, culture) in how IT students understand entrepreneurship and entrepreneurial capabilities and to what extent do sociocultural factors influence the development of entrepreneurial capabilities?

Methodology

A mixed method approach was adopted, incorporating both a quantitative and quantitative survey and in depth qualitative interviews (Gorard & Taylor, 2004).

The first phase of the project involved recruiting a research assistant and conducting a survey of IT students at RMIT and at Edinburgh Napier.

The RMIT Human Ethics Advisory Network granted approval and on April 13, 2017, a quantitative and qualitative survey was developed using Qualtrics, an online survey platform. Ethical approval was also sought by Edinburgh Napier University and the terminology of the survey was reviewed for the UK context and rolled out using Novi Survey.

The survey questions are attached in Appendix A.

The aim of the survey was to gather broad statistical information on the entrepreneurial intentions of IT students at RMIT University and Edinburgh Napier University and to examine how sociocultural factors such as gender, ethnicity and socioeconomic status shape their career decisions.

IT students who had responded to the survey were invited for interview, as well as students enrolled in the IT Entrepreneurship course at RMIT and students enrolled with the Red Triangle Incubator at Napier.

The interview questions are included in Appendix B.

Results

Between May 26, 2017 and June 16, 2017 the survey was emailed to students enrolled in IT at both universities and received 179 responses from RMIT and 85 responses from Napier.

A statistician was employed to clean the data, match relevant fields between RMIT and Napier Universities, and report on the responses. Although there were many less female IT students enrolled in IT Programs (only around 20%), this is representative of IT Programs in both Australia and Scotland. Table 1 contains information about gender of survey participants by University while Table 2 contains a breakdown of respondents to the survey by degree.

Table 1: Survey Participants by University and Gender

Participants	Total	Male	Female	
RMIT	179	144 (80%)	28 (16%)	7 blank (4%)
Napier	85	63 (74%)	22 (26%)	
Total	264	207 (78%)	50 (19%)	7 (3%)

Table 2: Survey Participants by Degree

Participants	IT Degree		Other Programs		Total
Undergraduate	Bachelor of IT	87	Bachelor of CS, SE, Digital Media	56	143
Postgraduate	Master of IT	42	Master of CS, Security, MBA, Engineering, Sound Design, PhD, Business, Games, Web	79	121
Total	IT	129	Other	85	264

The survey results showed that a reasonable number of participants were interested in becoming entrepreneurs (~30%). The male students had high numbers (~40%) expressing interest in entrepreneurship as a career. Although a few students were already starting up their own businesses, the majority of respondents who intended to become entrepreneurs planned to do this after working for some time to learn more about how the industry works. Table 3 shows the percentages of students overall by University considering becoming IT entrepreneurs, while Table 4 shows the numbers by gender. Table 5 shows the number for the level of award (undergraduate and postgraduate).

Table 3: Numbers of Participants Considering IT Entrepreneurship by University

Are you planning to become an IT Entrepreneur?	Yes	No	Maybe	Total
RMIT	67 (39%)	55 (32%)	49 (29%)	171
Napier	24 (35%)	30 (44%)	14 (21%)	68

Table 4: Numbers of Participants Considering IT Entrepreneurship by Gender

Are you planning to become an IT Entrepreneur?	Yes	No	Maybe	Total
Male	77 (40%)	66 (34%)	51 (26%)	194
Female	13 (30%)	19 (43%)	12 (27%)	44

Table 5: Numbers of Participants Considering IT Entrepreneurship by Degree

Are you planning to become an IT Entrepreneur?	Yes	No	Maybe	Total
Undergraduate	49 (33%)	54 (36%)	46 (31%)	149
Postgraduate	37 (47%)	30 (39%)	11 (14%)	78

The further analysis of recoded data suggested that while only around one quarter of respondents had definite plans to pursue an entrepreneurial career, a significant portion were undecided. For some, entrepreneurship was something to consider after gaining initial experience in the workforce, while for others the decision depended on the success of small pilot projects. This finding suggests that the decision to pursue a career as an entrepreneur is often not clear-cut but rather shaped by a range of factors. Investigating the factors that encourage and promote interest in entrepreneurship will be further investigated in the next stage of this study.

Table 6 gives reasons why participants would consider becoming an IT Entrepreneur. The numbers have been computed from the Likert scale responses where 1 was 'not at all' ranging to 5 while Table 7 lists how important some suggestions would be in supporting participants to become IT Entrepreneurs.

Table 6: Reasons for Becoming an IT Entrepreneur Ordered by Perceived Importance

Supports	Mean	Standard Deviation	Variance
Opportunity to follow my passion/interests	**4.39**	0.87	0.75
Job satisfaction	4.35	0.85	0.72
Opportunity to earn a high salary	4.13	0.95	0.91
Being your own boss	3.81	1.13	1.28
Flexible working hours	3.69	1.15	1.33
Option of working from home	3.68	1.16	1.34
Competitive graduate job market	3.06	1.26	1.6
Encouragement from family and/or friends	2.87	1.36	1.86
Fame and recognition	2.7	1.32	1.75

The researchers conducted interviews in Melbourne and Edinburgh over September – November, 2017. These were transcribed in December 2017. In all, 25 interviews were conducted, 19 from RMIT and 6 from Napier, and these included two staff members involved with the IT Entrepreneurship course. After transcription, an NVivo specialist was employed to analyse the transcripts using the key themes from this research. The nodes selected for the NVivo coding were: Aspirations, Big issues, Influence-role models, Psychological factors, Sociocultural factors and Support.

Entrepreneurship Aspirations: Gender Differences

Analysis of data collected for this study finds that gender does not play a significant role overall in shaping the entrepreneurial intentions of IT students. While the percentage of females intending to become entrepreneurs was lower than males, it was not statistically significant.

When examining the Scottish and Australian data combined, only 20% of students enrolled in IT degrees are female, highlighting the broad gender imbalance that characterises the IT discipline in both national contexts.

In the survey questions were asked about the education of the participants' parents, to ascertain whether this might have an effect on this gender imbalance or their entrepreneurship aspirations.

Figures 1 and 2 present the answers regarding the education levels of parents of the participants. They show that if anything, the education levels of the mothers were at least as high as those of the fathers, in all but the apprenticeships and postgraduate qualifications.

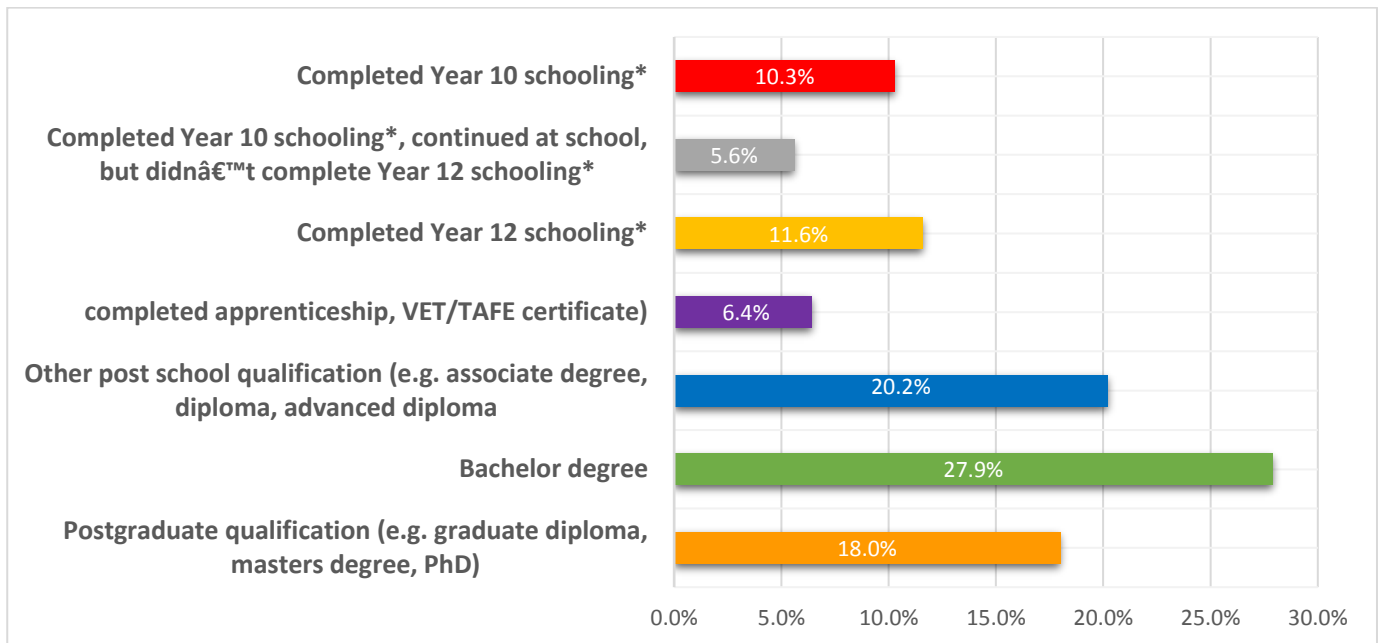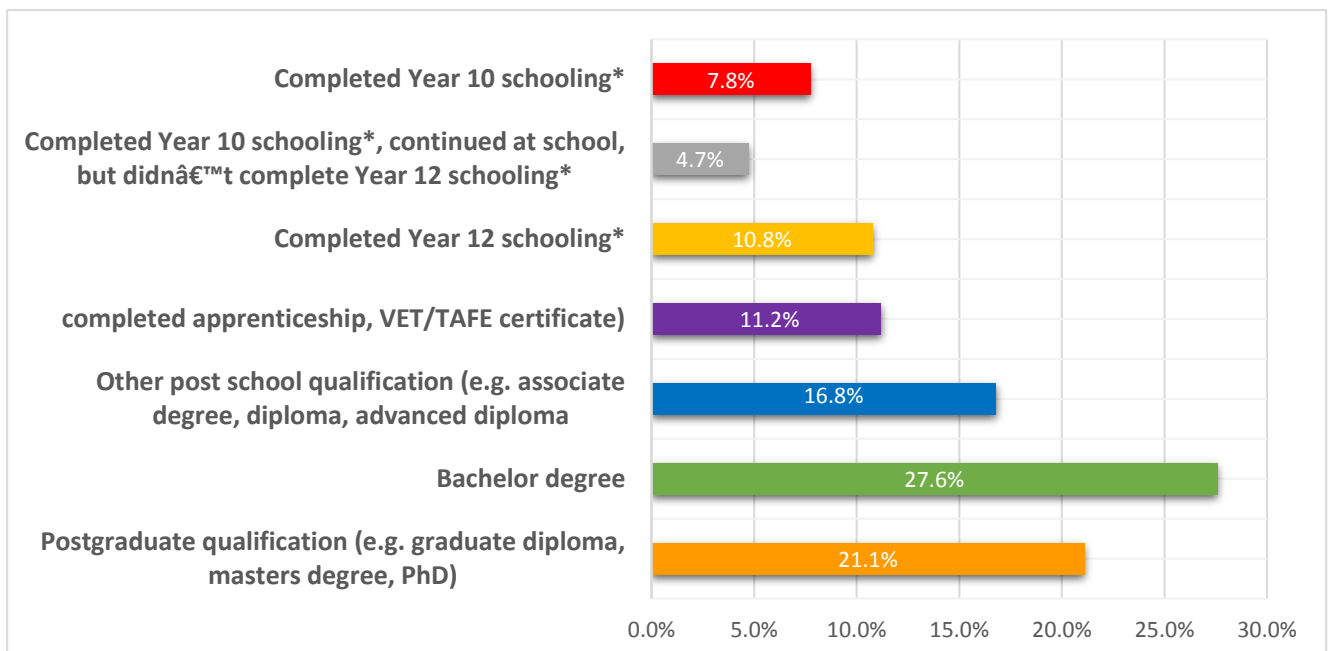Figure 1: Survey Q14 What is the highest level of education completed by your mother*? (*or equivalent)

Category	Percentage
Completed Year 10 schooling*	10.3%
Completed Year 10 schooling*, continued at school, but didn't complete Year 12 schooling*	5.6%
Completed Year 12 schooling*	11.6%
completed apprenticeship, VET/TAFE certificate)	6.4%
Other post school qualification (e.g. associate degree, diploma, advanced diploma	20.2%
Bachelor degree	27.9%
Postgraduate qualification (e.g. graduate diploma, masters degree, PhD)	18.0%

Figure 2: Survey Q15 What is the highest level of education completed by your father*? (*or equivalent)

Category	Percentage
Completed Year 10 schooling*	7.8%
Completed Year 10 schooling*, continued at school, but didn't complete Year 12 schooling*	4.7%
Completed Year 12 schooling*	10.8%
completed apprenticeship, VET/TAFE certificate)	11.2%
Other post school qualification (e.g. associate degree, diploma, advanced diploma	16.8%
Bachelor degree	27.6%
Postgraduate qualification (e.g. graduate diploma, masters degree, PhD)	21.1%

A key aim of the qualitative interviews was to further investigate how gender shapes IT students' decisions around career pathways. Overall, we interviewed 4 males and 2 females from Napier while there were 9 male and 10 females interviewed from RMIT, giving a total of 13 males and 12 females. From this sample we found that the majority (18) intended to become entrepreneurs, and that gender does have a role to play, not as a deterrant but rather as a moderator. All interviewees who intend to become entrepreneurs had a relative, usually a father, but sometimes an uncle, mother, grandparent, brother who had been a successful entrepreneur, see Table 7 below. Most of those interviewed who intend to become entrepreneurs have some family support and/or the example of a key relative.

They may not intend to become entrepreneurs straight away after finishing their degree, but this was stated as being for experience reasons, rather than for gender-based reasons. One exception was from a Taiwanese-born female who said:
> *"Asia culture is more focused on male than women because usually back to my mother's age, they think that women is useless, so they not even allowed to go to the college or not even to go to the high-level management things".*

However, when pressed further this student admitted that this attitude is changing for her generation, and females are being supported for high-level studies more, and encouraged to take middle management roles. Some of the individual reasons are presented in Appendix C with a summary from each interviewee about their entrepreneurial intentions.

Table 7: Family members who are entrepreneurs already, and family support from participants who were interviewed.

Entrepreneurs in Family	Frequency	Family Support	Frequency
All mother's family	1	Both parents	7
Both parents	1	Conservative, but would support if pays off	4
Both parents and brother	1	Concerned, but supportive	2
Father	7	Father not supportive of ENTP in IT, but would support in medicine	1
Father and uncle(s)	2	Father very supportive, mother not	1
Grandfather	1	Neutral, education is most important	1
Husband	1	Parents not supportive, but brothers are	1
Mother	1	Parents not supportive	2
Two brothers	1	No family or external support	6
Uncles	3		
No entrepreneurs in family or externally	6		
Total	25	Total	25

Barriers and Enablers

Among participants at both RMIT University and Edinburgh Napier University, the prime barrier to embarking on an entrepreneurial venture was finance.

This finding is consistent with other research that highlights the importance of sufficient financial support for commencing, struggling or failed entrepreneurs (EY, 2015). Research on youth entrepreneurship carried out by the Foundation for Young Australians revealed that more than three quarters of young entrepreneurs experienced difficulties accessing finance with two-thirds using personal savings to keep their business afloat (FYA, 2015). In the UK Research carried out by the New Entrepreneurs Foundation found a third of young professionals were keen to become entrepreneurs, however, access to finance remains a major barrier. (NEF, 2017). Notably, there are suggestions of a link between access to financial capital and gender with one study finding that a greater proportion of women are solely constrained by financial barriers than their male counterparts (Kwong, Jones-Evans & Thompson, 2012).

When considering an entrepreneurial career, results of this study reveal the importance participants place on having supportive family and friends. This highlights student awareness their own vulnerabilities and the value of strong social support networks when embarking on an entrepreneurial career. This is consistent with other research indicating that family social capital provides critical advantages to potential youth entrepreneurs. A US study found that parental entrepreneurship status is one of the strongest and most persistent predictors of entrepreneurship (Lee & Eesley, 2017). This suggests that having strong entrepreneurial role models among family and friends, as well as critical financial and emotional support, play key roles in shaping students' entrepreneurial intentions. Other enablers of IT entrepreneurship are given in Table 8, along with the ratings which the survey participants gave them. There could be more than one support selected and rated, or there may be some ignored as irrelevant, and so the numbers and totals vary.

Table 8: Perceived Enablers for Becoming IT Entrepreneurs.

Enablers	Not at all	Slightly	Moderately	Quite a lot	Very much
Flexible working hours	11	15	42	58	50
Being your own boss	10	11	39	58	58
Job satisfaction	1	7	15	57	92
Option of working from home	10	16	47	50	53
Opportunity to earn a high salary	3	5	37	52	79
Fame and recognition	44	35	47	29	21
Competitive graduate job market	25	35	47	43	26
Encouragement from family and / or friends	41	28	40	42	23
Opportunity to follow my passion / interests	1	6	21	43	105

Table 9 gives the ratings for perceived barriers to IT entrepreneurship, of which the primary one is finance, as discussed above, but this is followed closely by the perception of the participants that they have limited experience of working in the IT industry, and so may need time to make the necessary contacts and build up their networks. Some also realise that though they may want to become entrepreneurs, they are not so sure how their idea will go and are worried they may fail, or their idea may not be right, or they may not have the necessary administrative skills. Many of their perceived barriers could be alleviated by exposure to working in the IT industry and possibly by mentors, which is discussed in the section on the Role of Universities. Table 10 presents the underlying data.

Table 9: Barriers to IT Entrepreneurship Ordered by Perceived Importance

Barriers	Mean	Standard Deviation	Variance
Finance	**4**	0.99	0.98
Lack of industry networks/contacts	3.92	0.98	0.96
Lack of support and/or knowledge of how to go about launching a start up/starting a business	3.77	1.09	1.18
Haven't found the right idea or concept	3.59	1.25	1.57
Confidence	3.37	1.28	1.64
Limited relevant experience	3.27	1.23	1.51
Fear of failure	2.99	1.36	1.86
Family/caring responsibilities	2.83	1.33	1.78
Administrative barriers (paperwork, regulations, etc)	2.7	1.18	1.4
Lack of leadership skills	2.59	1.29	1.67
Visa	2.14	1.44	2.09
Lack of support from family and/or friends	2.09	1.17	1.37

Table 10 Perceived Importance of Barriers to IT Entrepreneurship

Barrier	Not at all	Slightly	Moderately	Quite a lot	Very much
Finance	2	12	36	56	66
Confidence	19	26	39	50	39
Family/caring responsibilities	39	30	45	35	22
Lack of support and/or knowledge of how to go about launching a start up/starting a business	7	14	45	57	53
Lack of industry networks/contacts	3	11	41	63	58
Visa	95	19	24	18	20
Lack of support from family and/or friends	77	35	42	15	7

Fear of failure	35	30	41	41	29
Administrative barriers (paperwork, regulations, etc)	38	33	58	36	10
Haven't found the right idea or concept	15	20	37	51	51
Lack of leadership skills	47	43	37	34	15
Limited relevant experience	17	29	53	41	35

Cultural Factors

Studies show that rates of entrepreneurship are higher among certain ethnic groups. For example, the work of Saxenian (2007) highlights the significant role of Asian immigrant entrepreneurs in the Silicon Valley.

Our interviewees were born in a range of countries: Australia (3), Bulgaria (1), China (3), England (1), India (3), Indonesia (2), Indonesia (1), New Zeland/Germany (1), Poland (2), Saudi Arabia (1), Ukraine (1), Vietnam (2) and Zimbabwe (1). A recent study of Stanford University Alumni found that while Asians of foreign nationality have lower levels of entrepreneurship than white Americans, Asian Americans have a higher rate of entrepreneurship than white Americans.

In our interviews, we have found that some Chinese and Indian students were generally less confident about becoming entrepreneurs, citing lack of knowledge of the industry and finance as issues. However, if the student could go home to start up their own business, that then some of these international students interviewed would have been more confident about becoming entrepreneurs.

Table 11: Responses to "Would the following encourage you to an entrepreneurial career?" (based on 5 point Likert scale where 5 = very much)

Question	Not at all	Slightly	Moderately	Quite a lot	Very much
Financial support	8	14	54	76	93
Mentoring (being matched with an entrepreneur 'buddy')	8	18	44	94	82
Help connecting to relevant industry	1	13	49	94	89
Education and training in entrepreneurship	10	24	58	77	76
Opportunities to discuss or brainstorm ideas with other budding entrepreneurs	14	36	65	68	64
Encouragement and support from my family and friends	34	50	63	48	52
Participation in a university incubator/activator	16	37	72	61	60

Support and advice from academics	16	30	71	74	55
Changes to visa policy	137	22	31	26	31
Changes to government policy	84	32	52	41	37

Role of Universities

A key focus of this project is to consider how universities are preparing students for entrepreneurial careers. Universities can enhance students' cultural and individual dispositions in terms of particular ways of valuing, thinking and doing. RMIT offers one course called IT Entrepreneurship which is offered to undergraduates in the School of Science and tailored to IT students. In addition to these, RMIT University has the RMIT Activator. Launched in 2016, the Activator is an initiative that aims to help current students, staff and researchers grow successful start-up ventures. The underpinning rationale is that equipping participants with real-world skills in enterprise creation will provide a distinct advantage with employers.

While the RMIT Activator has been available to students for the past 12 months, none of the students surveyed knew of its existence although several commented that they would be interested in this type of initiative on campus. A visit to the Activator revealed that IT students were developing software for Business or Medical entrepreneurs, rather than pursuing their own businesses.

In Edinburgh Napier, UK the University has provided incubators since 2004. The current version, Bright Red Triangle, now provides incubator spaces offering free business advice, support and facilities for Edinburgh Napier students and graduates who want to set up and run their own businesses. Over 1500 students have used the resources and, at any given time, there are usually around 50 students and graduates in the process of developing their ideas. The incubator provides a supported environment to aid students in establishing and growing their businesses by providing free office and meeting spaces, open 7 days a week, hot desks, phones, printers, general office supplies and a project development support officer.

This suggests an appetite for 'intrapreneurship' among IT students whereby employees carry our entrepreneurial activities within an existing organization (Adachi & Hisada, 2017). The topic of 'intrapreneurship', its appeal among IT students and the implications for the university sector has arisen from the in-depth qualitative interviews. While the RMIT Activator facilitates access to industry mentors who provide industry advice on developing their concept, there are suggestions that student entrepreneurs would benefit from working within in a larger organisation in order to develop and strengthen key knowledge and skills that can be applied both within the organisation prior to embarking on their own entrepreneurial venture.

Conclusions/Recommendations

Our data shows that the majority of IT students interviewed were interested in choosing entrepreneurship as a career pathway, with approximately one third of students surveyed responding affirmatively. Many of these students are aware of their lack of knowledge of the IT industry and would prefer to work for a few years before starting up their own businesses. This would give them the necessary understanding of the IT industry and more confidence in their own abilities to be successful.

Many of these students have family support to undertake their entrepreneurial activities. All recognise the importance of such family support by rating it as the primary enabler of success in IT entrepreneurship. They also recognise the importance of finance and this was the primary barrier to success.

Universities can aid the development of entrepreneurial skills directly through targeted courses, through facilitating careers officers, but also through the provision of places such as activators or incubators where students can meet with industry mentors. Such places enable the broader discussion of industry requirements and how to market, test and shape their IT ventures. This discussion may not happen only during the student's degree, but afterwards, once they have worked for a period of time in the IT industry and come to a clearer understanding of where they and their innovation may fit.

Appendices

Appendix A: The Survey Questions

Q1 Welcome to the RMIT IT Entrepreneurship survey!

At the end of the survey we would like to **invite you to enter a draw to win one of three $50 coles/myer vouchers**. If you choose to enter, you will be redirected to a separate page to enter your email address. Your email address will only be used to contact you if you win and will not be linked to your survey answers.

On the next page you will find the participant information sheet. Please read this carefully and if you are happy to take part in the survey click <u>next</u> to begin.

Thank you for taking the time to share your thoughts with us.

Q2

Participant Information Sheet/Consent Form RMIT Students
Title *Developing entrepreneurial capabilities for the global labour market: A cross national study of IT students in the UK and Australia*
Chief Investigator/Senior Supervisor   *Associate Professor Margaret Hamilton*
Associate Investigator(s)/Associate Supervisor(s)   *Dr Cate Gribble*

What does my participation involve?
Your participation will involve completing an anonymous online survey (around 10 to 15 minutes duration). The survey will begin by asking you some demographic questions (age, gender, ethnic background, etc). You will then be asked questions about your career plans and your views on entrepreneurship as a career pathway.
You will also be given the option to participate in a follow up interview.
If you are interested in participating in a follow up interview you will be redirected to a separate online form to provide details so a research assistant can contact you. Your contact details will not be linked with your survey answers.

*1   **Introduction***
If you decide you want to take part in the research project, you will be asked to give your consent. By clicking the button to start the survey, you are telling us that you:
• Understand what you have read, and
• Consent to take part in the research project.

*2   **What is the purpose of this research?***
This project explores IT Entrepreneurship initiatives at RMIT University, Australia and Edinburgh Napier University, Scotland. We are interested in learning your views on entrepreneurship as a career pathway and what factors influence your decision. We are also interested in your experience of RMIT entrepreneurship initiatives.

*3   **What does participation in this research involve?***
Participation in this research involves the completion of an anonymous online survey (around 10 to 15 minutes duration). Firstly you will be asked some demographic questions and then you will then be asked

questions about your career plans and your views on entrepreneurship as a career pathway.

Next you will be given the option to participate in a follow up interview. If you are interested you will be redirected to a separate online form to provide details so a researcher assistant can contact you. Your contact details will not be linked with your survey answers which are purely anonymous.

There are no costs associated with participating in this research project, nor will you be paid.

There is no direct benefit to participating in this study. However, your participation in this study will allow researchers to reflect on current entrepreneur initiatives at RMIT University, Australia and Edinburgh Napier University, Scotland and to develop recommendations that will enhance the preparation of IT students for the global labour market.

If you give your email details, you will be put in a draw to win one of three $50 vouchers to thank you for your time.

4   Other relevant information about the research project

We are approaching you because you are enrolled in an IT degree at RMIT, and we will also be approaching students from the RMIT Activator.

5   Do I have to take part in this research project?

Taking part in this research is entirely voluntary. If you do not wish to take part, you do not have to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage.

Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with the researchers or with RMIT University.

Submitting your completed questionnaire is an indication of your consent to participate in the study. You can withdraw your responses any time before you have submitted the questionnaire. Once you have submitted it, your responses may not be withdrawn because they are non-identifiable and therefore we will not be able to tell which one is yours.

6   What are the possible benefits of taking part?

There is not direct benefit to you personally in participating in this study. However participation in this study will inform the future directions of the IT Entrepreneurship course and contribute to a more in depth understanding of issues surrounding entrepreneurship education in the higher education sector. Another possible benefit may be to enable the development of recommendations that will enhance the preparation of IT students for the global labour market.

7   What are the risks and disadvantages of taking part?

This project will use an external site to create, collect and analyse data collected in a survey format. The site we are using is Qualtrics. If you agree to participate in this survey, the responses you provide will be stored on their host server. No personal information will be collected in the survey so none will be stored as data. Once we have completed our data collection and analysis, we will import the data to the RMIT server where it will be stored securely for five years. The data on the host server will then be deleted and expunged.

8   What if I withdraw from this research project?

If you do consent to participate, you may withdraw at any time. If you decide to withdraw from the project, please notify a member of the research team.

You have the right to have any unprocessed data withdrawn and destroyed, providing it can be reliably identified.

9   What happens when the research project ends?

Please contact Associate Professor Margaret Hamilton in the first instance for any general queries about this research project or obtaining results from the study via email (margaret.hamilton@rmit.edu.au) or

telephone (+61 3 9925 2939).

How is the research project being conducted?
10   What will happen to information about me?
Research results will be published and disseminated in a series of academic and professional publications, for example, conference proceedings and in peer-reviewed journals. Participants will not be identified in publications, as results will be reported in aggregate. It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified, except with your express permission.

11   Who is organising and funding the research?
This research project is being conducted by Margaret Hamilton, Cate Gribble and Sally Smith, and partially funded by the Society for Research into Higher Education in the UK.

12   Who has reviewed the research project?
All research in Australia involving humans is reviewed by an independent group of people called a Human Research Ethics Committee (HREC). This research project has been approved by the RMIT University HREC. This project will be carried out according to the National Statement on Ethical Conduct in Human Research (2007). This statement has been developed to protect the interests of people who agree to participate in human research studies.

13   Further information and who to contact
If you want any further information concerning this project, you can contact the researcher on 99252939 or any of the following people:

Research contact person	*Name:*	*Dr Margaret Hamilton*
	Position:	*Chief investigator*
	Email:	*margaret.hamilton@rmit.edu.au*

14   Complaints
Should you have any concerns or questions about this research project, which you do not wish to discuss with the researchers listed in this document, then you may contact:

Reviewing HREC name	*RMIT University*
HREC Secretary	*Peter Burke*
Telephone	*03 9925 2251*
Email	*human.ethics@rmit.edu.au*
Mailing address	*Research Ethics Co-ordinator*

Research Integrity Governance and Systems

RMIT University
GPO Box 2476
MELBOURNE VIC 3001

Q3 Part A   This section asks you for some background information. The information that you provide in this section will be used to assist in drawing more meaningful conclusions about the entrepreneurial intentions of IT students at RMIT. Your responses will remain strictly confidential and anonymous.

Q4 What is your gender?

○ Male (1)

○ Female (2)

○ Other (3)

Q5 How old are you?

Q6 What's your postcode in Australia?

Q7 What is your current level of study:

○ Vocational Education (1)

○ Associate Degree (2)

○ Undergraduate Degree/Honours (3)

○ Postgraduate Certificate/Diploma (4)

○ Masters (5)

○ Doctorate (6)

Q8 How long have you been studying/did you study at RMIT?

○   Years (1) _____

○   Months (2) _____

Q9 Which program are you undertaking/did you undertake?

Q10 Are you studying/Did you study:

☐   part-time (1)

☐   full-time (2)

Q11 Are you studying/Did you study

☐   face to face (1)

☐   online (2)

Q12 At which campus are you mostly studying/did you mostly study?

○ Melbourne City (1)

○ Bundoora (2)

○ Brunswick (3)

○ Other (please specify) (4) _____

Q13 Which of the following ethnic groups do you most strongly identify with:

○ Aboriginal/ Torres strait islander (1)

○ African (2)

○ East or South-East Asian (3)

○ Caucasian/European (4)

○ Middle Eastern (5)

○ Multiracial (6)

○ South Asian (7)

○ Other (please specify) (8) _____

○ Not sure (9)

○ Prefer not to say (10)

Q14 What is the highest level of education completed by your **mother**: (*or equivalent)

○ Postgraduate qualification (e.g. graduate diploma, masters degree, PhD) (1)

○ Bachelor degree (2)

○ Other post school qualification (e.g. associate degree, diploma, advanced diploma (3)

○ completed apprenticeship, VET/TAFE certificate) (4)

○ Completed Year 12 schooling* (5)

○ Completed Year 10 schooling*, continued at school, but didn't complete Year 12 schooling* (6)

○ Completed Year 10 schooling* (7)

○ Didn't complete Year 10 schooling* (8)

○ Don't know (9)

Q15 What is the highest level of education completed by your **father**: (*or equivalent)

○ Postgraduate qualification (e.g. graduate diploma, masters degree, PhD) (1)

○ Bachelor degree (2)

○ Other post school qualification (e.g. associate degree, diploma, advanced diploma (3)

○ completed apprenticeship, VET/TAFE certificate) (4)

○ Completed Year 12 schooling* (5)

○ Completed Year 10 schooling*, continued at school, but didn't complete Year 12 schooling* (6)

○ Completed Year 10 schooling* (7)

○ Didn't complete Year 10 schooling* (8)

○ Don't know   (9)

Q16 Part B. Future Career plans

Q17 What are your career plans after graduation?

Q18 Are you planning to become an entrepreneur? Why or why not?

Q19

3. This section explores your views on IT Entrepreneurship as a career pathway. How important are the following factors in encouraging you to become an IT Entrepreneur?

	Not at all (1)	Slightly (2)	Moderately (3)	Quite a lot (4)	Very much (5)
Flexible working hours (1)	○	○	○	○	○
Being your own boss (2)	○	○	○	○	○
Job satisfaction (3)	○	○	○	○	○
Option of working from home (4)	○	○	○	○	○
Opportunity to earn a high salary (5)	○	○	○	○	○
Fame and recognition (6)	○	○	○	○	○
Competitive graduate job market (7)	○	○	○	○	○
Encouragement from family and/or friends (8)	○	○	○	○	○
Opportunity to follow my passion/interests (9)	○	○	○	○	○

Q20
4. Which of the following are barriers to an entrepreneurial career?

	Not at all (1)	Slightly (2)	Moderately (3)	Quite a lot (4)	Very much (5)
Finance (1)	○	○	○	○	○
Confidence (2)	○	○	○	○	○
Family/caring responsibilities (3)	○	○	○	○	○
Lack of support and/or knowledge of how to go about launching a start up/starting a business (4)	○	○	○	○	○
Lack of industry networks/contacts (5)	○	○	○	○	○
Visa (6)	○	○	○	○	○
Lack of support from family and/or friends (7)	○	○	○	○	○
Fear of failure (8)	○	○	○	○	○
Administrative barriers (paperwork, regulations, etc) (9)	○	○	○	○	○
Haven't found the right idea or concept (10)	○	○	○	○	○
Lack of leadership skills (11)	○	○	○	○	○
Limited relevant experience (12)	○	○	○	○	○

Q21
5. Would the following encourage you consider an entrepreneurial career

	Not at all (1)	Slightly (2)	Moderately (3)	Quite a lot (4)	Very much (5)
Financial support (1)	○	○	○	○	○
Mentoring (being matched with an entrepreneur 'buddy') (2)	○	○	○	○	○
Help connecting to relevant industry (3)	○	○	○	○	○
Education and training in entrepreneurship (4)	○	○	○	○	○

Opportunities to discuss or brainstorm ideas with other budding entrepreneurs (5)	○	○	○	○	○
Encouragement and support from my family and friends (6)	○	○	○	○	○
Participation in a university incubator/activator (7)	○	○	○	○	○
Support and advice from academics (8)	○	○	○	○	○
Changes to visa policy (9)	○	○	○	○	○
Changes to government policy (10)	○	○	○	○	○
Other (give details) (11)	○	○	○	○	○

Q22 Is there any there anything else you would like to tell us?

Q23 Would you like to enter the draw to win one of three $50 vouchers *(if you select yes you will be redirected to a separate Qualtrics form to input your email so we can contact you if you win)*

○ Yes (1)

○ No (2)

Q24 Would you be interested in participating in a confidential interview to further discuss your experiences? *(If you select yes, you will be redirected to a separate Qualtrics form to input your email so we can contact you)*

○ Yes (1)

○ No (2)

End of Block: Default Question Block

Appendix B: The Questions Asked in the Interviews

☐ Age

☐ Gender

☐ Ethnicity (language spoken at home?)

☐ What high school did you go to?

Entrepreneurial intentions:

1. What are your career plans after graduation?

2. During your time at uni did you study entrepreneurship or contact the business incubator?

3. Are you planning on becoming an entrepreneur? Why? Why Not?

Role of university

4. Do you think your programme has your prepared you for a career as an entrepreneur? How could the course be improved?

5. Do you think there were opportunities to find out more about being an entrepreneur or experience entrepreneurship?

6. How can universities best support and encourage students to pursue entrepreneurial athways?

Sociocultural factors:

7. How does your family view entrepreneurship as a career path? Are they supportive? If yes, in what ways? If no, why not?

8. Are any members of your family entrepreneurs? If so, provide details? If not, what types of careers have your parents had?

9. What are the barriers to pursuing a career as an entrepreneur? E.g. Finance, family support, lack of mentors/role models, etc.

10. How do you think gender impacts on students' decision to pursue an entrepreneurial career in the field of IT? Do you think females face particular challenges? What can be done to encourage women to pursue entrepreneurship in IT?

11. Overall, what more can be done to foster entrepreneurship capabilities among IT students and encourage them to consider a career as an entrepreneur? E.g. University programs/support, government policy, industry mentors.

Appendix C: Interview Responses to the Question: Do you want to become an Entrepreneur? Why or Why not?

Aspirations: What are your career plans after graduation? Why entrepreneurship?

P1(M): Get a little bit of industry experience you need three years. And then look into opening up something, my own business. … The most important thing is being my own boss. And obviously contributing back experience. And at the same time it will give me an
opportunity to network and know other industry players and that will obviously help me build the knowledge I would have gained from uni as well.

P2(F): I've had an idea for about three years which is partly why I came to do this Masters programme here. And I've always been interested in doing something myself but I've probably never had the confidence to do it so I thought maybe by coming to study and area within computing that would hopefully provide me with some confidence to explore this area. And my plan was always to contact the Bright Red Triangle but because I work and study and have children it's very difficult to find the time. So my plan is still to do that.

P3(F): I always wanted to be an entrepreneur….Yeah. So, I would love to create a beautiful working environment for other people. I want to create job opportunities for others. And most of all, I would like to be my own boss, I would like to be able to like dictate whatever my creative mind comes up with…. And I also like responsibility. So, I will take care ... I would love to take care of my business and see it grow like I've seen ... I've seen how my Facebook page was getting more and more views and how random people from Instagram were liking my ... my ... my photos. And like I will soon see if I put more effort into it, how this business is actually progressing. So, like I love it, I love that I created this little thing and it's growing.

P4(M): I'm thinking of moving to project management business analysis or consultancy for a while. And then depending on how things go I might start my own thing after a while. …Well my idea is that I want to go in the industry and I want to work for a couple of years and I want to create my own contacts by people seeing the way I work. And once they see the way they work and I built some form of relationship with, I can go on my own and I know that these people if they're satisfied with the way I work they'll be looking for me.

P5(M): Not at this stage, maybe in the future but at the moment I would like to get more experience to see how business actually runs. I've
seen something as I working ... doing the internship during the summer.

P6(F): Well, I have many plans actually. I wanted to start to do my own start up, the problem is that I have a restriction on my visa over here
in the UK. So ... I mean to solve real world scenarios using artificial intelligence. And when I came across those and when I did ... I reproduced his work in my
dissertation. I ... it was very crystal clear to me what I had to do and how I can do it. The only issue was that I need ... I cannot do it alone myself, I
need more people who can actually gather the data to do the artificial intelligence work.

P7(M): No. I mean, ultimate end goal would be getting it to the stage where it's sort of a little bit self-sustaining, which isn't for a long time, probably.
But yeah, most of the clients have been sort of – well, initially they were very nepotistic. It was just – I think the first job we had was a family
member's construction company.

P8(M): I think small company. Less stress, I think. ….. But what you're saying, I guess, from your own experience, is that it's something that you wouldn't consider immediately, because you don't feel like you have the experience and you're not willing to take that type of financial and personal risk.

P9(F): I prefer to work for the company rather than build up myself my own company.

P10(M): currently I am a freelance consultant. So, that means I

have already a place I'm working. So, the question is what do I do after this. I know that my work would probably not want to lose me but I am
interested very much to start my own thing, kind of. At least part-time.

I have various ideas of what I want to do like kind of apps or businesses team up with but this [inaudible *0:03:40.5] and time to come up with
and I don't want to lose the money. I don't want to be in a situation where I don't earn money so that's why I'm putting this on hold. That's
basically my idea for the future.

P11(F): I think I would want to start off working for someone else, just so that I can get some experience. I would love to open my own business. I
would love to have an office where programmers and everyone else can gather and we can give service to other people, but that might be really
far in the future.

P12(M): Yeah. Have some experience about how the company runs so after that I can do it, my own.

P13(F): Yes. Because actually – I only say maybe. I don't know the future. If I go [*00:06:21][unclear] I will go for it. But if I don't, I just follow my own
pace.

P14(M): If we're trying to seed the desire for entrepreneurship or that hunger, I think rather than defining what an IT professional is or what the IT
industry is, we should help them understand where IT has made an important contribution to something in the world because then they get to
really see how broad it is.

P15(M): After I graduate I have a few small plans to start up a firm which will be providing security solutions to different companies….. A:I have not planned on the location yet, but I have my uncle in India who has an IT firm who sells Google Cloud products, and in collaboration with them I would like to start up this one. We are planning to start in Australia, there is a friend of his who has worked in Google and who was planning to invest some money in that. So, probably we might start that very soon.

P15(F): Not at this point, but maybe in future, yes. Because right now there are a lot of difficulties right? I have to get the funding, then a good idea, then I have to gather people who will be actively involved in that. There are a lot of things that come into picture.

P16(F): I never really planned to be an entrepreneur because in general it wasn't encouraged in my family. It only came to my mind recently when both of my brothers started doing their own businesses. They were encouraging me to get out of the industry and start making my own thing really.

P17(F): Yeah, not straight away.

P18(M): To run my own business, basically. I'm currently already doing a freelance company. Technically a partnership, and I work at the Casino, just trying to move from one to the other full-time would be good.

P19(M): I actually want to go full-time on a start-up.
Q: Whereabouts?
A: I actually I started one – actually in a unit at RMIT. Web Project One, or Web Project Two, or something like that. Or programming project one – it was weird, it was a Capstone project of the university, my under-grad. The computer science degree. And it actually did really well, and so I'm hoping to turn it into like a business, then after I graduate, I'd like to start working on that full-time, maybe get a co-working space, in the city.

P20(F): It's because I don't really have a real time experience, just real industry experience in IT, so the idea of become an entrepreneur is like still a bit, a bit distance to me and I need more, like, how the other people in the industry are currently working and how they operate things. Maybe in the future after five years of doing job in corporate and then maybe move on with my own business or something like that.

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