

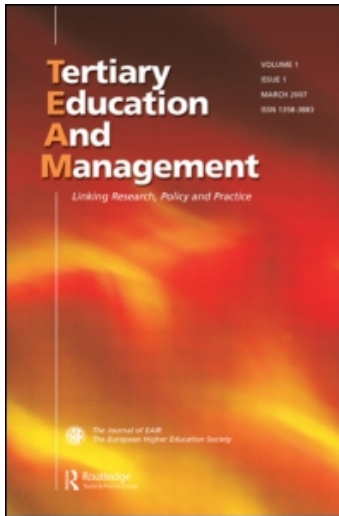
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Organizing the University–Industry Relationship: A case study of research policy and curriculum restructuring at the North-West University in South Africa

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A major requirement for transformation contained in the new education policy in South Africa is that the graduate outputs of the higher education system should match the needs of a modernizing economy. This paper addresses the organizational aspect of university–industry relationships that is an element of the transformation. In empirical terms, it reflects upon the policy of the North-West University in South Africa, as embodied by means of the introduction of the Business Mathematics and Informatics (BMI) curriculum and research. Empirical results indicate that the number of students who opted for mathematics had increased dramatically. The majority of graduates delivered by the BMI programme are employed in the financial sector, both nationally and internationally. This paper indicates that the organization of university–industry relationships enforces a difficult institutional balancing act that attempts, on the one hand, to meet the benchmark of international scientific indicators, and on the other hand, “fitness for purpose” in the local context.

Introduction

On 3 February 1997, the Vice-Chancellor of the Potchefstroom University for Christian Higher Education (PU) in South Africa received a letter from the Board of Directors of Amalgamated Banks of South Africa (ABSA) in which a five-year agreement was confirmed.¹ In the contract, ABSA committed itself to cooperating

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with the PU in a new programme in the field of Business Mathematics and Informatics (BMI):

In reference to the joint conversations between PU and ABSA with respect to the alliance in order to start up a course on Business Mathematics and Informatics at the University and the use of it by us, we gladly want to confirm the approval by the ABSA-Committee to financially cover the estimated costs of the course. We will evaluate the collaboration after 5 years from now. (Letter from ABSA Bank to the rector of the PU, 3 February 1997; Archives of NWU)

This agreement was the outcome of two years of intensive negotiations between the PU and ABSA. The alliance that was envisaged is but one example of several ways in which interactions might have taken place in the field of BMI between universities and the private sector. The way of collaboration developed between the PU and ABSA also included close cooperation with experts of the Vrije Universiteit Amsterdam (VUA) in The Netherlands. It implied novel university–industry cooperation within a new domain of expertise, as part of an entrepreneurial approach characteristic of the historically Afrikaans-language universities in South Africa since the early 1990s (Cloete, 2002), and explicitly as part of the vision and mission of the PU since that time (Reinecke, 1998).

This paper envisages reflecting on the main driving forces for the BMI innovation and its outcomes, covering a period of 10 years since 1997. The innovation appeared to be an important change in the curriculum and research of the Faculty of Natural Sciences at PU (Gibbons & Bjarnason, 2005a). In this paper we will pay attention to the interrelationship between the university–industrial collaboration and organizational change in South African universities. It is an important contribution to the field, because in spite of a number of significant institutional and organizational changes, detailed empirical knowledge about the local higher education organization is lacking (Ensor, 2004). As a case study, the innovation around BMI can provide us with a perspective on how the strategy of local actors infiltrated the very basic levels of research and curriculum change at the PU.

The transformation of the PU as described above must be seen in the broader context of transformations within the (global) knowledge society. Indeed, it is the whole process of knowledge creation that affected not only BMI at PU, but also the policy and curricula of institutes of higher education institutes worldwide. Under global pressure, the task environment of universities changed dramatically in the last 10 to 20 years (Vaira, 2004). University–industry coalitions and partnerships are indicators of this process. Etzkowitz and Leydesdorff, who introduced the metaphor “triple helix” to understand university–industry–government relations, argue (e.g. in 2000) that the categorization of this relationship in terms of “national systems of innovation” (Lundvall, 1992; Nelson, 1993), “Mode 2” thinking (Clark, 1998; Gibbons et al., 1994), “research systems in transition” (Cozzens, Healy, Rip, & Ziman, 1990) and “post modern research system” (Rip & van der Meulen, 1996) are indicative of the reorganization of knowledge creation and diffusion in the economy and society. These global trends ask for a policy oriented towards university–industry relations. At the same time, however, the policy-makers’ task is to maintain local,

regional and national attractiveness for students and research staff. How a higher education organization such as the South African PU reacts to such international/global trends depends on local demands and cultural attributes from the past. In this paper, the formation of a Centre for BMI at the PU serves as a further case study to illustrate why and how the university at a local level reacts and anticipates upon the national education and research policy in the context of the global pressures.

In the sections below, we will pay attention to the—sometimes conflicting—motives and initiatives of actors involved in the development, implementation and execution of BMI. We are primarily concerned with the question if (and if yes, in the how) the organization's structural and cultural changes (i.e. BMI as an innovation) at the PU have led to a more heterogeneous research and curriculum programme. Moreover, we will reflect critically upon the outcomes 10 years after BMI was introduced at the PU by discussing some benefits and pitfalls of the entrepreneurial approach adopted by the University. In this respect, we will also pay attention to the question if the approach has led to a more diverse student population at the campus of the former PU. However, we start with a section in which we put BMI into a theoretical, historical and political context.

Travelling and Institutionalization of Ideas in South African Higher Education Institutes

An important driving force for educational renewal in South Africa was the outcome of the momentous changes between 1990 and 1994, with the demolition of apartheid and the establishment of first full participative democracy in South Africa. The newly elected South African government was confronted with the need to devise an extensive range of new programmes for the reconstruction and development of South Africa. The universities were to be key instruments in a massive agenda of constitutional and social transformation. Among other things, it stressed the importance of innovation in the research function of higher education including: "... the emergence of new forms of *transdisciplinary* knowledge production; greater social accountability towards the taxpayer and the client/consumer regarding the cost-effectiveness; [and] the quality and relevance of teaching and research programmes" (Reddy, 1996, p. 7) [*italics ours*]. Three aspects of change are important to mention in this respect.

In the first place, a major transformational requirement was the 1997 Education White Paper (Bengu, 1997), which stated that the graduate outputs of the higher education system should match the needs of a modernizing economy. It implied the introduction in the near future of a new public funding framework for higher education, aimed to be equitable, performance-related and to promote excellence. Political rhetoric or not, the transformation of the South African higher education system that followed was not merely adding to researchers' and students' knowledge base, skills and potential, but it referred to ongoing change, and reflexivity. The government policy regarding academic and scientific restructuring and implementation is well recognized on the macro level, such as the contexts and paradigms within in which

the higher education system would operate and change (Marais, 2000; Moja & Hayward, 2000; Rip & Marais, 1998; Strydom & Fourie, 1999).

In the second place, the defining characteristics of the relevance of BMI are not singular concepts. The Government, for example, tended to define relevance in terms of their own interest and socio-political agendas. Others, such as commercial organizations, tended from the outset to have specific outcomes in mind for the contracts they commissioned. The PU became part of the newly formed North-West University (NWU) in 2004 as part of the compulsory mergers declared by the Minister of Education and that were aimed at changing the higher education landscape of South Africa inherited from the apartheid era (for a policy analysis of university mergers in South Africa, see Jansen, 2003; Schoole, 2005). Since the merger, the NWU has consisted of three campuses at the cities of Potchefstroom, Mafikeng and Vanderbijlpark in the area known as the Vaal Triangle, located respectively 200 and 100 km from the city of Potchefstroom. Although united within one institution, the physical size in terms of student numbers, stage of development and educational offerings of the components of the merged institution still differ extensively in favour of Potchefstroom. The Potchefstroom community—in times of apartheid a “white campus”—has been accused in the early phases of transformation not to invest (enough) in diversity and equity on its campus. Indeed, even after the merger, the Potchefstroom campus is still dominated by white students.

In the third and last place—and more theoretically speaking—most scholars have interpreted change in South Africa’s higher education system against the background of what has been called the new mode of knowledge production (Cross, 2004; Jansen, 2002, 2003; Kraak, 2000; Schoole, 2005; Waghid, 2002; Winberg, 2005). This idea became known as Mode 2; it presupposes inter- and transdisciplinary research and education, growing importance of university–industry relationships and context-driven, problem-focussed research and education (Gibbons, 1998; Gibbons et al., 1994; Nowotny, Scott, & Gibbons, 2001; especially in Winberg, 2005) to which we already referred to in the introduction of this paper. Mode 2 was not only used to reflect upon and analyse research systems, but also for reflections upon the reform of teaching curricula. As Ensor observes:

... advocates of Mode 2 would argue, there should be an equivalent *shift in the focus of undergraduate curricula, from disciplinary to interdisciplinarity*. In other words, because research (knowledge production) increasingly requires the engagement of specialists across a range of disciplines, it necessarily follows that the shaping of the undergraduate university curriculum (knowledge dissemination) should also become interdisciplinary. (2004, p. 347) [italics ours]

It is clear that within the pressing realities of the socio-political transformation of South Africa and its far-reaching consequences for higher education institutions, the ideas of Mode 2 have not only been used as a analytical framework by scholars, but, even more importantly, have distinctly affected the policy-makers at the institutional level of South African universities, although Mode 2 as a concept was also met by distinct criticism (see Godin, 1998; Pestre, 2003).

It is important to understand that, for us in this paper, Mode 2 serves not so much as an analytical heuristic, let alone a theoretical framework, for analysis. Instead, we see Mode 2 as an empirical phenomenon and/or working concept we have to deal with. Analytically speaking, we see the ideas of Mode 2 “travelling” around the world (Czarniawska & Joerges, 1996). The Mode 2 ideas and strategies are translated and implemented at a local level. The observation that ideas travel addresses the phenomenon that organizations tend to introduce the same transformations and changes at the same time. The travelling of ideas involves:

- Fashion ideas in relation to time and space
- Ideas that are locally translated into action
- Ideas that become enacted and institutionalized

In the first place, Mode 2 is, as we have shown in the introduction, a way to address the university–industry relationship that became into fashion in the 1990s not in the last place because it was adapted in UNESCO reports and policy documents. Institutes like the UNESCO served as a “vehicle” for Mode 2 as an idea. The idea of Mode 2 has been adopted in about the same period of time in many places all over the world. In the second place, the spread in time and space of Mode 2 was in the hand of people who interpreted and read it in different ways (Latour, 1986, cited in Czarniawska & Joerges, 1996). Mode 2, in other words, was translated by people who made sense of the idea (Weick, 1995). Finally, an idea becomes enacted when “... other people are persuaded to join in, decisions are formally made ...” (Czarniawska & Joerges, 1996, p. 44). What follows is a structuration of organizational fields (DiMaggio & Powell, 1983) a process that involves the institutionalization—or dominant patterns of organizing—of ideas. A structured organizational field “forces” or “encourages” organizations to become more alike under the pressure of coercive isomorphism (external pressures), mimetic isomorphism (imitation) and normative isomorphism (professionalization). This process of institutionalization involves a mixture of intentional and contingent factors that shape the organization. Mode 2 (and BMI for that matter) has led to a convergence of practices at universities in this respect, however, the institutional responses have differed because of local conditions—a process described by Green as glocalization (Green, 1999, cited in Tabulawa, 2007).

In this paper we are interested in what happens to the idea of Mode 2 when it travels, how it helped local policy-makers to transform a faculty and how it came into being when it was put into action. This implies that—for us—the more abstract and theoretical question how Mode 2 exactly leads (or does not lead) to more diverse and multi-disciplinary research and education is less relevant than the empirical question as to *how* and *why* Mode 2 served as an instrument of change at a specific university in South Africa.

The Case Study: Design and methods

During our empirical research, we followed the actors’ decisions to set up a new course in BMI in the field of financial risk management aimed at the banking sector. The

study, which we present in this paper, is the outcome of a qualitative research design: it is a case study (Berg, 2001; Patton, 1990). We have chosen, furthermore, to take a contextual approach, meaning that we place the events at BMI in their unique setting (Pettigrew, 1985). This approach does not come with a clear-cut set of methods. Instead, our research design takes the form of multiple sources of qualitative and some quantitative data.

The case study was done in two phases. It first dealt with a conceptual orientation in regard to BMI. This part of our research was achieved by on-site visits and interviews at two sites already competent in this field: the Faculty of Mathematical Sciences at the VUA and the Focus Area and Centre for BMI at the Potchefstroom campus of the NWU. It should be noted that BMI at the VUA differed from that at the NWU, having a broader focus and being part of a traditional academic department, rather than one mainly associated with a single organization type, like a commercial bank, and having a strong focus on risk in the financial sector. In interpreting the findings derived from visits to the two sites, it became evident that BMI forms a core component of qualitative and quantitative modelling of risk in the financial industry, with a strong emphasis on the national situation, but always with close relations to the context of international banking.

The second phase of our research consisted of an in-depth study of BMI at the NWU. This phase comprised an extensive analysis of existing documentation as well as interviews with knowledgeable actors who had been involved in the formative process. The interviews were open-ended in order to allow respondents to include elements that they considered important. In this way, it was possible to gain information on the diversity of meanings that individuals use when talking about the subject, to differentiate among them and even to identify the fragmentary meanings that exist across the organization of BMI (Yin, 1994).

The sample that was interviewed included senior academic planners, deans and professors, as well as students enrolled for the BMI curriculum. We interviewed in total 11 associate and full-professors of the Faculty of Natural Sciences at PU (the Potchefstroom campus of the NWU) including the two directors and the dean of the faculty. The views of the financial industry in South Africa, including the motives of ABSA in forming an alliance with the PU, were similarly assessed through document analysis. Furthermore, a series of interviews was held with members of ABSA bank in Johannesburg, including one with the Chairman at that time, who was also been a former CEO of ABSA, three general managers and 10 BMI graduates now working at ABSA and one other South African bank. We also held interviews in Amsterdam with four key actors who had established BMI at the VUA and who were partly involved in the development of BMI at the NWU. Moreover, we were doing a site-visit to the Eidgenössische Technische Hochschule Zürich (the University of Technology) in Zürich, Switzerland where we spoke to three professors working in the field of BMI. Although we do not explicitly refer to their experience with BMI, since that is outside the scope of this paper, the conversations we had with the professors at Zürich helped us to place BMI in the broader global context of higher education. In total we interviewed 32 people at different locations in South Africa, The Netherlands and Switzerland.

To gain an understanding of the broader context, additional written material was analysed. The documents reviewed were diverse and included, among others, “official” documents and policy papers produced by the South African Government—such as the 1997 Education White Paper—and documents written by local policy-makers for their own use, including memos, letters, (draft) notes and minutes of meetings. Even though most of the documents came from the organization itself, documents written about the organization were also reviewed, including newspaper articles and other media-related information. These provided an important input for the reconstruction of the decision-making process and for tracking the detailed changes in perceptions about the design of the curriculum restructuring as they emerged in the negotiation process.

Setting the Scene: Main strategic initiatives for BMI

In the 1990s, the traditional profile of Mathematics at the PU declined to an alarming level, as measured in the number of postgraduate students who had chosen to study Mathematics. Declining enrolments in mathematics reflected an international trend, which was to some extent slowed by an increase in applications from students interested in the mathematical modelling of complex phenomena. As such, the introduction of BMI did not relate only to an institutional-specific initiative at the PU, but also to a more general reassessment of the relevance of quantitative analysis in many fields of science and industry.

In an article in *The American Statistician* of August 1999, Gary McDonald, director of the Enterprise Systems Lab of the U.S. General Motors Research and Development Center, already pointed some time ago to the prominent role of mathematicians and statisticians in industrial and business environments. He further noted that as a result of the application of advanced Information and Communication Technology systems, data are being collected and stored in massive amounts for the use of design, engineering, banking and consumer research. According to McDonald, such key trends in, and their potential for, industry challenge the statistical profession to come up with interdisciplinary research and applications: “Perhaps”, he argued, “we should consider statistical training to be inherently *interdisciplinary* and *design curricula* that lead to joint majors emphasizing subject matter expertise with statisticians being a strong value-added component” (McDonald, 1999, p. 206) [italics ours].

In this regard, the establishment of a Centre for BMI in 1998 was an outcome of the strategic thinking at the PU—and indeed meant a cultural change (Bate, 2002). It was strongly guided by experts at the VUA, who had implemented a BMI course in the early 1990s. The basic idea of the VUA model was an interface between three different scientific disciplines: business economics (B), mathematics (M) and informatics (I), abbreviated as BMI. The view of BMI was formed through its interactions with the Dutch financial industry, more precisely with the Dutch Rabobank. BMI closely resembles fields elsewhere referred to as Financial Risk (Gallati, 2005), and its specific application to the financial industry as Financial Risk Management (Bessis, 2002; Jorion, 2004). As the PU and VUA had already signed an inter-university

cooperation agreement in 1997, it was relatively straightforward for the PU to draw upon the experience of VUA and attempt to build a relationship with the financial sector in South Africa along lines similar to those developed by VUA in The Netherlands.

In both cases, a primary motive for the introduction of the BMI curriculum was to attract new students. In the case of VUA, BMI was introduced in the hope of attracting students to a course of study in the (exact) sciences where, in line with international trends, student numbers were declining. At the PU the intention of attracting students was present too, but here it was also aimed at persuading students to study BMI as an attractive and rewarding new career option through the preparation of well-qualified graduates as specialists for employment in the banking sector in South Africa. The BMI programme at the PU was embedded within a centre that was committed to education and research, and which was linked to the traditional core functions of the University: education (undergraduate and postgraduate), research and service (Birnbaum, 1988). The initial model of the functional and structural characteristics associated with the centre is shown in Figure 1.

The Centre for BMI had to function in close association with Business Economics and Computer Science on the one hand, and Mathematics and Statistics on the other, situated in the Faculties of Economics and Natural Sciences, respectively. The Centre itself was based on the strategic alliance between the PU and ABSA, with the alliance partners funding the Centre on a fifty-fifty basis. Additional funding for research had to be generated through South African funding bodies, like the National Research Foundation and its THRIP programme, contractual agreements with other actors, like IT firms, and through consulting activities.

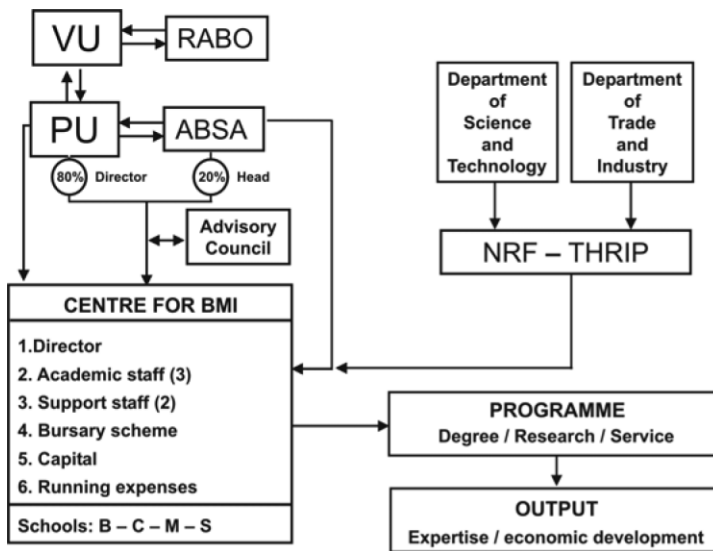


Figure 1. The model used for teaching and research in a Centre for BMI. Source. BMI/NWU

BMI in Action: The role of the NWU and ABSA

If we want to understand the organizational background of the Centre, we have to have a deeper understanding in the motives and roles of the main institutional actors in the establishment, implementation and execution of BMI: (1) the University, and (2) the ABSA Bank. The curriculum redesign appeared to be the outcome of a negotiation process between these actors.

The University: A strategic decision for an entrepreneurial orientation

The responses of universities to the new dispensation affecting higher education in South Africa were distinctly diverse. The PU's policy-makers chose "*an entrepreneurial orientation*" as a key phrase of its vision statement, formulated in 1994 (Reinecke, 1998). Clearly, the leadership has been inspired by the discourse of the entrepreneurial road to university transformation (Clark, 1998; Rip & van der Meulen, 1996). After the merger and formation of the NWU in 2004, a new vision statement and a comprehensive strategic plan were developed and implemented. It retained a reference to quality, societal responsiveness and the entrepreneurial approach in its strategic documents, expressed in terms of "*The NWU as a Mode 2 university*". Indeed, Mode 2 was a travelling idea; it was used as a source of inspiration and later on, during the implementation of BMI, as an instrument of change.

The vision of PU/NWU to become an entrepreneurially oriented university had a distinct effect on the traditional culture of "independent" research. The change in culture is also clearly reflected in the reports of the External Audit Committees (see CHEPS, 1998). The comments of the committees clearly point to a change in academic culture. How did this change affect one of the primary functions of a university: the educational empowerment of its students?

The impact of introducing BMI is clearly illustrated by an analysis of the career paths that are pursued by the graduates of the Centre. As the Centre was established as a joint venture between the University and ABSA, the latter, not surprisingly, became the leading employer of graduates from the Centre, many of whom were able to complete their studies with the assistance of an ABSA bursary. Interestingly, students who did the BMI course on an ABSA bursary and subsequently left the Bank, and who knew that they would have to repay the bursary as soon as they decided to join another company, found that their new employers were prepared to repay ABSA. All in all, the graduates of the Centre became employees in a wide range of other sectors as well, as shown in Figure 2. More recently, a small but increasing number of BMI graduates became employees of Barclays Bank UK, most likely due to the acquisition of a major share of ABSA by Barclays UK in 2005.

Two-thirds of the graduates chose careers in the banking sector: 38% of the total at ABSA, 23% at other South African banks, including the SA Reserve Bank, and 8% at international banks in London, namely Lloyds TSB, Deutsche Bank, Credit Suisse and Barclays Bank. Three South African universities appointed graduates of the Centre in academic positions, while others followed careers in the IT and financial

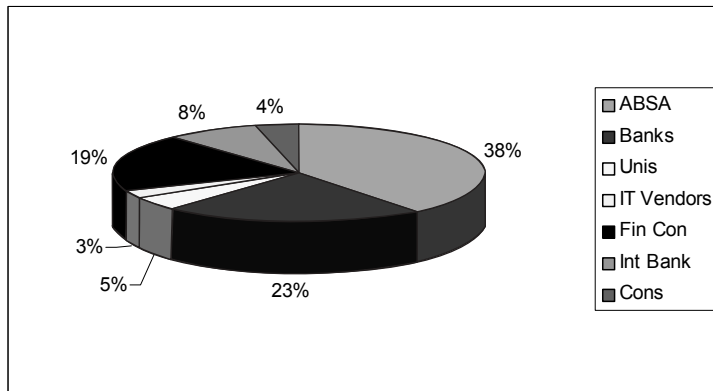


Figure 2. Distribution of alumni of the Centre for BMI as employees in various financial sectors: (1) ABSA Bank (38%); (2) Other South African banks (23%); (3) South African universities (5%); (4) IT vendors (3%); (5) Financial consulting firms (19%); (6) International banks in London (8%); and (7) Independent consultants (4%). *Source.* BMI/NWU

consultancy sectors. Four percent of the graduates became independent consultants. A few students continued with PhD studies and one of the graduates went to The Netherlands for further studies. As could be expected from the focus of the Centre on the financial sector, none of the graduates at the time of the empirical research became employees in other sectors, such as the chemical or pharmaceutical industry or hospitals in South Africa.

The student numbers per academic year, since the implementation of the BMI degrees at the University, are shown in Figure 3. Increased enrolment of new students for the degrees was immediately evident and has progressed virtually linearly since the implementation of the BMI curriculum. The growth in numbers was rather problematic, as each student was required to complete a research project that had to be supervised by one of the limited number of academics who participate in the BMI programme. The management of the Centre decided to increase the first-year admission requirements for programme. The change in policy was implemented in 2007, and the effect of this decision is clearly shown in Figure 3.

A positive aspect of the student profile is the high achievements of some of the entering students in their secondary education. Nonetheless, it still remains problematic that a low number of students from the black South African communities enrol for the degrees in BMI. It should be noted that the BMI programme was initiated only at the Potchefstroom campus of the University, while education in Mathematics is also offered at its other two campuses—the Vaal Triangle and Mafikeng. It is the current intention to offer BMI, constructed from numerous modules already extant in programmes at the Potchefstroom campus, as a new extended training roadmap to all three campuses of the merged NWU. There is a BMI programme at the Vaal Triangle campus that is related to that at Potchefstroom but is more limited in scope. At the time of writing, no specific programme incorporating BMI is offered at the Mafikeng campus.

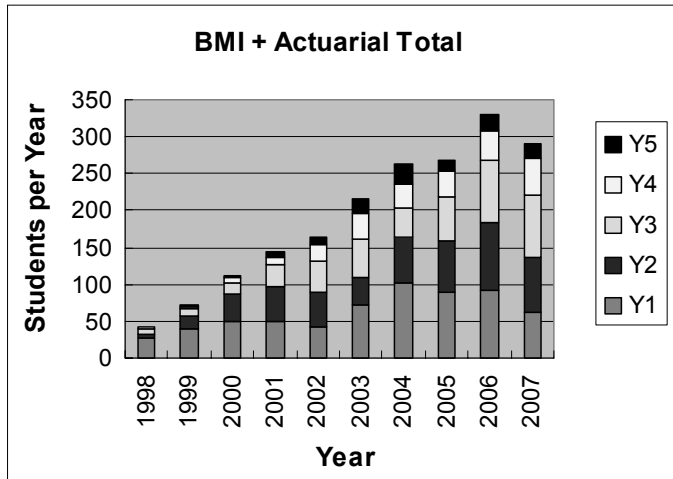


Figure 3. The growth of student numbers for the BSc and BCom degrees, offered in the fields of BMI, at the Potchefstroom campus of the NWU. *Source.* BMI/NWU

A strategic initiative was taken in 2002 to increase the percentage of bursaries allocated by ABSA (see later in this paper) to black matriculants who choose BMI as a field of study. The initiative increased the number of black bursary holders from approximately 12% before 2003 to approximately 60% in 2007. For BMI it is important to realize that the state of Mathematics and Science education at any educational level is not equal in South Africa, to the detriment of black students (Reddy, 2006; see also Chisholm, 2003). Moreover, the output of black matriculants with a C symbol or higher for Mathematics on the higher grade is progressively falling to extremely low levels that greatly limit the number of possible black candidates for BMI studies—and for that matter, also for the natural sciences, health sciences and engineering. From interviews we had with black alumni, however, we can conclude that some black graduates who obtained MSc degrees through the Centre showed an impressive performance in the market place and have now embarked upon successful careers.

In 2005 the external, international audit committee for the relevant focus areas at NWU observed:

It is our view that the integration of the Mafikeng and Vaal campuses can be delayed no longer. Some movement and development must take place here. It is appreciated that there are organisational issues that must be dealt with in order for the research culture to develop on each campus, but these matters need to be addressed sooner rather than later. We would like to make the point that the evaluation of the Focus Areas has the additional effect of identifying opportunities where the integration process could begin. (Gibbons & Bjarnason, 2005b)

Ironically, the merger of the three institutions seems to hold the key both to solving delivery problems in terms of the imperatives of Mode 2 education and to complying with the view of the audit committee. The initial emphasis of the merger focused on

the managerial level. In view of the vast differences that separate the three campuses of the University, the strategic philosophy was to ensure that chief operational managers (Rectors) were appointed at each Campus, and a Vice-Chancellor at an over-arching institutional head office. The intention was that each Campus should form an integral part of the unified whole, that not one of them would be under threat from another, and that they each faced the imperative of functioning effectively.

ABSA Bank: Influencing the curriculum to train future employees

On the national level, the progressive democratization of South Africa since the beginning of the 1990s has confronted the banks with the realities of the new socio-political dispensation, while on the international level banks had to meet the imposed requirements regarding capital adequacy (see Taylor, 2005). The corporate culture (Martin, 2002) of most South African banks at the beginning of the last decade of the previous century was still quite parochial. The reality of national and international transformation was rather complex for all South African banks.

In particular, the parochial culture asked for a more comprehensive approach, to which some individual banks responded by deciding to form a new bank: the ABSA. The amalgamation eventually included six financial institutions, United, Allied, Volkskas, Trust Bank, Senbank and Bankfin, in one new bank. ABSA became not only the largest bank in South Africa within one year of its inception, but also one of the top 200 banks internationally in terms of assets. Once amalgamated, many further strategic decisions were taken by ABSA, including responses to the new dispensation of international banking and the negotiations with Barclays UK, which resulted in Barclays obtaining a majority share in ABSA. From a macro-economic point of view, the South African banks like ABSA have performed strongly in terms of investments in many countries on the African continent (Daniel, Naidoo, & Naidu, 2003).

In the interview on the significance of BMI for ABSA, the Chairman of the bank placed *risk* as the central driving force within the financial industry and as the prime motivation for the involvement of ABSA in the BMI initiative at PU. From a similar perspective, banks are typified as “risk machines” (Bessis, 2002). Risk and its management have become a core business for banks.

The immediate benefits to ABSA in investing in the Centre for BMI were threefold: (1) the arrangements provided a direct line of communication with the Centre through the Director/Head relationship with regard to the leadership and managerial functions of the Centre; (2) the potential of addressing the equity imperative through the cohort of (black) graduates from the Centre that eventually became employees at ABSA; and (3) the ability to identify projects of interest and relevance to ABSA (i.e. financial risk management) that could be researched by the master’s-level students. This latter benefit is especially important because the bank has to meet international quality standards with regard to credit modelling, e.g. the Basel accords, and a demonstrated capability in measuring processes of operational risk, which will remain a major driving force in the risk management world of the banks in years to come.

On the whole, the initiative at the PU to exploit the Mode 2 approach and to focus some of its mathematical and IT academics on BMI created the opportunity for ABSA to have important risk-related topics researched and a steady supply of experts (BMI graduates) who might become future employees. A typical cooperative response is that employers extrapolate curricular prescriptions from their present preoccupations. “The result is that employers invariably stress work-related skills, that is, they over estimate specialized competence ... therefore, ‘relevance’ is invariably defined in vocational terms, and relevance comes to mean ‘relevance for specific kinds of work’” (Cloete & Bunting, 2000). This rather extreme and rather narrow interpretation of the relevance aspect might be present in the ABSA–NWU joint venture.

That the bulk of projects carried out by the advanced BMI students were initially defined by ABSA and were related to specific ABSA needs cannot be ignored. According to some respondents, scholarly experts at ABSA reciprocally provided the research approach adopted by the student to resolve a particular problem. Of course, it becomes a real possibility that an uncontrolled escalation of this tendency will, in the end, “*ABSAdize*” scholarship at the Centre for BMI. With *ABSAdization* we mean that the research (questions) of the BMI researchers are narrowed down in such a way that it is the ABSA agenda that decides what the interesting research topics are. This tendency is, in a way, an unintended consequence of an insufficient critical implementation of the Mode 2 concept (for a discussion of this unintended consequence of the Mode 2 concept, see Blume & Geesink, 2000). In fact, following the ABSA agenda rather uncritically might become detrimental to the independence of the academic researchers. However, the recent profile of the origin of the projects suggests that this situation is changing. The number of master’s students’ projects (master’s dissertations) per “client organization” per year indicates that ABSA still claimed 52% of the students, but that 28% of the projects were defined by other banks, and the remaining 20% by other industries, like the health sector, attorneys, asset managers and IT firms.

Employment strategy is vital for the banks: the strategy relates to the 1997 South African Labour Relations Act and the Employment Equity Act, requiring of the bank to employ black workers (Nel, Swanepoel, Kirsten, Erasmus, & Tsabadi, 2005). The Centre does not seem to respond sufficiently to this need of the bank by producing the needed cohort of black graduates. At the other hand, it is evident that the bank increasingly invested in black students’ bursaries at BMI. Due to a change in policy with regard to the allocation of undergraduate bursaries, the bursaries for black students exploded since 2006 (Figure 4).

Discussion

As outlined in the first part of this paper, higher education in South Africa has changed dramatically over the last decade. Two potentially contradictory demands are now clearly visible:

On the one hand, the pressure to prepare South Africa for participation in a sophisticated *global economy* (e.g. by modernizing its banking industry—the authors of this paper); and on the other hand, the pressure to render higher education more responsible to the *local*

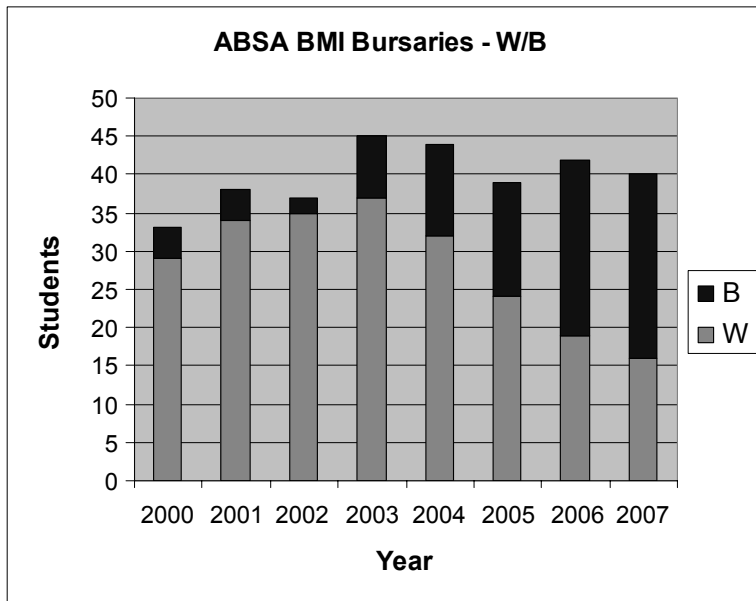


Figure 4. Distribution according to race (B = black students, W = white students) of bursaries allocated per annum to prospective students in BMI

needs and challenges ... in the context of very real resource constraints ... [While] it was the case that South Africa's higher education sector should respond appropriately to the imperatives of globalisation and democratisation was uncontroversial ... what constituted an appropriate response was hotly disputed. (Ensor, 2004, p. 314) [italics and abbreviations ours]

The implementation of BMI at the NWU was a strategic choice that affected the organization of the faculty as a whole. Indeed, it meant a cultural change because implementing a strategy can be seen as an organizational-cultural phenomenon (Bate, 2002). During the process of implementation of BMI Mode 2 was a global fashion for university policy-makers. The idea behind Mode 2, embedded in documents such as UNESCO reports, literally travelled around the world and has been translated at a local level—in our case at the NWU. Indeed BMI came into being when the idea of transdisciplinary, context-driven and problem-focused research and education was adopted all over the world. Mode 2 as an idea and policy-instrument became well known in South Africa (Jansen, 2002). As a matter of fact, the local PU policy-makers started to imitate this idea—a phenomenon called *mimesis* (DiMaggio & Powell, 1983). The (re)invention and implementation of BMI at the NWU was part of a process of institutionalization. Indeed, we can see similar tendencies in other parts of the world like in Amsterdam and—although it was not part of this paper—in Zürich, Switzerland.

When we look more carefully at the local level, our investigation clearly indicates that education (and research) in the narrow field of BMI exhibited some of the characteristics one would expect of an entrepreneurial university in general (Clark, 1998).

As formulated, the introduction of BMI was a distinct response with regard to the needs of the financial industry in South Africa in one specific area, yet also affecting the University. After a decade of organizational changes—affecting both research and curriculum—mathematics at the NWU is now more heterogeneous than it was a mere decade ago. Its focus has shifted away from pure disciplinary mathematical teaching and research to a more diversified and applied field of financial risk.

However, what we also see that the present BMI education seems to fall short on two fronts. In the first place, the University's decision predominantly to link BMI to the financial industry was a timely, proactive step, but with some distinct long-term consequences. The University should be aware that there is a possible threat that the immediate short-term success of BMI could nonetheless easily result in a situation in which the research and education agenda becomes less instead of more diverse. In this paper, we referred to that situation as *ABSAdization* of BMI. In this situation, should the financial sector change its mind about what its core competencies need to be, it could be very difficult for BMI instructors and researchers to change over to other fields.

In the second place, we can conclude that despite the commendable efforts at the Centre for BMI in the interest of securing quality and relevance in their educational obligations, the idea of equity and diversity initially did not appear high on the educational agenda. This attitude changed only due to a change in policy with regard to the allocation of undergraduate bursaries (which had immediate results). Diversity would seem to require that the students, at least at graduate level, be able to deal with different cultural imperatives, to operate effectively in a range of social settings, and to be able to work with and develop complex notions of identity and citizenship. It is only recently that this attitude has started changing.

Conclusion

The case of BMI may serve as a useful study to evaluate the foregoing tension, based on some empirical evidence. We can conclude that the strategies at the NWU were the result of a difficult balancing act which attempted, on the one hand, to meet the benchmark of the international (academic and industrial) indicators and which was, on the other hand, “fit for purpose” in the local context of South Africa. This was precisely the tension identified by Ensor (see section ‘Introduction’) and it became an observable reality at NWU.

As we state in the introduction, this paper should not be read as a plea for others to adopt Mode 2 as their analytical theory of choice. Rather, we have attempted to show, at the local level at which BMI was introduced and translated, how the Mode 2 concept provided a challenging framework and instrument for organizational change for the actors involved. As argued in this paper, cooperation with the financial sector—which was an outcome of a “Mode 2 strategy” at a local level—is clearly advantageous to the future development of the NWU so as to demonstrate its responsiveness to government policy as expressed in the 1997 Education White Paper. To put it frankly: at the PU campus, the idea of Mode 2 has been used by the university

management as *an instrument* for change and intervention in traditional academic structures, which resulted in an extensive restructuring of curricula and research agendas at the University. In addition, the choice for financial risk management as the core research theme for BMI has helped both researchers and students broaden their academic focus.

At the same time, there is support for the idea that local policy-makers, given their limited means, should not close their eyes to the threat that following too slavishly the directions taken by the larger firms in the financial sector may, for them as well, be too narrow a choice with regard to curriculum change. The challenge, as always, is to enrich the academic portfolio and curriculum in more heterogeneous ways (Rip, 2004). Again, it is a lesson that is of relevance for many working in the field of higher education who are—in one way or another—involved in university–industry cooperation.

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Note

1. An earlier version of this paper has been presented by Kees Boersma at the Annual Conference of the Society for Research into Higher Education (SRHE) “Reshaping Higher Education” in Brighton, Sussex, in December 2007.

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