

BRIDGING THE INNOVATION CHASM: STUDENTS' UNDERSTANDING OF THE CONCEPT OF PATENT

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ABSTRACT

Do students understand the process of patenting new ideas, innovations, or inventions? A sound understanding of the definitions, concepts and dynamics of patenting could help students in playing an active role as entrepreneurs and innovation actors. This paper contributes to the discussion of entrepreneurial and innovation chasm by providing the results of a survey on the students understanding on the process of patenting. Questionnaires consisting of 17 statements that were categories into five research sub-questions were disseminated by e-mail to 100 students registered for a Bachelor of Technology (BTech) Computing degrees, at the Faculty of Information and Communication Technology (FoICT), Tshwane University of Technology (TUT). The results showed that majority of students understand the process of patenting new ideas/innovation or inventions. In this regard, it is permissible and proper for students to play an active role as entrepreneurs and innovation actors.

Key words: Entrepreneurs, entrepreneurial, innovation, and patenting.

INTRODUCTION

How can Africa, as a continent move from being consumers to producers? One way of answering such a question is to look at who are the potential actors capable of becoming producers, and what do they understand about the process of protecting their ideas that could make them producers.

Within the university context, such producers could either be university employees (i.e. academics, officials, etc) or students. It is easy to realise that students don't have the expertise as compared to the academics. However, students have far more hours to put into becoming producers. In the context of this study, students are seen as potential entrepreneurs and innovators.

According to Rebernik (2009) majority of university programmes continue to train students to be employed by- and work for somebody; failing to train them to be self-reliant owners and entrepreneurs. There is a saying that, "the best way to predict your future is to create it". Entrepreneurs and innovation actors create their future and that of others by embarking on entrepreneurial and innovation activities that could result in, among others, job creation. In this regard, students are innovation engines that could offset most university sponsored student business ventures (Rebernik, 2009; Bailetti, 2011).

A university sponsored student business venture or spin-off company strives to transform knowledge acquired (through laboratory projects or research projects or innovative thinking/ideas) by students into an

income-generating business (Bailetti, 2011). According to Elpida et al. (2010), spin-off ventures are vehicles for transferring knowledge into application that is vital for society.

Students' laboratory projects or research projects or innovative thinking/ideas might need to be protected through a patent. It is therefore proper to ask them if they understand the process of patenting new ideas, innovations, or inventions. A sound understanding of the definitions, concepts and dynamics of patenting could help students to play an active role as entrepreneurs and innovation actors.

This paper contributes to the discussion of entrepreneurial and innovation chasm by providing the results of a survey on the students understanding on the process of patenting. The rest of this paper is structured as follows: section 2, summarises the research questions which guided this study. In section 3, a brief literature review is presented. Section 4, presents research methodology and section 5 present the results. Lastly, in Section 6, we conclude the study and suggest directions for future research.

RESEARCH QUESTIONS

This paper has been guided by the following five research questions:

- **RQ 1: Do students have a general understanding of patenting new ideas, innovations or inventions?** It was envisaged that the answer to this question will indicate if students have a general understanding of how a patent works and the patent process. This question seeks to find out if whether or not students know that they should conduct patent search before they file their own patents?
- **RQ 2: Do students understand the general categories for which patents could be lodged under?** It was envisaged that the answer to this question will indicate if students understand what to patent.
- **RQ 3: Do students understand that a patent does not mean making a profit immediately?** It was envisaged that the answer to this question will indicate if students have a general understanding whether there is a money that could be made through the patents or not.
- **RQ 4: Do students understand that some patents could be kept as trade secrets?** It was envisaged that the answer to this question will indicate if students have a general understanding of how what are trade secrets and how they are lodge.

LITERATURE REVIEW

The Core Entrepreneurial Action (CEA)

Elpida et al. (2010) in support of Bathelt et al. (2010) identified four basic stages (termed the "Core Entrepreneurial Action"): (i) exploration of ideas, (ii) realising the business concept of an idea, (iii) finding the financial resources to develop the business concept, and (iv) consolidating and strengthening an entrepreneur culture necessary for fertilising the ideas and concepts into a clear direction, as the ones that helps transforming knowledge into creation of economic value. The Core Entrepreneurial Action (CEA) is very similar to a stage-gate process - a value-creating business process and risk model designed to quickly and profitably transform an organization's best new ideas into winning new products (Ndonzuau et al., 2002).

- i. **Stage 1: Exploration of the ideas** – this stage is normally unstructured and includes all activities that generate the ideas. It is considered as the beginning of the spin-off process (Elpida et al, 2010 and

Bailetti, 2011). Ndonzuau et al. (2002) cited by Elpida et al. (2010) suggest that in order to commercially exploit any ideas, some form of an analysis of the ideas' technological, commercial and personal aspects needs to be established. Elpida et al., (2010) further suggests that the criteria for exploitation of ideas may include soft judgement which looks at the level of maturity, the level of excitement and the level of visible outcomes.

- ii. **Stage 2: Realising the business concept of an idea** – according to Elpida et al (2010) the feasibility of the business concepts needs to be judged against three criteria: (i) technical/scientific research, (ii) market research, and (iii) protection potential.
- iii. **Stage 3: Finding the financial resources to develop the business concept** – it is at this stage that there exists the only factor that separates a successful business concept from the wasted idea (Rasmussen and Borch, 2010). Within this stage, the financial resources could be obtained from funding by entrepreneurs own resources, university, government, industry, venture capitalists, banks, angel investments, etc. It is within this stage that proper binding financial and legal agreements are signed.
- iv. **Stage 4: Consolidating and strengthening an entrepreneur culture** – it is in this stage that techniques for motivating and strengthening an entrepreneur culture is deem necessary for fertilising the ideas and concepts into a clear direction.

Stage two of CEA has to do with the potential of protecting the concept against competition. In doing so, as mentioned by Ndonzuau et al. (2002) two different aspects may be considered: (i) natural protection and (ii) artificial protection. Natural protection is based on both the technological level of the results (the degree of innovation) and barriers to imitation that give the results-owners a technological lead for a considerable period of time (Ndonzuau et al., 2002). While, artificial protection is the one that is based on patents or copyrights and is generally more appropriate and appreciated.

According to Elpida (2010), as far as the entrepreneurial spin-offs are concerned patenting or licensing is probably the best way to protect an idea which helps when the new venture request finance from investors. The artificial protection is understood more as the management of intellectual property rights and that need skilled people as implementers. If students are producers of such intellectual property, it is proper to investigate their understanding on patent process.

Various studies have been conducted in terms of management, legal aspects, and technology transfers of academic patents (Duderstadt, 2001; Jensen and Thursby, 2001; Mok et al., 2010; Sohn and Lee, 2012). On the other hand, very limited studies focus attention on students' participation in academic patenting. However, almost all studies of academic patent do not take into account students' perspective in understanding patenting or patent process. Few studies in the field of law look at the student's contribution adhering to IP laws (McCutcheon, 2003; Collins, 2013; Wright, 2014).

Students in a Patenting Process

An article by Fox (2013) allude to the agreement between Morrison & Foerster inc., of providing in-kind patent prosecution services to students in the University of California (UC), San Diego's "myLab," program which is based at the university's Qualcomm Institute for Telecommunications and Information Technology. According to Fox (2013), the objective of myLab is to combine engineering, art and technology with hands-

on experience. The agreement is designed to encourage students at the undergraduate level or younger to undergo the process of submitting an idea to be patented (Fox, 2013).

The “myLab initiative” by Morrison & Foerster inc., and UC, San Diego aims to deepen the students understanding of patents as it does not aim to make profit through patent royalties neither aim to start companies but will put the patents in public domain whereby anyone (i.e. entrepreneurs) could exploit the patents (Fox, 2013). Meanwhile, the same students are also welcomed to exploit the patents.

In general, students could have an idea of what is a patent but not a technical know-how of filing a patent application and its underlying process. In this regard, technology transfer offices (TTOs) and experience researchers or academics who are familiar with the patent process could be of help; as in the case of four students from the Republic of Kazakhstan’s Nazarbayev University (NU) who obtained a patent on a new design for a fixed-wing motorized model airplane (NU, 2014).

Taking the students’ ideas or inventions through the patent process will enrich their understanding of the commercial science, engineering and technology (SET) world and, hopefully, give them the proud distinction of a patent with their name on it.

RESEARCH METHODOLOGY

Since the aim of this paper is to contribute to the discussion of entrepreneurial and innovation chasm by looking at students understanding of the patent process and realising that very few studies concentrate on such aspect; therefore, it was proper to adopt empirical research method. According to Moody (2002) empirical research methods are a class of research methods in which empirical observations or data are collected in order to answer particular research questions. It uses either or both qualitative and quantitative methods for conducting research. The combination of both qualitative and quantitative methods is known as “mix-method or triangulation” (Moody, 2002).

In this paper, mix methods were used to survey a total of 100 students enrolled for Bachelor of Technology (BTech): Computer Engineering Systems (CES) and for BTech: Information Technology (IT) at Tshwane University of Technology (TUT), Faculty of Information and Communication Technology (FoICT). The survey was conducted by disseminating self-administered questionnaires to students using an e-mail.

To strengthen the data collection and get some more facts informal discussions were conducted with a group of 30 students (i.e. 15 from BTech: CES and BTech: IT). The topic and sub-topics of the discussion were formulated around the aforementioned research questions. Descriptive statistics was used to analyse the collected data.

RESULTS

Of the 100 disseminated questionnaires, the response rate was 60% (60 questionnaires were returned), while non-response rate was 40%. Of the 60 returned questionnaires, 50 (83%) were returned unspoiled and only 10 (17%) were spoiled.

In figure 1, a summary of the participants age and gender distribution is provided. Majority of the participants were males, most of which were in the age range from 26 to 30; while the same age range accommodated most female participants (see figure 1).

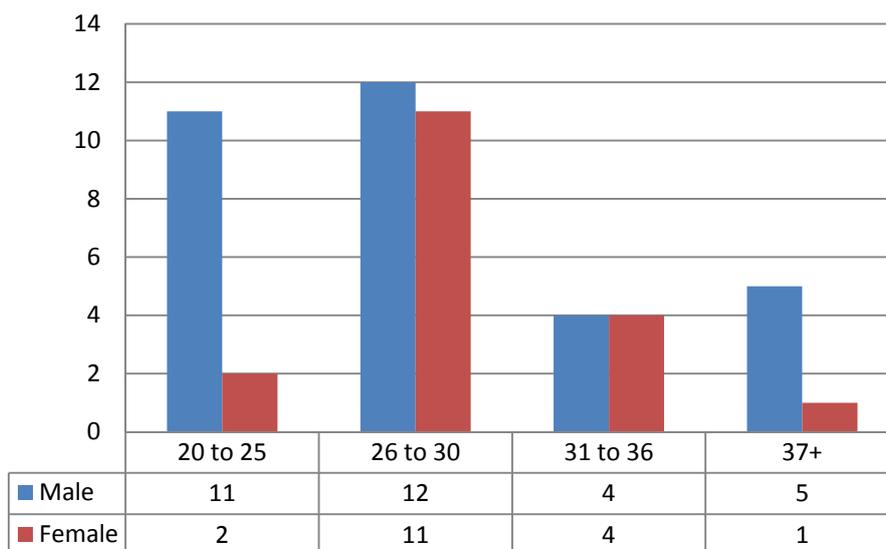


Figure 1: Participants age and gender distribution

RQ 1: Do students have a general understanding of patenting new ideas, innovations or inventions?

In South Africa, a patent is an exclusive right granted for a specific period of time to a patentee (the inventor or owner of the patent) in exchange for a full disclosure of the invention to the public (IP Wise, 2013). A patent is intangible property and may be sold or licensed for use by others. A patent is an intellectual property with a legal right enforceable by legal action (Smith, 2010). A patent does not stop others from building/suggesting a look-a-like inversion of what had been patented.

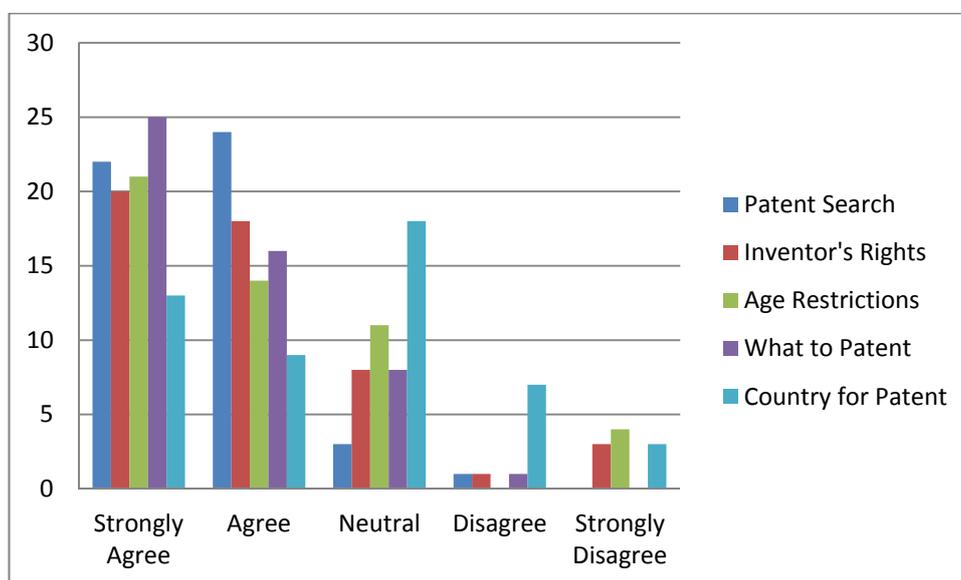


Figure 2: The understanding the patenting

According to Smith (2010) to obtain a patent should follow three steps: (i) lodge an application with the country's Patent Office, (ii) pay all fees to allow search and publication process to be executed by the Patent Office, and (iii) evaluation of the filed application to check if it meets all relevant legal requirements of the Patent Office.

Figure 1, showed that majority of students (48%) understands the three steps of obtaining a patent. While nearly 50% of the students strongly agreed that they understand what to patent. On the interview section, the researcher observed that most students who understand what to patent are basically employees of companies that have some business development units.

Patents are granted for 20 years, starting from the date (i.e. priority date) on which the first patent application is filed and they are territorial which means that a South African patent, for example, does not give any rights outside the borders of South Africa.

Majority of student became voted for being neutral (as indicated in figure 1) on the fact that a patent is territorial. During the interview this aspect was deliberated upon and it showed that most students thought that if one lodge a patent application an approval is worldwide, not know that they can receive a provincial approval.

There was a strongly agreed vote that patents have some age restrictions. During the interviews most students said an individual should receive a consent approval from the court of law through their guardians.

RQ 2: Do students understand the general categories for which patents could be lodged under?

What protection does a patent provide? Which categories could be patented? For most students such questions become bizarre to them if they lack the “know-how” of patenting. In figure 3 below, most students voted for categories of food and clothing as things that could receive patents as compared to new laws of nature and/or new discovery of minerals or plants. The findings are in agreement with IP Wise (2013) - A patentable invention is a product, process or service that is: (i) new (novel, not publicly disclosed in any document or oral presentation or through use); (ii) inventive (not obvious in the light of the prior art); and (iii) capable of use in trade, industry or agriculture. For example, food and clothing are products, hence they are patentable.

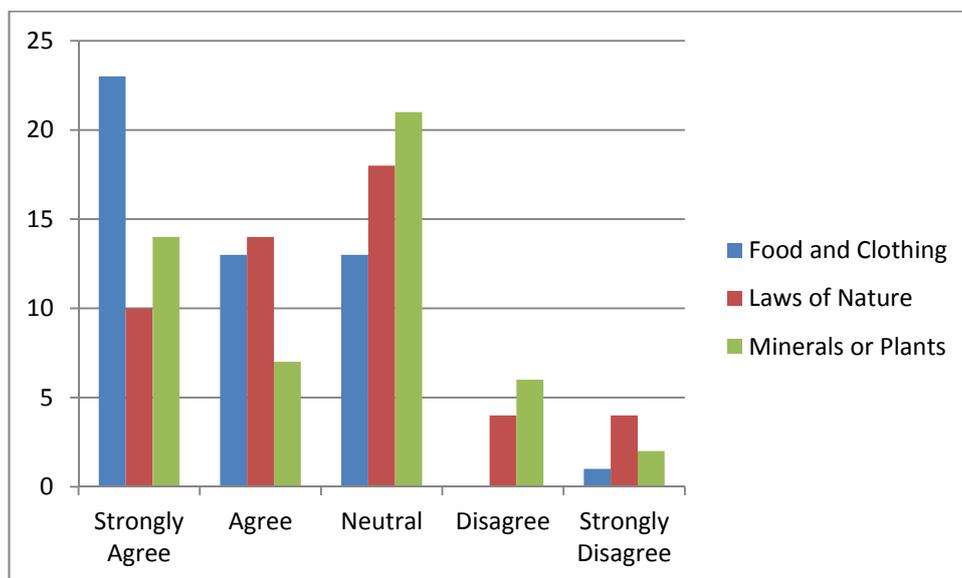


Figure 3: General categories in which a patent could be lodge

RQ 3: Do students understand that a patent does not mean making a profit immediately?

A patent gives an inventor the right to exclude all others from making, using, importing, selling or offering to sell the invention for up to 20 years without the inventor's permission. This gives the inventor the opportunity to produce and market the invention himself, or license others to do so, and to make a profit.

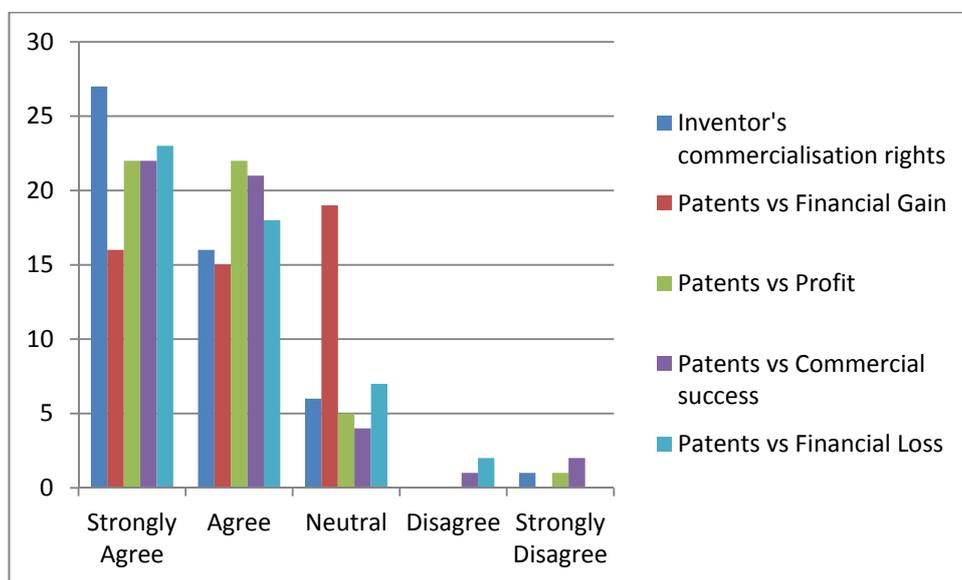


Figure 4: Patents provision of financial right

As indicated in figure 4, most students believe that a patent protects their commercial rights. They were neutral in the fact that a patent could provide them with quick financial gain; although, they strongly agreed that patents could bring about financial success and also possibilities of financial loss.

RQ 4: Do students understand that some patents could be kept as trade secrets?

According to Smith (2010) trade secrets are confidential information that comprises the specialist “know-how” that enables a business to manufacture products or services successfully. Unlike trademarks, they do not require to be registered since by their very nature registration will break their secrecy. Trade secrets do not share the pre-conditions of patents, as they do not require to being novel in nature (Smith, 2010).

Figure 5 provide questionnaire results that indicates that majority of students (68%), strongly agreed that trade secrets by their virtue are secrets and should not be declared or registered as it is with patents. Students knowledge of patent depicts that majority of them (72%) strongly agreed that they are aware of the fact that failure to file for patent might lead to others copying your ideas. In the case of the latter, they equated it with plagiarism during essay/article writing.

Furthermore, 70% strongly agreed that in the case anyone infringed their registered patent; they could take a legal action. In support, to the latter, Bainbridge (2007) cited by Smith (2010) provided four remedies that the courts could aid with: (i) an injunction restraining the defendant/infringer from carrying out activities that infringed the patent, (ii) damages to compensate for the loss suffered as a consequence of the infringement, (iii) an order that infringing articles be destroyed or delivered up (i.e. handed over to the patent-holder); and (iv) a declaration that the patent is valid and has indeed been infringed by the defendant/infringer.

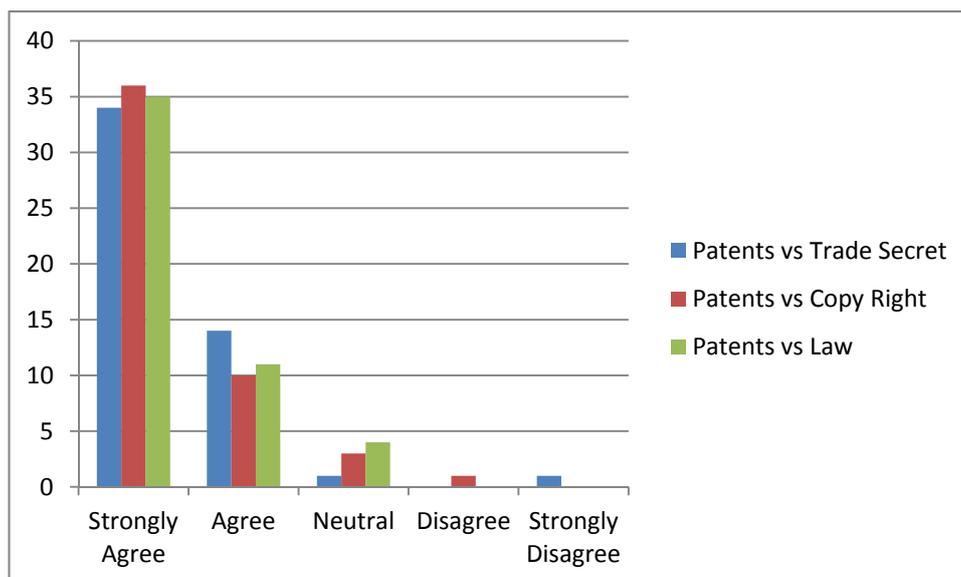


Figure 5: Patents as trade secret and/or copy right

As indicated in figure 5, it is no doubt that majority of students have knowledge and understand that some patents could be kept as trade secrets and confidentiality lies at the heart of the trade secret protection. From the informal group discussion, students from the BTech: CSE group strongly agreed that it will be vital for students to sign binding confidentiality agreements prior to their engagement to a project that involves some trade secrets. Although BTech: IT students agreed to the signing of confidentiality agreements but they were not having too many opinions on how to carry it.

The results of the questionnaires and that of informal discussions, as stipulated in figure 5 and briefly explained, confirmed the definition of trade secrets and its protection as it is mentioned by Smith (2010).

Generally, students understand the process of patenting the invention and as well that they can name their patents.

CONCLUSION

Understanding of patenting among computing student is encouraging, strong and needs to be explored. Patent studies focus their attention on patent creation and exploitation by academics instead of students. Almost all studies of academic patent do not take into account student perspective in understanding patenting or the patent process. There is a need for more research in student perspective and active role as actors in academic patenting.

FUTURE STUDIES

It was observed through this study that most female students seems to have started their bachelor's degree between the ages of 26 to 36; and from 37 years upwards they do not enrol for postgraduate degrees. It could be of great importance to understand female students' contributions in entrepreneurial and innovation activities or their trend of patenting both during their active academic years and non-active years.

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