

**Perceived *Pros* and *Cons* of the *Intellectual Property Rights*  
from *Publicly Financed Research and Development Act***

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## **Perceived *Pros* and *Cons* of the *Intellectual Property Rights* from *Publicly Financed Research and Development Act***

South Africa's Intellectual Property Rights from Publicly Financed Research and Development Act, No. 51 of 2008 (the IPR Act) is expected to enter into force by proclamation within the next few months. This article examines some of the arguments raised in support of, and against, the Act and its associated draft Regulations.

The subject matter of the IPR Act is intellectual property (IP) emanating from research and development conducted using public funds, such as that carried out at Universities. The purpose of this article is to provide the reader with a broad grasp of the general debate surrounding the IPR Act and Regulations. The question underlying the debate may be formulated as follows: in whose hands – the government, the inventing organisation or the inventors – is the ownership and management of government-funded IP best placed to promote its prompt development for the benefit of the South African taxpayer?

### **Perceived *Pros* of the IPR Act**

- 1 *Reassurance to Government that its Science and Technology money will be properly managed.* The IPR Act is needed to reassure Government that there is a framework in place to manage any funds that are set aside for the Department of Science and Technology (DST) for use in scientific and technological research. The South African Government needs to know that its money will be properly managed, and the Act provides that reassurance. With stiff competition for funding coming from such priorities as housing and health, the DST badly needs such a document to back up its claims for existing and additional funding.
- 2 *Better IP management at public institutions.* The Act requires each university to have an IP Office, or at least a dedicated staff member performing that role. It also paves the way for each university to put in place an IP Policy. Several prominent universities did not have either an office or a policy until the advent of the Act.
- 3 *Uniform framework for national IP management.* The legislation provides a uniform framework for better IP management in South Africa as a whole, and enables use of IP for specific public interest purposes such as health and security. The Act is designed to give South African taxpayers the full benefit of their investment in publicly funded research.
- 4 *Protection for researchers.* The IPR Act sets minimum percentage benefit shares to be given to researchers if IP, which they have developed, is successfully commercialised. Of the first one million Rand of gross revenues, IP creators receive a minimum of 20 per cent. Thereafter, they receive 30 per cent of net revenues. The Act clearly stipulates too that benefits accrue not only to the IP creators themselves, but also to their heirs.<sup>1</sup>
- 5 *The IPR Act is based on successful United States legislation.* The well-established innovation system of the United States is held in high regard. The Bayh-Dole Act is the equivalent of, and prototype for, South Africa's IPR Act. The partnership set up by Bayh-Dole between research universities and the private sector created millions of jobs for Americans, significant wealth for the United States, and a higher standard of living, and helped to re-establish the United States as the technology innovation leader in a growing and increasingly competitive global economy. "Reams of objective data exist supporting the conclusion that the Bayh-Dole Act greatly improved the commercialisation of federally-funded research, that the system is

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<sup>1</sup> Section 10 of the IPR Act, 2008.

working very well, and that the public sector private sector partnerships which were generated under the Act are essential both to the well-being and the competitive position of the United States.”<sup>2</sup>

University technologies have helped to create nearly 6,000 new companies in the United States since the enactment of the Bayh-Dole Act in 1980. Over 550 companies are spun off annually based upon university IP. That is more than two new companies formed each working day of the year. University research created 4,350 new products from 1998 to 2006, which equates to about 1.3 new products per day. Nearly 700 new products are introduced each year. Federally funded research at universities and laboratories has resulted in 130 new drugs, vaccines and diagnostic devices being developed for public use. Many of these discoveries were treatments for infectious diseases and new cancer therapies.

Such success is unique to the United States.

There were almost 5,000 existing active university licenses in the United States in 2006 – each representing a university-industry partnership. The majority of licenses are with small companies and start-up companies.<sup>3</sup> This bodes well for the South African DST’s focus on Small, Medium and Micro Enterprises (“SMMEs”).<sup>4</sup>

- 6 *Certainty of title in inventions.* The IPR Act makes it clear that title in and to inventions emanating from publicly financed R&D will vest in the recipient of the funds, e.g. the recipient university, rather than the researcher or Government. It is argued that this certainty is likely to encourage industry to engage with universities for the development of inventions. As Bremer *et al* have argued, “without the incentive of ownership, wealth creation is not possible.”<sup>5</sup>
- 7 *Strong laws to encourage private industry.* This “pro” is linked to the one above, but is distinct from it. The IPR Act affords private industry a framework of strong IP laws to encourage undertaking the considerable risk and investment needed for product development. Companies will know that if they fund research, they can be certain that the IP will be protected and managed properly, and, where necessary, licensed back to them exclusively so that they can be rewarded appropriately.
- 8 *Encouraging re-thinking on utilisation of inventions.* The IPR Act may push South African universities to recognise that utilising inventions for the benefit of society can often be best accomplished through commercialisation – which requires the co-operation and risk taking of the private sector. Within one year of MIT’s rethinking its licensing activities as a result of Bayh-Dole, the number of licences that it issued increased nearly 1,000 per cent. During the next 20 years, the MIT Technology Licensing Office helped in the formation of nearly 800 new companies. A recent study of MIT spin-off companies shows that if the active companies founded by MIT graduates formed an independent nation, their revenues would make that nation at least the 17th largest economy in the world.<sup>6</sup>

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<sup>2</sup> H. Bremer *et al.* “The Bayh-Dole Act and Revisionism Redux,” BNA’s Patent, Trademark & Copyright Journal, 78 PTCJ 483, The Bureau of National Affairs, Inc., 14 August 2009.

<sup>3</sup> Association of University Technology Managers (AUTM): U.S. Licensing Activity Survey, 2006.

<sup>4</sup> See, for example, an address by His Excellency, Mr Derek Hanekom, Deputy Minister: Department of Science & Technology, delivered at a DST-ESASTAP conference entitled, “Enhancing SME participation in South Africa – EU science and technology partnerships,” Cape Town, 9 September 2009.

<sup>5</sup> Bremer *et al.*, Note 2 *supra.*, referring to Hernando De Soto, “The Mystery of Capital, Why Capitalism Triumphs in the West and Fails Everywhere Else”, Basic Books, 2006.

<sup>6</sup> <http://web.mit.edu/newsoffice/2009/kauffman-study-0217.html?tr=y&aid=4551551>

- 9 *Protection from premature disclosure of inventions.* The IPR Act protects confidential information in the possession of institutions from untimely disclosure – a matter of considerable importance to the private sector in a globally competitive economy.
- 10 *Protection of taxpayers from non-use or poor use of inventions which they have financed.* The IPR Act vests various rights in the government to protect the public against non-use or unreasonable use of inventions supported in whole or in part with taxpayer's money.<sup>7</sup>
- 11 *Source of income for universities.* The Act provides universities and other institutions the possibility of generating income to support research and educational activities through the technology transfer function.
- 12 *Additional benefits to researchers.* Apart from prescribed minimum shares in the benefits of successful commercialisation of their IP, the IPR Act holds many other incentives and benefits for researchers and inventors. Firstly, since each university will from now on have ownership of the IP it generates, it is the university that will need to assume the financial burden of applying for patents and prosecuting them through to grant, and for carrying out commercialisation. Yet the researchers/inventors will still benefit from successful commercialisation, if any.

The cost of a global patent programme for a single invention, including filing the patents and prosecuting them through to grant, can easily exceed R1 million. This figure does not include further costs of policing the patents in the various countries, and keeping their renewal fees paid up to date. In the past, these financial hurdles were often insurmountable by individual researchers.

Apart from the financial benefits, it is the university that will be responsible for the administrative burden associated with the numerous irrevocable deadlines that need to be met in patent prosecution. Last but not least, commercialisation assistance is also made available, enabling proof of concept, proof of value, marketing and business plans to be developed, partners to be found, and an appropriate commercial model to be developed.

- 13 *Promotion and growth of the technology transfer profession in South Africa.* Numerous new offices of technology transfer have been created and a new skill set will be required to manage them.

### **Perceived Cons of the IPR Act**

- 1 *Infringement of existing rights of researchers and academics.* There is a perception in some quarters that the IPR Act has removed, or infringed upon, certain existing rights of researchers and academics.

To understand this point, a brief examination of the background to the Act is needed. There was an important difference between the recent implementation of the IPR Act in South Africa, and implementation of the corresponding legislation in the United States (the Bayh-Dole Act) and the United Kingdom in the early 1980s. In the United States and the United Kingdom, IP emanating from publicly funded research was vested in government before the legislation was brought in. The effect of the legislation in those countries was to take that IP and give it to the universities. The government was entitled to take that course of action because it owned the IP. Thus, the legislation effected a downward *devolvement*, or *privatisation*, of the IP from government to the universities.

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<sup>7</sup> Section 14 of the IPR Act, 2008.

In South Africa, by contrast, the reverse situation is underway. The starting *status quo* was that academics in many cases had ownership or control of the IP that they generated, and were free to do with it whatever they wished. Now the IPR Act places that IP in the hands of the universities. The Act can therefore be seen to be curtailing the academics' previously existing rights and freedoms to manage and exploit the IP.

With this in mind, it is the view of this writer that we may see a Constitutional Court challenge against the validity of the IPR Act in due course. If so, the question to be answered by the Court will be whether the IPR Act is saved by the limitations test contained in Section 36 of South Africa's Bill of Rights. In terms of this test, the Act's curtailment of existing rights will be Constitutional if the State can show that the Act's provisions are "reasonable and justifiable in an open and democratic society based on human dignity, equality and freedom."

- 2 *Distrust of government motives.* There is a level of distrust of the motives behind the IPR Act and the establishment of the National Intellectual Property Management Office (NIPMO). There is a perception in some quarters that the Government intends to appropriate researchers' IP for its own national uses.

These perceptions may have had some foundation in the first draft of the IPR Bill, which even the Government still refers to as the "schoolmaster" version. However, there have been subsequent revisions of the draft Bill, and assurances have been given by the Government in numerous forums. The suspicions of the academics mentioned above reflect a limited understanding and do not take account of Government's repeated explanations of the purpose of the Act.

Nevertheless, the perception persists and is therefore grounds for concern. As Stellenbosch University have argued, "[intellectual property] without the buy-in of researchers is of little practical or commercial value since the skills of these researchers are indispensable in developing the IP into a commercial success and keeping it successful through improvements."<sup>8</sup>

By no means all researchers are opposed to the Act. There are broadly three types of university innovator encountered:

- The consummate entrepreneurs who see the advantages of partnering with the university and drive the commercialisation of their projects forward.
  - Those to whom satisfying their curiosity and "having fun" in the laboratories is what appeals most, and who have little interest in making money.
  - Those who believe that there is a bad odour associated with the IPR Act specifically and IP commercialisation generally, and want nothing to do with it.
- 3 *Disproportionate emphasis on licensing of patented inventions.* There is a view that legislation such as the IPR Act has a narrow focus on licensing of patented inventions, and that this approach "ignores the fact that most of the economic contributions of public sector research institutions have historically occurred without patents through dissemination of knowledge, discoveries, and technologies by means of journal publications, presentations at conferences and training of students."<sup>9</sup>

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<sup>8</sup> "Stellenbosch University submissions regarding the Draft Regulations proposed in GG 32120 under the Intellectual Property Rights from Publicly Financed Research and Development Act 51 of 2008", 6 May 2009.

<sup>9</sup> A. So *et al.* "Is Bayh-Dole Good for Developing Countries? Lessons from the Experience," PLoS Biology 6(10):e262, 28 October 2008.

This concern is tied up with the concept of academic freedom. According to Article 16(1) of the Bill of Rights, “Everyone has the right to freedom of expression, which includes ... academic freedom and freedom of scientific research.” Stellenbosch University argues that “the free and unencumbered disclosure and distribution [of IP] may be more beneficial [than its protection]. [We] encourage open cooperation with other institutions, including other research institutions and the private sector (both local and international) to give [our] scientists the necessary opportunities to achieve the goals of teaching, research, innovation, and community interaction. These functions are the essential functions of a university, whereas the exploitation of IPR is also critical but remains secondary.”<sup>10</sup>

Khan argues that the draft IPR Regulations “in effect ban South African researchers from participating in [multinational] consortiums” which require sharing of IP on an open-source basis.<sup>11</sup>

The draft IPR Act and Regulations do, in fact, create a mechanism for placing IP in the public domain through open-source systems, provided that various requirements are satisfied. However, there are concerns that the bureaucracy associated with seeking approval from the Government to place such IP in the public domain will hamper the free flow of research.

This concern about red tape at the national level echoes academics’ concerns at the institutional level. They worry that the obligation imposed upon them by the IPR Act to present information to their institutional technology transfer offices will be unworkable, firstly because of lack of resources at the offices, and secondly because of the vast quantities of research being carried out. They are concerned that such an obligation will hamper their research efforts.

Stellenbosch University suggests that according to the present wording of the Act and draft Regulations, all computer programs and databases, and even certain paintings and literature (those not associated with conventional academic work) may need to be disclosed to university technology transfer offices, and that this is “simply impractical.” The offices could not gain knowledge of all such creations let alone make informed decisions on them.<sup>12</sup>

The University goes even further, arguing that the Regulations may conceivably be used by NIPMO as a type of censorship to prevent academic institutions and academics from publishing research results. The suggestion is, in other words, that the Government could rely on the IPR Act to gag academics by arguing that their work contains IP.<sup>13</sup> Under this argument, the Act is seen as a potential instrument for infringement of the right to freedom of expression.

Stellenbosch also holds that: “The Regulations as they currently stand will also undoubtedly act as a strong deterrent for research, investment and commercial exploitation of IPR rather than as a much needed stimulus. The effects on higher education institution (HEI) research funding are likely to be disastrous.”<sup>14</sup>

However, Bremer *et al* argue<sup>15</sup> that the Bayh-Dole Act has not harmed the dissemination of knowledge in the United States, nor has it prevented journal publications, presentations for the training of students, etc. Indeed, it complements the historic mission of university research by

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<sup>10</sup> See Note 8, *supra*.

<sup>11</sup> R. Khan, “Draft Legislation on Intellectual Property could be end of SA Scientific Research,” *The Mercury*, 17 June 2009, p. 10.

<sup>12</sup> See Note 8, *supra*.

<sup>13</sup> See Note 8, *supra*.

<sup>14</sup> See Note 8, *supra*.

<sup>15</sup> See Note 2, *supra*.

making its contribution to social good much more tangible and immediate through the creation of new products directly benefiting the taxpaying public.

Indeed, one could go further and argue that to leave inventions lying idle at universities constitutes a dereliction of a university's responsibility to disseminate knowledge and to engage with the community for the benefit of society.

- 4 *Patent system does not work.* Critics of the IPR Act argue the patent system does not work. For example, Khan writes: "The [draft IPR Regulations] seek to [transfer knowledge and encourage innovation] through the use of patents and IP, a route that has proved less than successful overseas and which is viewed as stifling – rather than encouraging – research and innovation."<sup>16</sup>

Khan cites no authority for this view in her article.

Bremer *et al* respond as follows to similar criticisms in the United States: "While the critics bemoan the ability of the patent system to grant ... ownership of IP, the only alternatives are open source technology or trade secrets, neither of which provides similar motivation and incentives for innovation. It is truly the protection that the patent system creates that makes the commercial development of ground breaking discoveries possible."<sup>17</sup>

The following statistics suggest that the patent system does work, and that it works well:

- In 1978, the first year of operation of the Patent Co-operation Treaty, 459 patent applications were received by the International Bureau. By 2008 this figure had grown to 164,000 applications *per annum*. There was an average 9.3 per cent growth year on year from 2005 to 2007.<sup>18</sup>
- In 2007, invention disclosures at 194 United States universities and research institutes (which are regulated by the Bayh-Dole Act) increased by 6 per cent compared with 2006, to 19,827. [This equates to approximately 100 disclosures at each institution *per annum*.]<sup>19</sup>
- In 2007, United States patents issued to universities increased by 11.3 per cent, to 3,622 compared to 3,255 in 2006.<sup>20</sup>
- In 2007, 686 products were introduced and 555 start-up companies were established – an average of 13 products and 10 start-ups per week.<sup>21</sup>
- Examples of university start-ups include: Google, Netscape, Genentech, Hewlett Packard, Polaroid, Lycos, Sun Microsystems, Silicon Graphics, Chiron, Amgen, Regeneron and Cisco Systems.<sup>22</sup>
- Sixty-eight per cent of United States university start-ups created between 1980 (when the Bayh-Dole Act was introduced) and 2000 were still in business in 2001, compared to ten per cent for non-university start-ups during that same time period.<sup>23</sup>

Further, in defence of the patent system, there are situations in which a failure to apply for patents can actually constitute a disservice to humanity. In this connection we can look at

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<sup>16</sup> See Note 11, *supra*.

<sup>17</sup> See Note 2, *supra*.

<sup>18</sup> J. Erstling (Director: Office of the Patent Cooperation Treaty), "PCT Today: History, Status and Projected Growth," speech delivered at AIPLA Colloquium, 2003, date not stated, available at <http://www.aipla.org/>.

<sup>19</sup> Tech Transfer E-News, citing a survey conducted by the U.S. Association of University Technology Managers (AUTM), February 2009.

<sup>20</sup> See Note 19, *supra*.

<sup>21</sup> See Note 19, *supra*.

<sup>22</sup> National Council of Entrepreneurial Technology Transfer.

<sup>23</sup> See Note 22, *supra*.

inventions in the capital-intensive fields, such as pharmaceuticals, pesticides, insecticides, and genetic and microbiological inventions.

Taking the example of pharmaceuticals, the cost of securing marketing approval for a new medicine can exceed \$1 billion, and many a candidate drug fails to reach the market even after large costs have been incurred. These costs have to be recovered somehow. A pharmaceutical company only starts to break even in the final few years of a 20-year patent. Without patent protection, pharmaceutical companies will not go down the road of developing a drug and the benefit of that drug will be lost to humanity.

This is a real scenario. In one project with which the University of KwaZulu-Natal was associated, a pharmaceutical company pulled out of a deal to commercialise an extremely promising, potentially life-saving drug because an unauthorised publication of the invention took place before patent filing, thereby removing the possibility of patent protection for the drug. It is now highly unlikely that the medicine in question will ever reach the market, and lives may be lost unnecessarily. Since the drug in question is now in the public domain, that field of research has been removed from the pool of commercially attractive research topics, and no company is likely to invest there.

- 5 *The IPR Act may damage science in South Africa.* Critics of the Bayh-Dole Act (and by extension, therefore, of the IPR Act) allege that it causes damage to science nationally. However, the state of science in the United States is healthy almost 30 years after the introduction of the Bayh-Dole Act. In 2005, according to the President's Council of Advisors on Science and Technology<sup>24</sup>, 29 per cent of articles authored worldwide by scientists and engineers were from the United States. Also, scientific papers by United States researchers are the most cited across every field of science.<sup>25</sup>
- 6 *Stringencies of IPR Act may scare off potential funders of research.* There is a concern that the stringencies of the IPR Act will make the commercial proposition unattractive to potential funders of research, that the risks will be seen to outweigh the benefits. The fear is that this will, in turn, damage the innovation process, which is dependent on a "triple helix" comprising the research institutions, private industry, and Government. The industrial development, marketing and promotion of products derived from IP are critical to commercial success and require substantial investment and skill which is not within the domain of a typical university.

There are particular concerns that the IPR Act and Regulations will unduly interfere with the actions of technology transfer offices in their dealings with foreign funders and partners, and that this interference may deprive academics of badly needed funding, which will lead in turn to a departure of such academics to greener pastures.<sup>26</sup>

- 7 *Interference in decision-making powers of University Principals.* In terms of South Africa's Higher Education Act 1997 and the institutional statutes of South African universities, responsibility for financial management has been delegated to the Principal and the management team of each institution. The Principal must report on the university's fulfillment of this responsibility to the Minister of Education. Such responsibility requires that Principals be given the necessary powers and flexibility to comply with their obligations. Critics of the

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<sup>24</sup> University-Private Sector Research Partnerships in the Innovation Ecosystem, President's Council of Advisors on Science and Technology, November 2008, p.2.

<sup>25</sup> Science and Engineering Indicators, National Science Board. 2008, Volume I, p. 5-7, NSB 08-01.

<sup>26</sup> See Note 8, supra.

IPR Act argue that the Act interferes with these decision-making powers, and that such interference is highly problematic.<sup>27</sup>

- 8 *The IPR Regulations are too rigid.* There is a concern that the rigidity of the proposed IPR Regulations will prove counterproductive. According to Stellenbosch University, “it is quite clear from our experience that each situation must be assessed on its own merits and that it is extremely difficult to adopt a ‘one-size-fits-all’ model for all IPR matters. While it is understood that each commercial transaction has to be assessed and negotiated with a view to extract the maximum benefit for [the university], its researchers and the South African society, it has become clear to us that no hard and fast rules can be applied since the circumstances pertaining to the research and the commercial opportunities for the resultant IPR will differ in each case.”<sup>28</sup>
- 9 *Impact of IPR Act is too broad.* The majority of research funding at tertiary institutions in South Africa is derived from the private sector; the IPR Act impacts on all research that is even partially funded by the State.
- 10 *IPR Act imposes compulsory commercialisation of IP.* The IPR Act and Regulations are interpreted to require that institutions commercialise their IP, failing which NIPMO will get an opportunity to commercialise it. If an institution decides that the IP would be best-placed vested in a funding entity or IP creator (which amounts to a waiver of the institution’s rights), NIPMO will automatically become entitled to acquire the IP before the funding institution or creator. This legal framework is considered to be impractical by some institutions. For example, an institution may wish to delay the seeking of protection until further development occurs which strengthens the protection or makes the IP commercially more viable. The legislation as originally drafted was not clear on whether the institution would be entitled to delay filing for patent protection without being deemed to have abandoned its IP. The most recent draft of the Regulations does, however, make it clear that IP will not be considered abandoned simply because a patent filing programme is postponed pending development of the IP to a stage at which it becomes ripe for patent protection.

Opponents of the legislation also argue that vesting of the IP in another entity may be entirely appropriate in the light of other commercial considerations pertaining to the transaction.<sup>29</sup> One response to this objection is that the Act provides for exclusive licences, which can be awarded to funding partners and/or IP creators. The mechanism for licences is less onerous than the mechanism for assignment, so this route may serve as an acceptable alternative to assignment. By the use of exclusive licences, the commercial interests of partners and creators can be secured while leaving the control and asset value of the IP vested in the institutions. The Act also provides for co-ownership of IP by institutions and partners.

- 11 *High cost of implementing the IPR Regulations.* It is argued that giving effect to the bureaucracy of the IPR Regulations will be expensive both financially and in terms of time. Accordingly, commercialisation opportunities may be lost or there may be expensive delays in getting new products to market.
- 12 *IPR Regulation regarding distribution of revenue is inadequate.* There are concerns about the draft IPR Regulation dealing with distribution of revenue to IP creators. It is thought that insufficient attention has been paid to the different ways in which creators are compensated, e.g. by way of shareholding in spin-off companies. Also, critics argue that the Regulation places arbitrary caps and restrictions on the costs which institutions may deduct from

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<sup>27</sup> See Note 8, supra.

<sup>28</sup> See Note 8, supra.

<sup>29</sup> See Note 8, supra.

revenues when calculating net revenues (from which, in turn, the share of benefits payable to IP creators is calculated).

## Conclusion

South Africa's IPR Act seeks to address the situation where IP, developed by researchers, lies idle at universities or is sold off to private companies, often overseas, with no benefit accruing to the university, the Government or the South African people. The over-arching principle at play is that where State funds have been used to generate IP, the State and the South African public should receive some benefit from that IP.

It is the opinion of this writer that the various arguments against the IPR Act of 2008 are outweighed by the benefits which the Act offers to the so-called "triple helix" comprising the research institutions, private industry and Government. Contrary to claims by its critics, the Act provides a superb framework for government-funded research to benefit South Africans and improve lives.

The legislation does have its drawbacks. Relaxation of the Regulations relating to foreign collaboration is a particular area needing urgent attention. This is because the United States and South African landscapes cannot be compared in terms of their respective depths of private industry available for partnership, so the precedent of the Bayh-Dole Act should not be followed blindly.

On the other hand, it has been this writer's experience at the University of KwaZulu-Natal that the IPR Act seems to be working already, even though it has not yet entered into effect. The University's Intellectual Property and Technology Transfer Office, which opened its doors in November last year to meet the requirements of the Act, has already received more invention disclosures than were received by the University from 2006 until 2008, and has filed more provisional patent applications than were filed in that same period.

The following quotation by a United States writer provides a fitting close:

*Remember the technological malaise that befell America in the late 1970's? Japan was busy snuffing out Pittsburgh's steel mills, driving Detroit off the road, and beginning the assault on Silicon Valley. Only a decade later, things were very different. Japanese industry was in retreat. An exhausted Soviet Empire threw in the towel. Europe sat up and started investing heavily in America. Why the sudden reversal of fortunes? Across America, there had been a flowering of innovation unlike anything seen before. Possibly the most inspired piece of legislation to be enacted in America over the past half-century was the Bayh-Dole Act of 1980. Together with amendments in 1984 and augmentations in 1986, this unlocked all the inventions and discoveries that had been made in laboratories throughout the United States with the help of taxpayers' money. More than anything, this single policy helped to reverse America's precipitous slide into industrial irrelevance.<sup>30</sup>*

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<sup>30</sup> "Innovation's Golden Goose," The Economist Technology Quarterly (editorial), 14 December 2002.