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**COORDINATING UNIT FOR OPERATIONAL ACTIVITIES**

High Level Task Force on Valuation and  
Capitalization of Intellectual Assets  
(First meeting, 18-19 November 2002)

**Technology, Innovation and Commercialization – Intellectual Assets –  
Opportunities for Selective Intervention**

Background paper for discussion

**INTRODUCTION**

Innovation and commercialization in the field of technology are not as prevalent as they could be. We know this because there are conspicuous pockets of success that promote as much envy as they do praise. These examples provide valuable clues as to what is needed, though of course no single formula. What is clear is that these successes are not brought about by innovation alone but have as much to do with prevailing business conditions and the way in which business is done.

Not surprisingly, it is the strategies adopted by leading corporations, Universities and small business organisations in the US and UK that have been reviewed most extensively, invariably presented in the context of what is or will be the “New Economy”. Whatever the origins of the term New Economy, it is commonly used to describe a number of new dynamics that together allow for a new way of looking at what is possible for the economy and what is desirable for humanity. Happily, the dynamic that is now recognised to be of paramount importance to business is that of human intelligence and ingenuity.

A Bank of Boston report of 1997 found that Massachusetts Institute of Technology-related companies employed 1.1 million people and produced annual sales of USD 232 billion. *Financial Times*, 25.4.02

Just as companies are discovering the importance of “human capital” so also is the importance of the individual being recognised as citizen, as employee, as consumer. The importance of values and their observance has come to the fore. These values are central to the development of citizen-centric government, observance of corporate social responsibilities, and the building of successful brands; they all involve building trust relationships that promote participation, inclusion and choice.

James D Wolfensohn, President of the World Bank, has said this of the New Economy:

*“The New Economy has the potential to unleash extraordinary development benefits and real social and environmental gains, but to achieve such gains requires participation and intervention at the local, national and global level. The New Economy will most effectively deliver a positive balance of benefits and costs if we ensure that societies are fully able to take advantage of the arising opportunities by encouraging socially and environmentally responsible business conduct. This can often be best achieved through partnerships that bring together, and create synergies in, the competencies of civil society and labour organisations, businesses, governments and international bodies.”*

This paper will look at a number of areas in which there exist opportunities for selective intervention that have the potential to promote greater participation in technology innovation and commercialization. The ideas put forward here are to promote debate. That said, and in order to provide context for these ideas, practical suggestions are made which of course each present their own challenges.

The key drivers for business success are now commonly recognised to be knowledge, innovation, collaboration and investment; all of which thrive best in conditions of trust, confidence, and mutual respect. Whereas technology can be reduced to precise formula and definition, business is an organic activity involving human aspiration, need, fear and will; it is as complex and diverse an activity as are the relationships that make it possible.

The urge to discover and improve and the willingness to bring about change for individual and collective benefit are the natural predispositions of inventors and entrepreneurs and those who work to support them. This natural human activity takes place within the framework of legal, regulatory and fiscal structures that Governments put in place to provide some commercial order and discipline, but which can as easily prove to hinder as encourage business development.

While Government should resist the temptation to interfere in the commercial application of innovations, the scope for public sector support and reinforcement of market mechanisms in the area of technology and innovation policy remains substantial.

The fundamental challenge before us is to discover where and how best to intervene in the business “ecology” so as to release and channel the energies that are knowledge, innovation and collaboration and be willing to be innovative in our approach to doing so. As Albert Einstein put it: “A problem cannot be solved from the same consciousness that created it”.

This paper is organised into four subject areas, all of which are interrelated in the business of innovation. These are:

- Mining knowledge resources – considering how best to provide ready access to underused resources of knowledge and, in particular, the repositories of patented inventions;
- Sustaining innovation – looking at the fundamental importance of protection and reward for innovation and how the present system is failing to meet its promises;
- Commercialization through collaboration – identifying the opportunity that exists now to encourage collaborative business models and proposing the creation of innovation and commerce organisations that bring inventors and business people together;
- Investment and capitalization of innovation – summarising the main categories of investors, examining the role of valuation in transactions, and considering opportunities for the creation of new investment models.

## **MINING KNOWLEDGE RESOURCES**

The issue here is much the same for a country as for a company and there are valuable lessons to be learned from corporate experience of knowledge management.

There are broadly two kinds of knowledge: acquired knowledge, that is knowledge that is recorded; and tacit knowledge, that is knowledge held within a person's memory derived from learning and experience. For knowledge of either category to be valuable it must be accessible and shared.

Knowledge has been called “the only meaningful economic resource”. Knowledge has also been likened to a form of energy, like electricity, that exists only when it is being used; the same has been said for talent. Releasing this energy depends on whether talented people are willing and able to contribute and share knowledge in pursuit of common goals. The right knowledge in the hands of bright people is what is most likely to engender innovation and see its potential realised in the market.

Scientific and technical knowledge and a capacity for innovation are only part of the equation. What is also needed is knowledge of the market and of business. The present and likely future expectations of consumers, the workings and preferences of investors and bankers, marketing and distribution; these and other skills are equally important if the products of invention are ever to realise their commercial value and if research and development resources are to be best directed.

### **Patents - Unlocking Potential**

Every country possesses its own repository of acquired knowledge in the form of learned texts held in its libraries and in the form of patents held in its Patent Offices. While

libraries are usually well indexed and eminently searchable by the average person with some understanding of their subject, patent records are not.

The basic premise of the patents system is that in return for the grant of a monopoly in the exploitation of an invention, the invention itself is published so that it becomes accessible to the public and so becomes public knowledge. Yet another premise of the patent system is that a patent should disclose to a suitably skilled person how the invention works. In practice this is anything but the case; patents are not easy to read or to understand.

The result is that the great body of public knowledge resident in patents is significantly under utilised as a resource from which to discover technical solutions and commercial opportunities. How then can this resource be made accessible and its inherent energy be released and made available to business?

It is estimated that companies in Europe waste £20 billion each year repeating research and development work that has already been patented. *The Sunday Times* 25.11.01

The most obvious solution is indexation supplemented by the power of contextual search engines where the full texts of patent records are available electronically.

Existing indexation systems offer complex means of searching patent information:

- The US Patent and Trademark Office manual of classifications for patents has 400 classifications;
- The International Patent Classification administered by the World Intellectual Property Organisation is divided into 8 sections, 21 subsections, 120 classes, 628 sub-classes and almost 69,000 groups (of which approximately 10% are "main groups," and the rest "sub-groups");
- The Derwent World Patents Index service provides access to over 22 million patents documents covering 11.2 million inventions obtained from the patent records of over 40 patent issuing authorities. This is an electronic service and is an example of what can be achieved using modern ICT. (see [www.derwent.com](http://www.derwent.com))

Another approach to indexation that could provide a yet more valuable tool for business development is one that seeks to categorise the nature of the solution rather than the specific invention, TRIZ.

### **TRIZ – The Theory of Inventive Problem Solving**

TRIZ was developed by Genrich S, Altshuller, a Russian scientist, in the 1960s and is enjoying a resurgence of interest among businesses today (see [www.mazur.net](http://www.mazur.net) for a summary of TRIZ).

Altschuller categorized patents in a novel way. Instead of classifying them by industry, he removed the subject matter to uncover the problem solving process. He found that often the same problems had been solved over and over again using one of only 40 fundamental inventive principles.

Based on an examination of over 200,000 patents he was able to show that over 90% of the problems engineers faced had been solved somewhere before. He concluded that if engineers could follow a path to an ideal solution, starting with the lowest level, their personal knowledge and experience, and working their way to higher levels, most of the solutions could be derived from knowledge already present in the company, industry, or in another industry.

Were patents indexed according to TRIZ principles, users should more readily find clues as to how problems may be solved. Once in the right area of enquiry, the user can go to the patents themselves to examine the specific solutions recorded.

### **Patent Matrix – Easy Navigation of Patent Claims**

One example of how to make patents more easily understood and managed, while at the same time providing a valuable tool for patent applicants and examiners alike, is the proprietary Patent Matrix system developed by a former USPTO examiner, JiNan Glasgow.

[The electronic version of this document contains a link to an example of a patent structured according to the Patent Matrix system. The document is in PDF format with built-in links to the body of the patent text.]

Use of the Patent Matrix has already been proven to substantially reduce time and costs in the drafting and prosecution of patent applications.

This is an example of a developed tool with great potential for further development that the inventor has already identified as being an ideal complement to TRIZ.

### **Accessibility**

The ideal outcome is one where both inventors and business people are able, directly or with assistance, to access the body of patent knowledge. This approach would also present a clear service opportunity for professionals such as Patent Attorneys and Technical Consultants who would be able to offer assistance and guidance in the navigation and analysis of this knowledge resource. Patent Offices could themselves provide such services on a fee-paying basis. Some level of education would be needed at the business level, though it would be vital to ensure that the professions are engaged in the process so that business can have the benefit of suitably qualified service providers.

Were the same approach to be adopted among many countries then the collective benefit would be multiplied exponentially.

## **SUSTAINING INNOVATION**

For innovation to flourish there must be proper incentive. Profits for companies and fair rewards for individuals are vital incentives for innovation and commercial enterprise.

The right to reward and protection for a person's creations is regarded by some as of the level of importance of a fundamental human right. Others may not put it quite so highly yet have a very real attachment to what they have created and so experience great personal distress and discouragement when their "rights" are abused. The management and staff of a business that has invested in taking an idea from the laboratory to market will understandably experience collective anger and anxiety where others effectively steal their work and threaten their business survival.

The fact is that many people find it hard to understand that a person who steals your wallet is a criminal and may be arrested and ultimately lose his liberty, whereas someone who steals your livelihood can continue to do so without hindrance until you are able to finance and win a private action to stop them. Furthermore, even if you succeed in enforcing your "rights" there is rarely any prospect of meaningful compensation or financial recovery.

### **Patent Promise**

The patents system has been widely promoted as a cornerstone of the knowledge-driven economy. Individual inventors and small businesses are more than ever before being encouraged to seek the protection of a patent for their inventions.

Research of patent filings in countries such as Japan has led to the conclusion that there is a direct correlation between the number of patents filed and the country's technological and economic superiority. Emphasis has then been placed on education so as to promote the virtues of patent filing, the supposition being that the patents system is not used as much as it could be because inventors and business in general are unaware of its benefits.

Patent filings have generally risen and this is certainly evidence that the marketing effort is having its desired effect. However, it is said that a large part of the business constituency, mostly comprising small businesses, still does not yet grasp the importance of intellectual property rights to their business.

It is also possible that such businesses understand very well the importance of what they have and use to do business, yet see little evidence of the supposed benefits of obtaining patents and other registered rights and so deliberately stay away.

Technological innovation and commercialization, including licensing, can and does take place without the use of the patents. The sheer cost and time scales involved in securing patents (nationally, let alone internationally) lead many to choose instead to take particular care as to with whom they do business and to rely instead on contractual obligations and remedies. A patent is not the same thing as technology; a patent is a legal fiction. The commercial value of a technology lies in the price the market is willing to pay for it. A patent can only offer the added value of enforceable exclusivity.

Financial benefit to a business of a technology is not obtained from any corresponding patent until such time as that patent is itself brought to bear in generating revenue through licensing or sale or when used as collateral for a loan or other security. At such time the value that the patent adds to the transaction is predicated upon a monopoly right afforded under the laws of the country that has issued the patent. However, the promise of exclusivity afforded under law is in practice of limited practical benefit to all but larger businesses that can afford the costs of enforcement.

Obtaining of patents is certainly of benefit to those intending to sell on to large companies who in turn are happy to promote such activity as it ensures that any technology they do buy has a patent that they can afford to enforce. Patents are also of benefit to the fortunate few able to secure the funding necessary to support litigation against major companies who are often the worst culprits when it comes to deliberate infringement.

### **Patent Uncertainty**

A patent is granted after careful examination to satisfy the Patent Office concerned that the application qualifies for patent protection. However, a patent is never underwritten by the State that granted it. The grant of a patent does not confer an absolute right.

There are a number of circumstances in which a patent may be subsequently revoked. In infringement proceedings a defendant may challenge the validity of a patent on various grounds including the discovery of prior art from anywhere in the world of which neither the patent holder nor the issuing Patent Office could have been aware at the time the patent was granted.

There is no centralised patent searching service used by National Patent Offices. Each office undertakes its own searches within the resources available and so there is every chance that even recorded prior art will be missed. It is now common to see offers on the Internet of as much as USD 100,000 to anyone able to find prior art that will knock out patents. This presents a fundamental uncertainty for any business and though the principal of novelty is central to a fair patents system the persistent uncertainty inevitably impacts on investors' view of patents as secure assets.

### **Patent Protection**

The holder of a patent has no more protection under law than the holder is able to secure through private action before the courts. Such actions are often protracted (usually by the defendant who has every interest in delaying adjudication) and so favour the party with the greatest resources.

The costs and time involved in bringing proceedings operate as a practical obstacle to securing the economic benefits of exclusivity that the patent holder and any chosen licensees are supposed to enjoy.

Kane Kramer of Country Secrets...has spent thousands of pounds on securing the rights to his product, Metal Coat, a paint with a metal finish, in more than 118 countries, but he still sees it copied regularly by companies around the world, infringing the patents, he says. "I have fired off angry letters but I really can't afford to go to court". *The Times, 11.6.02*

There are doubtless many patent holders whose inventions are being used by others without authority and from which they consequently obtain no reward. These patent holders are economically barred from ever enforcing their rights, deprived of the resources to which they are entitled and would otherwise be able to invest in further innovation.

### Patent Solutions

- **Declare all patents irrevocable other than on grounds of fraud** - This need not be for the whole of the life of the patent but perhaps for an initial period (such as 5 years from date of grant) during which time the commercial value of many patents will have been revealed and if so have prompted the opportunistic infringement that can starve a new business of vital early revenues or even stop it in its tracks.
- **Compulsory technical arbitration** – All cases of alleged infringement of patents should be referred to compulsory technical arbitration. The costs of such arbitration, other than the costs of the parties and their private advisors, should be covered by the patent authority.

In the event that a defendant chooses to contest a finding of infringement by the Arbitrator before the courts then the burden of proof should shift entirely to the defendant and the defendant should be required to indemnify the patent holder's costs of the proceedings (including the costs of professional advisors).

Compulsory arbitration is one of the recommendations of Professor William Kingston of Trinity College, Dublin, in his report entitled 'Enforcing Small Firms Patent Rights' (published in 2000).

- **Underwrite patent examination** - In the event that a patent is revoked on grounds that the patent should not have been granted, including on grounds of prior art that could have been discovered from known sources of reference, then the costs incurred by the former patent holder in defending the patent (including costs of professional advisors and awards made against the patent holder in respect of defendants' costs where applicable) should be reimbursed by the issuing authority.
- **Patent insurance** – A compulsory scheme of insurance should be established to cover the full costs of a patent holder incurred in defending a patent that is ultimately revoked on grounds of prior art that could not have been discovered from known sources of reference.



These are the sorts of solutions that must be found to redress the failings of the patents system as it relates to business needs.

## **COMMERCIALIZATION THROUGH COLLABORATION**

A common theme among commentators from industry and the professions is one that emphasises the importance of ongoing and close cooperation between inventors, business managers and advisors. The pace of market change and competition for customer attention means that time is very much of the essence. Formalities and hierarchies are being swept away in favour of constant dialogue and collaboration between all involved.

Such collaboration, though still a challenge, is inevitably easier to achieve within a single organisation yet it is precisely such cohesion that the diverse and dispersed community of individual inventors and small businesses will have to emulate to compete.

Where innovation takes place within or is sponsored by an established company then there is little need concern us as such a company will have the means to take such innovation through development to ultimate commercialization. Such organisations are self-reliant and are well able to fund such activities from retained earnings or to obtain investment capital from traditional sources.

Individual inventors, small businesses and research institutions are less able to fend for themselves and their choices when it comes to commercialization of their inventions are severely limited; indeed in most cases the best that they may hope for is to be able to sell or licence their technology to major companies.

The better course must be to encourage local collaboration so as to multiply the value of technologies through increased dissemination, developing technological competencies and building value at home.

### **New Business Models**

Collaboration involves voluntary cooperation between people in pursuit of a shared purpose. Collaboration as it can now be realised thanks to modern information and communications technologies presents a potentially powerful means by which economic benefits and costs may be better distributed.

The whole notion of what a company is for is being revisited in the context of the forces now at work in the "New Economy". The architecture of business has undergone significant changes in recent years that represent a substantial departure from the traditional model and reflect a reappraisal of the interactions and value derived from and between "assets" (physical, financial, etc.), including, in particular, intellectual assets.

Whereas a traditional business model would see a company owning its research capability, its means of production, distribution and perhaps even sale, a modern business may choose to outsource all of these functions to others retaining only ownership and management of its intellectual assets. Equally, separate businesses may combine for the purposes of a

specific venture; this is called “co-optition”, where smaller businesses come together to compete for business or market share against the major companies.

What keeps small companies small and limits their commercial scope and reach is that they mostly act alone and, therefore, have only the strength of one. If such businesses were able to readily find others with whom to collaborate, and to work within a well-defined and balanced business structure, they could then punch above their weight and offer credible competition to the larger companies. They could accomplish something collectively that they could not accomplish separately.

### **Conditions for Collaboration**

Creating the right conditions for collaboration in the commercialization of technologies involves three essential areas:

- **Marketplace** – Those involved in R&D and those with the commercial appetite for innovation must be brought together if commercialization is to be achieved. This involves providing a ready means by which inventors may find people with production, marketing and management skills who may join with them to create a ‘company’ that together will be able to secure investment and bring an invention to market.

There is presently no common and readily accessible marketplace in and through which innovative technologies can be matched with innovative commercial applications. Such marketplaces can now be provided at relatively little expense through the medium of the Internet. B2B (business to business) exchange models and the software that drives them are now readily available and relatively inexpensive, with experienced service providers eager to support them.

- **Confidentiality** – In the field of innovation there is always concern over observance of obligations of confidentiality. Unless people have the confidence to disclose their ideas to others who may have a mutual interest in their commercialization, again no one will benefit.

A collaborative organisation of inventors and business people could establish standard terms of confidentiality for use in dealings among members and with others. Such an organisation could also enforce observance of confidentiality among its membership and pursue third parties for breaches confidence.

- **Structure** – This involves establishing clear and fair parameters for sharing of ownership, responsibility, risk and reward in business ventures.

All too often business people spend unnecessary amounts of time energy and money attempting to devise schemes of business from scratch when well-tested models exist already that require only minimum change.

A collaborative organisation of inventors and business people could offer a number of standard models for doing business. There are doubtless many successful models that

could be adapted to the needs and preferences of particular groups taking account of domestic law and regulation.

The issue, as ever, is one of confidence and trust. Where common models can be established and are recognised to be fair, these can evolve through collective experience.

There is much room here for innovation in the way in which people and businesses work together when conditions prevail that reward innovation and encourage high standards of business ethics and social responsibility.

## **University Models**

Universities have developed various models for the commercialization of technologies that are in essence collaborative arrangements that entail reaching agreement as to how rewards are to be shared between staff, students and the Universities themselves. Each has their way of handling licensing and sale of technologies, funding, and new ventures that 'spin-out' from the University to commercialise a particular technology.

The UK Government has invested £68 million in the foundation of the Cambridge-MIT Institute (CMI) that is to develop a new model for intellectual property generation and commercialization. Such expertise is to be shared with other UK universities. *Financial Times, 25.4.02*

In the UK, the Government is keen to emulate the success of the United States and ensure that the billions spent on research result in efficient transfer of knowledge and innovation to the wider economy. A number of UK Universities have well-developed methods of dealing with innovation, all working through special vehicles established for the purpose. Each has its own formula for deciding how income from successful innovations is to be divided, invariably the main sticking point and cause for contention between individuals, departments and University.

The Association of University Technology Managers (AUTM - see [www.autm.net](http://www.autm.net)) is an example of collaboration across many categories of research organisations including universities, hospitals, non-profit research organisations, government research facilities, and commercial R&D. Though a primarily US organisation, the AUTM also has member universities from other countries, including the UK, Switzerland, Hong Kong, Japan, South Africa and Russia to name but a few. The AUTM web site has links to the web sites of all members and to their technologies for sale or licence where available.

## **Inventor Associations**

The International Federation of Inventors Associations (IFIA – see [www.invention-iffia.ch](http://www.invention-iffia.ch)) has member associations drawn from 91 countries and members from 112 countries. This organisation is engaged in a variety of activities including pressing the case for a worldwide patent.

The IFIA web site includes an 'Internet Inventions Store' offering more than 350 member technologies for licence and sale. The association also promotes technology fairs and other activities designed to bring members' innovations to the attention of the market.

### **Innovation and Commerce Organisations**

Releasing the stored energy of acquired knowledge, providing incentive for innovation and encouraging collaboration as a means of channelling those energies warrants deliberate intervention to provide structural incentive that will better mobilise innovation.

Innovation and commerce organisations (ICOs) should be established to provide practical support for innovation and business. Such organisations would be able to offer standard business models and terms; legal, financial and commercial consulting services (direct and from panels of independent professional advisors); enforcement and marketing services; and representation before government and trade bodies.

ICOs would be able to seek funding to support selective patent filing, prosecution and enforcement in other countries in return for a share in licensing revenues. This would ensure that successful technologies were protected, and proper return secured, in overseas markets where a patent holder would not otherwise have the resources to finance such patent coverage. Government has a number of means by which the creation of such organisations may be encouraged.

- **Legal**

One approach would be to introduce an ICO as a new form of legal entity, with specified parameters in terms of constitution, ownership, control and activities.

An ICO could be made subject to specific process concerning resolution of disputes, including compulsory technical arbitration, and have the right to pursue infringements of members' rights against third parties. An ICO would be able to seek insurance cover for its own and members' costs of litigation against patent infringements.

An ICO could also create its own fund from which to finance enforcement. Patent holders who have registered patents in home and foreign markets that are being used profitably by others have the opportunity to combine resources in order to convert infringements into income. The idea of constituting a collective of patent holders in the form of a Patent Defence Union is made by Professor Kingston in his paper "Enforcing Small Firms Patent Rights".

ICOs could set their own rules for admission and handle their own member disciplinary procedures, perhaps with right of appeal to an appropriate government tribunal or to the Courts.

- **Fiscal**

A variety of tax concessions and other incentives could be afforded to ICOs to encourage membership and thereby participation in the formal economy. These could include incentives for investors, including concessions for investment trusts and other forms of securities and investments in technology innovation and commercialization.

Tax relief on royalty income received by members of ICOs from licensed technologies from which ICO membership contributions could be drawn would allow ICOs to become quickly self-sufficient. Tracking revenues in this way would ensure that high membership fees did not exclude potential new members. Successful members with higher revenues would pay more but would also be more likely to require litigation support from the ICO as their inventions would be commensurately more likely to be infringed.

ICOs could be given the choice of operating as non-profit making organisations and therefore be afforded other forms of tax relief in order to keep their administrative costs, and therefore membership fees, to a minimum.

- **Funding**

Government could provide grants, loans and guarantees to finance the establishment of ICOs as well as participating directly as members contributing government owned technologies for dissemination to the market.

Subsidies could also be provided to Universities and other research institutions conditional on membership of an approved ICO so as to encourage more market-oriented research.

## **Innovation and Commerce Exchange**

Each country should establish a single electronic marketplace where all innovations, whether patented or not, are indexed (perhaps according to TRIZ principles), listed in complete detail and accessible to authorised users who have subscribed to rules governing access to and participation in the exchange. Such rules would provide for notification to, acknowledgment and fair reward of contributors whose innovations are utilised for commercial purposes, whether or not covered by patent.

One key requirement of such a service would be the user's acknowledgement of the rights of the contributor in any innovation that the user wishes to use, and the contributor's commensurate right to receive fair reward for that use. Innovations covered by patents would earn greater reward where the licensee is able to secure sole or joint exclusive rights and those rights are capable of being enforced by or on behalf of the patent holder.

In order to promote greater dissemination of technology innovations, and so as to avoid protracted and expensive negotiations, such markets could also provide for industry adjusted standard scale rates of licensing royalties or one-off capital payments.

Such markets, though voluntary, would benefit also from recognition under law (perhaps with oversight from a government appointed watchdog) and the support of State sponsored dispute resolution services such as the compulsory technical arbitration suggested above. An online exchange would have the means to track all data accessed or downloaded and all communications exchanged by users in the event of subsequent dispute.

### **Business Matchmaking**

During the Dot.Com boom, ingenuity abounded as people put their ideas forward for funding in a way never seen before. Venture capitalists complained of receiving literally hundreds of business plans every day most of which failed to meet their investment criteria.

One common reason for rejection was that there was insufficient management and commercial expertise on the applicant team, covering marketing, finance and so on. Technical people submitted plans that they simply did not have the commercial acumen to realise. Despite receiving many plans covering similar commercial propositions, VCs do not see it as their role to introduce complementary teams who together might succeed. One simple reason for not doing so was that they were generally bound by non-disclosure agreements.

An Innovation and Commerce Exchange such as is envisaged here should include a 'dating' service to bring inventors and business people together, matching technical expertise with industry knowledge and management skills. An Internet-based marketplace is ideally suited to such a service.

### **INVESTMENT AND CAPITALIZATION OF INNOVATION**

Investment can take many forms, from providing cash to assigning assets for use in a business. Most investors expect returns significantly greater than the amounts invested. The amount of return expected and means by which that return is realised vary according to the nature of the investor and the risk involved.

Investment is indispensable in the field of research, and to new businesses that require substantial start-up capital to achieve their potential rather than growing organically over time. Investment is also needed where rapid growth is desired, to finance new plant, acquisition of another business, and other step changes that require large amounts of capital that the business does not have.

It is important to remember that Banks, though they have a valuable role to play in supporting business, are not investors. Banks lend money against collateral over which they have control and that is certain to provide full recovery of the amount loaned in the event of a default by the borrower, such as a failure to pay an instalment of interest due.

In addition to traditional investment, there are examples of financing models applied in the field of intellectual assets that have allowed businesses to raise capital funds against future revenues from exploitation of those assets.

### **Venture Capital**

It is commonly suggested that the Venture Capital (VC) market is the ideal source of investment capital for technology-based business as it is less risk averse than the mainstream investment market. The VC market is characterised by large funds to which high net worth individuals and other investment funds contribute, managed by a dedicated team working within the terms of reference of the fund.

For those that remain, their formula is invariably the same: invest only in business with a clear track record, identifiable customer base and high growth potential offering the prospect of early 'exit' at high return within 1-3 years. In return for investment in a business, the VC will require a substantial share of equity, often leaving the original owners as minority shareholders. Exit involves disposal of the VCs stake in the business such as by trade sale or public offering.

VC investment is therefore ideal for those business people who are happy to give up control and a larger part of the ownership of their business to investors who want to make quick gains and leave. In short, VCs are not in it for the long term and their sole objective is to secure maximum return on their investment within the shortest possible timeframe. Such investment criteria will often not suit the longer-term view that technology research and development demands, though is still of value to the commercialization of developed technologies.

### **Business Angels**

This is the name given to individual investors who alone or alongside others generally invest smaller amounts of money than VC funds and often offer management support, perhaps even taking a non-executive Board position so as to be able to monitor a business more closely. Such investors are often retired business people who bring with them considerable commercial expertise and experience.

Like VCs, Business Angels look for equity participation (shares in the business) and may exit when a VC becomes involved but are generally likely to take a longer-term view. Such investors are particularly encouraged by tax incentives.

### **Corporate Venturing**

This is the name given to investments made from funds set aside by large companies. These investments vary from company to company. Some use these funds for spinning out parts of the company's business or some new initiative that is thought more likely to succeed outside the company. In other cases, investments are made so as to allow companies to gain a closer understanding for example of specific areas of technology or new software tools that the company needs to know more about as having some possible future relevance to its business.

## **IP Asset Based Financing**

Intellectual asset based financing has been developing gradually over recent years. Investment banks have provided capital of an amount representing a percentage of future licence revenues. The projected revenues are calculated, discounted for risk and then further reduced so as to provide an acceptable margin of profit for the provider of the capital.

This type of financing came to prominence when the artist David Bowie secured USD 50 million in return for handing over his expected royalty revenues for 10 years. The same technique has been used for patent portfolios. A variety of structures are used, most common being the creation of a special purpose corporate vehicle to which the assets or the right to receive licence revenues are assigned.

## **IP Asset Derivatives**

One proposal put forward by Alexander K. Arrow, formerly of The Patent & Licence Exchange Inc, is the creation of Technology Unit Investment Trusts (TUIT) comprising bundles of technology assets whose collective value is represented by future licensing revenues. Under such schemes, IP owners would not have to give up ownership of their technologies but take a share in the ownership of the TUIT commensurate with the computed value of the assets they have contributed.

The TUIT concept may be ideally suited as a means of generating funding for members of ICOs. Members would be able to contribute their innovations so as to create an asset pool from which capital funding could be raised for further innovation and commercialization.

Such new ideas should be encouraged and the investment community at large should be asked what conditions it would consider favourable to investment of the funds that they manage.

This could give rise to new forms of investment fund designed to exploit the opportunities created by new technology collectives and encouraged by tax concessions/incentives and improvements in the enforcement regime.

## **Valuation**

In ordinary business transactions value ultimately has more to do with perception than calculation. In a free market, a buyer will always pay the least possible and the seller will seek the most. The respective needs and circumstances of buyer and seller and their direct and collateral relationships will all have an influence on the day.

There is only so far one can go with valuation theory. The various and complex tools available are in the end used to justify the price objectives of buyer and seller. Any method for projecting future value necessarily depends on making assumptions. If the parties agree on those underlying assumptions and on the formula applied then well and good. If not, then traditional negotiation, albeit more scientifically based, will take its course.

The sale and licensing of technologies give rise to issues of valuation and respective bargaining power that often leave the smaller player disadvantaged. Ensuring that sellers have



access to good advice as to the commercial value of their technologies can go some way to improving their negotiating position.

One way of matching the scale and economic power of the major companies is for smaller companies to participate in collaborative organisations of sufficient scale as to be able to establish their own market authority.

## **INTERMEDIARIES AND ADVISORS**

Lawyers, patent and trademark agents, accountants, technology brokers, commercial advisors, and many other types of provider have a vital role to play in providing practical counsel and guidance, and thereby reducing the incidence of business failure.

The protection of intellectual properties through registration is a specialised discipline and one that demands careful planning and management. Equally, the business models through which those assets realise their value must also be constructed with care and consideration for the many issues that can arise. Professional advisors have a key role to play in innovation and commerce.

While some business people have the benefit of specific business education, the vast majority do not. Government can hope to offer information and some general guidance to citizens through dedicated agencies, however it is the professional services sector to which businesses traditionally turn for advice. The professions will be encouraged to gear up to meet a demand for service when they can see that service opportunity being generated through measures to promote commercialization of technologies.

## **CONCLUSIONS**

What is clear is that innovation of itself is not enough. We have to address the entire journey to and through the market and consider the practical issues that confront business from the perspective of all of the principals involved. The participation of inventors, entrepreneurs, professionals, and investors are all required to achieve successful commercialization. Their particular needs and capacities must be taken into account, individually and collectively.

The present business situation in the field of technology innovation and commercialization is inefficient and inequitable. If more energy is to be released then selective intervention is going to be needed in a number of key areas. Such interventions will not please everyone and will present their own problems, yet without such initiatives one is merely tinkering and substantive improvement cannot be expected.

Stories abound of valuable intellectual properties being abused by those who know that they have the financial muscle to deter enforcement. Concerted action, perhaps subsidised by government grant, would allow patent holders to build licensing revenues from presently unauthorised users who have profitably exploited proprietary technologies. This kind of self-help is an obvious first step in building a licensing culture and generating income for investment from existing resources.

Investment capital will only be attracted to finance future value potential from innovation where investors also have confidence in the enterprise responsible for realising that potential. Investors want to see a track record of successful innovation before they will invest and so one cannot expect capital flows to improve overnight.

Innovation and commerce organisations of the kind suggested offer a possible collaborative vehicle for businesses that are otherwise too small and too dispersed to compete effectively or to attract investment. Through such collaborative organisations, combined with the power of a shared marketplace and with the right fiscal incentives, conditions for mobilising innovation could be significantly improved.

In all of this effort to promote innovation and wealth creation, the one issue that will have to be addressed is that of fair reward. This issue is particularly relevant in the context of the monopolies, and near monopolies, afforded by intellectual property rights and is being brought to centre stage as consideration is given to the impact of the WTO/TRIPs (Trade Related aspects of Intellectual Property) agreement of the WTO on developing countries.

It is often said that business is driven mainly by fear and greed, and this is sadly not far from the truth. The seemingly insatiable demands of the stock markets for ever-greater profits have distorted values in every sense. While all wish to leverage their intellectual assets for maximum return, a balance has to be struck that promotes innovation and fair reward yet still allows responsible business to find profit opportunity and growth.

All these challenges should be thrown out to our academics, professionals and business people to encourage fresh thinking and practical proposals. Government policies can serve to establish the right conditions for innovation and commercialization. The rest is up to the market, which when it sees the opportunity will not be slow to innovate and exploit new ways of generating value.