

From conceptualisation to commercialisation: The Gradnet story

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Background: A very small percentage of all the research generated by universities is commercialised. The article is a case study of the transformation from action research to a spin-off company. It looks at the practical implications of such a transformation.

Objectives: The aim of this article is to provide a holistic view of what the process entailed to leap from academic research to the commercialisation of the research into a company as was the case for Gradnet.

Method: A case-study approach was used to document the conceptualisation and development of the research-based, spin-off company, Gradnet. This includes the background of the original research that formed the basis of the innovation process.

Results: It was found that the commercialisation process of academic research is not necessarily a natural process for the researcher in the absence of an appropriate supporting infrastructure.

Conclusion: All academic disciplines have the potential for establishing commercially viable research projects. This potential should be actively explored and pursued by the institution.

Introduction

During the post-apartheid era, the higher education landscape in South Africa has been changing rapidly and drastically. The merger of the Rand Afrikaans University (RAU) and the Technikon Witwatersrand (TWR) was a trying and challenging event. Preparation for the merger started with the announcement of the merger in June 2002 (Department of Education 2002), but practical challenges began to be addressed in earnestness in early 2004 as the date for the merger was set for January 2005. One of the challenges of this merger was the communication with and information dissemination to graduates (also known as alumni) from both institutions.

Many educational institutions strive to forge strong and loyal bonds with their alumni for purposes of fundraising, community engagement, networking opportunities and career advancement (Barnard, Rensleigh & Niemann 2005). This relationship building often takes years to reap mutually beneficial rewards for all participating parties and provide a 'return on relationship' (Gummeson 2004) for all the stakeholders who invested in it. A merger could prove fatal to the established loyalty bonds which were formed over many years of relationship building by the merging institutions as alumni may feel threatened and alienated by the loss of institutional identity and the consequent loss of their own educational identity. In the case under consideration, a lack of timeous and efficient communication to these alumni was a further instigator of the perceived threat as information dissemination through the grapevine filled the communication vacuum that was created by the uncertainty of the merging institutions. A very real need arose to create and maintain cost and time-efficient communication channels and content to these external affinity groups that could convey to them the continued institutional integrity and new brand identity of the merged institution. The purpose of such a move would have been to establish a new loyalty to the new brand by means of continued and sustainable involvement between alumni and institution (to be called the University of Johannesburg [UJ]).

It was also necessary to present to the alumni of both merging institutions benefits of and incentives for involvement as the new brand would have no impact in terms of loyalty and allegiance from their point of view. Generation X alumni has an increasing attitude of 'what's in it for me' with regard to institutional involvement, and higher education institutions have to find innovative and novel ways of proving the value of involvement to the new generation alumni (Yrle, Hartman & Payne 2005). It was also accepted that alumni would be hesitant to donate funds to a new institution to which they felt no affinity. Therefore a new approach was needed to engage them in a meaningful and sustainable way.

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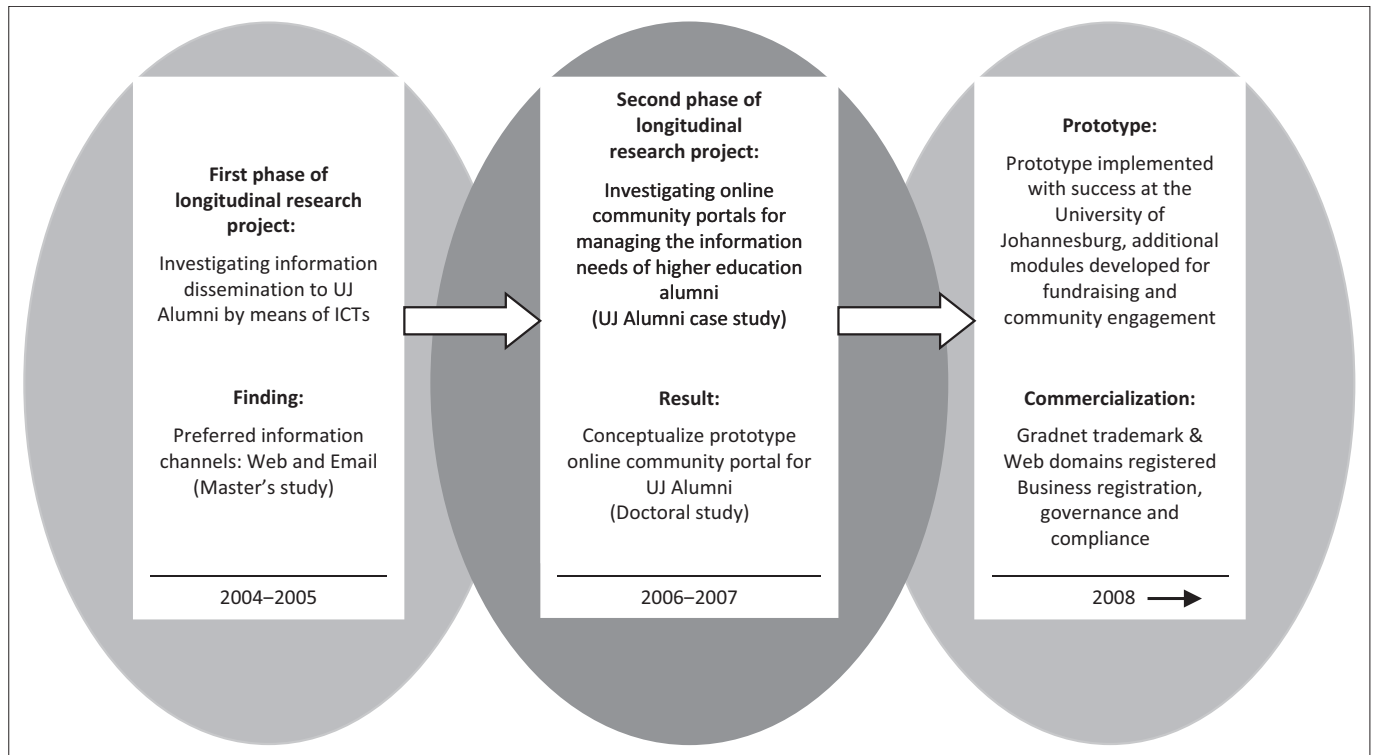


FIGURE 1: Phases of the longitudinal research project.

This article is a case study of the conceptualisation and development of a research-based, spin-off company, Gradnet, which entails the development of an academic research project into a commercialised entity (Barnard & Rensleigh 2013). The article will focus on two phases of a longitudinal study as well as on the prototype and commercialisation process (see Figure 1).

The research that shaped the innovation

Innovation usually arises as a result of a felt need to improve the status quo and identify more opportunities for resource generation (Barnard & Van der Merwe 2014). During the pre-merger years of the University of Johannesburg, the need arose to create a different and improved vehicle for communication and interaction between the then Rand Afrikaans University and its alumni stakeholder group. Electronic communication such as emails and the World Wide Web was still a novelty for the majority of the public in South Africa, and in addition to that, the digital divide was an element to be reckoned with. The communication systems used by the higher education institutions during that time period was limited mostly to postal services. These services had obvious disadvantages: The mail was slow to reach its destination and was often returned to sender due to the outdated postal address information of the university databases. The cost (with regard to financial and human resources) of printing and mailing was disproportionately high in comparison to the benefit gained by this form of communication.

At the time, the creator of Gradnet was employed as the Head of Alumni Relations at one of the pre-merger institutions. The

limited number of staff members in this office, the annually increasing number of graduates from the institution that needed to be added and managed on the alumni database, as well as a limited budget to engage with alumni were catalysts in the innovation process that commenced in 2003. The employee wanted to conduct research into the most effective ways of engaging with alumni that would save money, time and resources for the institution. However, a core objective was to convince alumni to be more supportive of the activities of the institution, especially since the institution was facing a difficult and much-contested merger. Action needed to be taken if the sense of alienation within the alumni stakeholder groups from both pre-merger institutions were to be transcended. The employee decided to enrol for a Master's degree in Information Science at the institution to conduct formalised research for the purposes as set out above.

According to the Workers' Compensation Board (n.d.), research is an attempt by careful enquiry, experimentation, study, observation, analysis and recording to:

- discover new facts, knowledge and information
- develop new interpretations of facts, knowledge or information
- discover new means of applying existing knowledge.

Rowley (2004) lists the essential criteria for good research. It has to:

- add to existing knowledge
- have a clear purpose or research question
- be objective and reliable

- address the issues of access (to people, organisations, data, etc.) politics (internal) and ethical conduct (with regard to privacy, confidentiality and transparency).

The rapid development of information and communication technology (ICT) is a factor that needs to be borne in mind in terms of research time and time to application. An innovative and active research model is necessary to accommodate this ever-changing, fast-evolving environment (Wieringa & Morali 2012) in a holistic manner (Flood 2010). Action research is such a research paradigm, comprising a powerful combination of research and action that proceed parallel to each other as Rowley (2004) argues:

... action research depends upon a collaborative problem-solving relationship between the researcher and the client with the aim of both solving a problem, and generating new knowledge. An action researcher working inside an organisation has two roles: that of employee and that of researcher. (p. 209)

Feurer and Chaharbaghi (1995:4) and Flood (2010) state that, when adopting the action research approach, the researcher has a number of objectives with regard to the understanding and improvement of current practices, the enhancement of the problem-solving capacities of the practitioners with whom the researcher collaborates and the advancement of knowledge about the practice itself. These objectives imply that the outcomes of the research are highly organisation-specific, which is an appropriate approach for research-strategy formulation and implementation in dynamic environments (Feurer & Chaharbaghi 1995) such as the founding of UJ. The action research cycle is, therefore, important in order to determine the outcomes, that is, whether the original diagnosis was correct and whether or not the appropriate action was taken.

First phase of the longitudinal study

Due to the practical nature of the research topic, it was decided to follow an applied action research approach by which a useful, real-world solution to a problem is devised. The implementation of the research results into something workable was the main aim of this type of approach and falls under Pasteur's quadrant of use-inspired research (Stokes 1997). Quantitative empirical research is the underpinning of this approach and can be compared to market research (including a feasibility study) in the context of a commercialisation process. Barnard *et al.* (2005) endorse the principle that market research, and matching value offerings to clients' needs, form the basis of a solid ideas-to-market and profitable enterprise. In addition, applied research focuses on an experimental investigation which makes use of existing knowledge for new applications or for improving upon existing applications in a significant way. It is directed at meeting specific needs by gaining comprehensive knowledge and understanding of the application, allowing for the solving of imminent problems (Stokes 1997:3). For this purpose, applied research on its own can be too 'slow' to accommodate the dynamic, ever-changing and fast-evolving Web environment. Consequently, an innovative and active

research model is necessary such as a combination of applied and action research. Such a research approach can form the foundation for an innovation process as it seeks to determine or measure the gap between the status quo and the ideal circumstances for realising advancement objectives in a timely manner (Barnard & Rensleigh 2013).

The first phase of the longitudinal study took 11 months to complete (Barnard 2004). This phase of the research project aimed to determine whether the alumni stakeholder group wanted to have contact with the institution, and if so, what the preferred channels and frequency of information dissemination would be. This study investigated the different information and communication channels available to reach the alumni target audience and determined which ones would be best suited to fill both the management needs of the institution and the benefits needs of the alumni. By means of self-selecting, purposeful and convenient sampling, a broad feedback scope was created that provided a clear indication of the needs and wants of the target audience. To ensure equal representation of the different alumni affinity groups, stratified sampling was used to sample the target-group population, namely the alumni of the University of Johannesburg, into homogenous groups. A sample of 600 alumni was randomly selected from the alumni databases of the RAU and the TWR according to the specified strata, namely the institution where they have graduated, gender and age. In addition, the different information-communication technologies available to disseminate information to the target audience were investigated and compared. The empirical study was done by compiling a questionnaire about the specific needs of alumni regarding the reception of information. These questions were designed in accordance with the literature study that was done within the theoretical context of the research. The questionnaire consisted of three relevant sections, namely biographical information, information and communication media and technology, and relationship building. An integrated, multi-disciplinary approach was necessary to create a holistic picture of the multifaceted profiles of the research subjects. Only close-ended questions were included in the questionnaire with scaled options from which participants could select the most appropriate alternative. A telephonic survey was done over 22 days to gather the empirical data. The decision to gather the data via telephonic interviews was made because of the quick response times associated with this method as well as the thorough manner in which the questionnaire could be completed. Of the total number of the sample population approached, 99.7% were willing to participate. Only two (0.3%) of the respondents were not willing to participate, either because of time constraints or because of a lack of interest.

Second phase of the longitudinal study

When it was established by Barnard (2004) that the online community portals would be the most effective information and communication technology to engage the alumni target audience, the second phase of the longitudinal study was

formalised in the form of a doctoral thesis. This phase aimed to determine the extent to which Web-portal technology and online communities could be successfully utilised by the alumni offices of higher education institutions in South Africa, using the University of Johannesburg as a case study. Furthermore, the phase aimed to create information sharing with and amongst its alumni affinity groups in order to build and maintain valuable relationships, networks and partnerships with them (Barnard 2007). Again, very specific sub-questions were formulated that had practical significance for an application strategy.

Both quantitative and qualitative approaches were taken with the second phase of the research project. As part of the quantitative study, an empirical survey was conducted amongst the 'new' (post-merger) alumni of the University of Johannesburg to determine their information needs with regard an online community portal and the content required for such a community Web model. A total number of 10 380 questionnaires was distributed over 17 days to graduates of the University of Johannesburg at the graduation ceremonies, thereby making it a self-selecting, purposeful and convenient sample. The questionnaire consisted of four sections, namely biographical information, online activities, alumni information services and alumni community needs. The final sample group, namely those who thoroughly completed the questionnaire, came to a total number of 1139 participants.

In order to establish what the impact of this research project could be on the wider alumni audiences of South African higher education institutions, qualitative research was conducted as a second component of the empirical research. This consisted of a discussion forum that was hosted by the UJ Alumni Relations Office to which all the management representatives for Alumni Relations and Fundraising of all the state-subsidised tertiary institutions in South Africa were invited. The objective of these discussions was primarily to test their opinions on the use of Web technology (such as online community portals) for meeting the needs of their alumni target audience. Of the 17 institutions that were invited, the total number of participants for this empirical phase came to 14 institutions, with 35 representatives attending. The need for knowledge sharing was determined when the representatives called for a consortium to be established as a result of the discussions.

Development of a prototype

The research findings provided an indication of the business processes that should be in place to enable the UJ Alumni Relations Department to have a successful information management strategy for optimal relationship management of its alumni stakeholder group. The results of the survey, combined with the results from the discussion forum, were used as the blueprint for the design of a fully functional prototype for an online community portal relevant to higher education alumni. The theoretical framework was set to determine the make-up, context, need and value of an online community portal for higher education alumni. In addition,

a gap analysis outlined the current (at the time) state of involvement and information requirements of the alumni stakeholders and the institution versus the 'to be' state that needs to be developed to meet those requirements and manage the information flow amongst alumni stakeholders more effectively. The functionality of the prototype had the potential of promoting not only business-to-business (B2B) and business-to-consumer (B2C) interaction but also consumer-to-consumer (C2C) interaction. It also had the potential of exploiting the possibility of human-resource placements through career services, amongst other income-generating services. The aim at this stage was not to commercialise the research but to share knowledge and possibly transfer technology to other institutions in South Africa who were faced with similar challenges.

As with managing any project, planning, organising, implementing, controlling and evaluating are critical to the overall success of the execution. An overall objective is necessary to guide the development of the project from launch to end. Van Brakel (2003) outlines a portal-development strategy in eight steps, which were used as guideline in the development of a portal strategy for the UJ alumni's online community portal. The development of the prototype of the alumni's online community portal was funded by the UJ Alumni Association and formed part of the second phase of the longitudinal study. It was built using a Microsoft platform, namely ASP.Net 2.0 as the Web application platform, which was a secure and stable platform that allowed for interactive functionality. Microsoft SQL server 2000 was the database platform. This prototype was a fully functional core-system that was implemented at the University of Johannesburg's Alumni Office. The doctoral thesis was published by Barnard (2007), and it includes screen shots of the completed prototype. The prototype was implemented with success at the University of Johannesburg, and additional modules for fundraising and community engagement were added for use in these sectors.

The commercialisation process

The demand from the tertiary institutions that participated in the qualitative research to obtain a solution for their institutions led to the establishment of a spin-off company to make the technology available on a bigger scale (Barnard & Rensleigh 2008). From a business point of view, this segment of the research was, correspondingly, a needs analysis of the potential clients of the end product as they would be able to utilise the solution to their own advantage and to that of their alumni (clients).

At this point the intention to commercialise the product started to emerge. A research-based spin-off (Conceicao, Fontes & Calapez 2012) is a company that is established by a public research institution, has an equity investment from the public sector or university or has the university or employee of the public sector as the (co-)founders (Barnard 2011). With government subsidies decreasing and students struggling to pay fees, more and more higher education institutions realise

the value of applying their research output in generating (third-stream) income for the institution. Conceicao *et al.* (2012) emphasise that the process of transforming research into spin-offs can provide an avenue for generating significant income for institutions. Commercialisation is the process of introducing a new product or production method to the market (Lam 2011). After the new product or production method has been developed, it will be officially launched into the market by means of a sales and marketing strategy (Barnard 2011).

Technology transfer transpires after the commercialisation process (Rasmussen, Mosey & Wright 2014). According to Souder, Nashar and Padmanathan (1990) and Ramanathan (1994), this is the process of moving technology from one entity to another. The transfer of the technology is seen to be successful if the receiving party – or transferee – can use the technology effectively and eventually integrate it into its own core activities (Ramanathan 1994). Bozeman (2000) and Rasmussen *et al.* (2014) point out that moving this technology can include know-how, technical knowledge or physical assets. The movement of technology from laboratory to industry and from one application to another domain can also be seen as technology transfer (Phillips 2002). Innovation is fundamental to successful commercialisation and technology transfer as it is the catalyst to growth and the element that provides a competitive advantage to enterprises. Universities, which are hubs for research and development, are receiving more consideration as producers of innovation (Rasmussen *et al.* 2014).

The Gradnet trademark was registered, and the acquisition process for the relevant web domains was underway. The services of a patent attorney were acquired to execute the legal documentation and processes with regard to the trademark and copyright. In addition, a fiduciary company was appointed to perform the necessary business registration, governance and compliance procedures.

Value proposition of Gradnet

Gradnet showed potential for generating third-stream revenue (meaning income sources from any other means than from student fees and government subsidies) from partnerships and product offerings. This was possible due to the dual nature of the system: Primarily it could be used as a database management, administrative and communication tool by the institution, but equally important, it could be used as an interactive communication platform for the alumni affinity groups and individuals who wanted to network with each other. The portal could be brand customised according to any participating institution's specifications, providing institutions with the freedom and opportunity to enhance and advance their own institutional brand via the portal offering. The value-added modules that were offered via the portal would be designed and developed on a continuous basis to address the pertinent needs and challenges of the business and educational sectors by offering relevant and sustainable solutions, services, products and functionality.

The public would gain access to an updated feed of participating institutional news, events, research output and partnership opportunities via the main web domain, www.gradnet.com, whilst the academic application would provide e-learning opportunities, journal articles, research and fundraising databases to institutional stakeholders. The administrative application made provision for the secure capturing, storing and retrieving of data, statistical reports, content management and stakeholder segmentation for improved relationship marketing. The commercial application included a CV compiler and e-recruitment, qualification authentication and online shops, although this application was at first not a primary focus of the portal.

The mission of Gradnet was to create an optimal online collaborative environment for higher education institutions and their stakeholders that would: (1) promote networking, brand loyalty and lifelong learning (in support of an organisation's intellectual capital, business intelligence and knowledge sharing) and (2) create unique value propositions and mutually beneficial partnerships (Barnard 2011). To achieve this mission, it was important to provide the technology at no cost to participating institutions as this would provide equal opportunities to all institutions to capitalise on the revenue model. This split-revenue model consisted of an instant click-through split in profit whenever transactions occurred via the system. A three-way split in profit was proposed between the participating institution, the service provider (whose core business was the provision of products and services) and Gradnet. It was a medium to long-term profit plan for Gradnet, but it would be well worth it according to income projections. This would also enable the participating institutions to benefit from the centrally developed functionalities that would be deployed to all users as and when they were made available. Gradnet would take on the responsibility for continued research and development whilst institutions would provide the users to the system (Barnard 2011).

To enable a stable, scalable and cost-effective structure for the Gradnet portal going forward, the founder started to investigate different options before taking the leap to production. Projections of the marketing and business plan indicated that the amount of active users on the system could reach significant numbers. These growth projections secured seed funding for the first five years. The vastness of the projected growth potential would require a very reliable and stable platform base. Due to the high cost of using and developing on a Microsoft platform, meetings were set up with the Google team in South Africa.

At the time, Google was establishing itself as a strong global competitor for Microsoft with its various Google Apps offerings. The founder was invited to the Google London office for detailed discussions about the possibilities of migrating Gradnet onto the Google platform. The availability of the Google Apps for Education was an excellent match that complimented the Gradnet mission, and the contracts

were finalised with Google for the secure and scalable storage of all data on the Google servers (i.e. The Cloud) whilst embedding the Google Education Applications within the Gradnet framework (Barnard 2011). Google guaranteed a much more flexible and cost-effective offering than did Microsoft as well as a 99% uptime of their servers. It was a leap of faith from Gradnet's side as operating businesses from the Cloud were still considered very novel and bold at the time, but it was worth the risk as it enabled Gradnet to provide the portal at no charge to participating institutions in support of its mission.

The benefits of Gradnet for institutions included the following:

- collaborative knowledge sharing
- the creation and execution of partnership opportunities
- the recruitment and headhunting of graduates for company vacancies
- supporting the institutional value-chain concept
- managing customer relationships (CRM) more effectively through improved information management in tertiary institutions.

A major benefit of Gradnet was that, the more institutions participated in the network, the bigger their potential became to generate third-stream revenue as a result of the shared-revenue model, which was made possible by embedding the PayPal system into the portal (Barnard 2011).

The PayPal e-commerce engine enabled the proposed split in profit sharing by providing an instant transaction-split functionality that made every transaction transparent to all partners. PayPal was at the core of the payment system with the custom-designed Gradnet billing and invoicing system as well as the custom-built, shop-front functionalities running alongside it. The objective was to provide a secure online-transaction space with minimal risk to all participants. This was also communicated frequently to the institutions via the marketing presentations. End users worldwide are familiar with the PayPal brand and perceive it as a safe place to store their personal financial information. First National Bank is the institution that brought PayPal to South Africa. Companies would be able to sell discounted merchandise to the Gradnet end users via the Gradnet Online Mall with a secure and well-known e-commerce engine. The principles underlining the commercialisation of Gradnet were to provide IT infrastructure to institutions as a tool to motivate more engagement from stakeholders. Therefore, the more active users that joined, the more valuable Gradnet would become, irrespective of actual annual turnover from sales. Financial value would therefore be derived from participation and not from selling off IT infrastructure (Barnard 2011).

In terms of human resources, a support team needed to be appointed to assist with the implementation, training and help desk of Gradnet. Because of the web-based nature of the product and enterprise, implementation did not require on-site implementation, but training institutional

users to navigate the system optimally was required as well as a fulltime help desk to answer calls for assistance from institutional users. A training manual, which was used as a central guideline document that would assist with the training of users, was therefore written. This was also published on the Help-Desk website for easy reference. Although the system was very user friendly, the manual and website provided step-by-step schedules on how to apply the different functionalities of the system and provided an overview of the navigation structure of the functionalities.

The handling of end users' biographical data was an important aspect in terms of security and access. During marketing presentations, it was emphasised that all data would be handled to comply with the national Information Security Act. Compliance to this guarantee was core to the ethical business approach of Gradnet.

The actual launch of the Gradnet brand and beta website and services in 2010 was a showcase of all the mentioned aspects to the public and interested parties. A regional representative of Google was the guest speaker at the event, which was held at a five-star hotel in Sandton, South Africa. This was done to create clout and credibility for the newly established brand. The speaker addressed the audience as an authority on Cloud computing and referenced Gradnet as a prime example of an innovative company who was pioneering and embracing new technology. After the conclusion of the formalities at the event, guests could move amongst the mounted plasma screens in the conference venue and 'test-drive' the functionalities that formed part of the system. It must be emphasised that the marketing, branding and positioning of an end-product that is being taken to the market is central to a successful commercialisation process.

Following her exit strategy from Gradnet in 2012 with the selling of the Gradnet Holdings companies, the founder can look back at valuable lessons learnt and priceless experience assimilated that form the basis for generating and sharing knowledge in future.

Lessons learnt

Making the transition from researcher to managing director of a company is a leap by any measure. On paper, a research project can look simple and fairly straightforward, but aspects such as the business plan, legal framework, funding, technology transfer, operations, finances, marketing and brand management are challenges that need to be dealt with swiftly and timeously (Barnard 2011). Good timing is a critical factor in taking a concept from idea to market. If a research project shows potential to be commercialised and both the institution and the researcher are serious about pursuing this course of action, researchers need to know that no research findings are to be published prior to registering the patents and trademarks of that innovation. The moment that research findings or methodology is published, they become public property. If anyone reads the published work and files a patent based on that information, the researcher

will not be able to defend the innovation and secure the patent afterwards. Careful planning is therefore required when embarking on a commercialisation trajectory for a research project. Similarly, when research collaboration takes place across institutions, it is important to clearly document the contributions in detail as the project unfolds. Meticulous logging and documentation of collaboration might be a difficult and tedious task, but not doing so can eventually lead to legal action that has the potential of destroying the momentum and potential of commercialisation.

When a researcher is publishing results under the name of, or in co-operation with, an educational institution, it is important to be aware of the intellectual property policy of that institution. This policy should provide guidelines as to what the initial legal framework would be for setting up the company and shareholding structures. However, it is an acceptable and advisable practice that form should follow function, and therefore, structuring the business side of things should only commence once there is a clear business plan on the table. The business plan should be as comprehensive as possible, keeping in mind that it is a flexible document that should be regarded as a frame of reference, a tactical and strategic guide, for all business endeavours on the short, medium and long-term. The business plan is the central component to secure the funding for the commercialisation process and to document the shared vision comprising the objectives and projections of the enterprise.

Sufficient funding is arguably the most crucial executor of the commercialisation process. Due to a lack of funding, start-up companies can fail even before they have been properly launched. Innovators and entrepreneurs can have the best of ideas, but without funding, their ideas are dead in the water. When a researcher at a university comes up with a commercially viable project or idea, the institutional commercialisation office usually assists with the sourcing of funds. Agreements should be drafted to determine and formalise the exchange. Usually inventors dilute their initial shareholding in exchange for funding, and this becomes an ongoing process for every fundraising round that the business requires in future. If the institution is not interested in pursuing the commercialisation avenue for a specific research project, the Intellectual Property and Commercialisation Policy of the institution should make provision for that by assigning to the researcher full ownership of intellectual property and the freedom to commercialise. Again, documenting these agreements and sessions are crucial to prevent any future legal disputes. These session agreements with regard to the intellectual property should be regarded as the foundations of the commercialisation process. Acquiring the assistance of experienced intellectual property attorneys is highly recommended.

Company structures should be set up in accordance with the legal requirements of the specific country's regulations and the funding agreements. Determining and establishing the company structure is another important element to be

finalised before business transactions can commence. A board of directors, who will govern the company going forward, needs to be appointed or elected. If the founder or the inventor of the company is not trained or experienced in business management, they need to do a crash course in taking on this responsibility themselves. Alternatively, employ someone with business management experience. Occasionally the funders of the business will insist on employing their own CEO or Managing Director to take control of the business aspects of the innovation (Barnard 2011). This will leave room for the founder to continue with research and development activities in the continuous improvement of the innovation. Often the founder will be involved with the marketing strategy of the innovation in order to provide more credibility and gravitas when addressing the target audience and demonstrating functionalities.

One of the most expensive exercises for an Internet company is the registration of its brand trademarks and patents internationally. Different countries have different regulations, and this could be a very complex route to follow. An easier and more cost-effective route for brand management would be to register all the web domains (especially the primary ones such as .com, .net, .info, .org) of the Internet company's brand as soon as possible as this gives a professional and international 'ownership' to the brand. However, this will not prohibit other companies from registering the brand trademark in foreign countries. Owning all the web domains for that brand can make it very difficult for other companies to do business online using that brand name. Nevertheless, if an Internet company wants to open offices or shops in different foreign countries, it would have to go the route of registering the brand trademark and patents in those specific jurisdictions.

When looking at the complex legal and regulatory framework that accompanied the commercialisation process of Gradnet, it is recommended that researchers and universities appoint a fiduciary company to handle these terms of reference. Many universities in South Africa do not have the necessary skills and hands-on approach that is needed in the business environment. The red tape usually associated with the university milieu is more than often not conducive to quick and efficient decision-making that is an especially critical requirement in a start-up business environment. Running a business successfully requires a fast-paced assertiveness that will ensure a competitive edge for the company.

Conclusion

One of the greatest discoveries made during the innovation process of Gradnet was the interdisciplinary nature of action research. In a tumultuous modern world, it is impossible to ignore the many grey areas that are constantly identified as 'falling through the cracks' of the academic and managerial silos that many universities and companies have constructed. It is especially those overlapping areas that can provide the key to unlocking new knowledge and innovative solutions to universal challenges. Multi-layered partnerships and strategic

collaboration play a significant role in the innovations of the present and the future.

Another observation is the lack of an integrated and streamlined approach at many South African universities with regard to their commercialisation activities. The University of Stellenbosch serves as a prime example of an institution that is getting it right. Other institutions can look at this institution for mentorship and guidance for their own commercialisation endeavours. There should be stronger collaboration between public universities and government institutions such as TIA (Technological Innovation Agency) and the IDC (Industrial Development Corporation) in order to identify viable research projects and secure seed funding for these innovations.

In conclusion, it must be noted that all academic disciplines have the potential for establishing commercially viable research projects. It is a common misperception that only the 'hard-core' sciences have the potential of commercialisation and technology transfer. This is not the case as the global landscape poses many challenges that need resolving. If an applied action research approach is followed in any academic discipline, it could render practical solutions to address those challenges while at the same time provide an enterprise opportunity to the innovators. Looking for these opportunities is where entrepreneurship starts.

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Competing interests

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this article.

Authors' contributions

Z.B. (University of Johannesburg) conducted the research as part of a PhD postgraduate study under the supervision of C.R. (University of Johannesburg).

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