A framework to comprehend the position of intellectual property rights in complex organisational capital

Gouri Gargate* and Karuna Jain

Shailesh J. Mehta School of Management,
IIT Bombay,
Powai, Mumbai – 400 076, India
E-mail: ggouri@iitb.ac.in
E-mail: kjain@iitb.ac.in
*Corresponding author

Abstract: The objective of this paper is to provide an IC-FC-OC-IPR framework for efficient intellectual property management (IPM) of an organisation. The nature of this research is exploratory. The framework describes context and position of intellectual property rights in a complex organisational capital and acts as a starting-point for researchers to do research in an area of IPM. Three new constructs are introduced which will categorise IPM at three different levels. IPM activity matrices can be developed using three constructs and related three measurement parameters suggested in the paper. Integration of innovation process and IPM is practiced in Fortune 500 organisations but considering organisations in developing world, the scenario is different. These organisations are struggling for efficient IPM. This paper gives structured framework to address this research gap. The limitation of this paper is that the framework has been validated in electrical industry sector.

Keywords: intellectual property; intellectual property management; IPM; intellectual capital; financial capital; innovation; organisational capital; integrated intellectual property management; intellectual property portfolio; Intangible assets; IP strategy.

Reference to this paper should be made as follows: Gargate, G. and Jain, K. (2013) 'A framework to comprehend the position of intellectual property rights in complex organisational capital', *Int. J. Intellectual Property Management*, Vol. 6, No. 3, pp.201–216.

Biographical notes: Gouri Gargate has over 15.5 years experience in academics and intellectual property domain. She has legal, technical, management and intellectual property background. She is registered patent agent, patent analyst and currently pursuing research in intellectual property management from IIT Bombay, India. She has presented her research work in IPR at international conferences like PICMET.

Karuna Jain is the MHRD IPR Chair and Professor of Technology and Operations Management at Shailesh J Mehta School of Management, Indian Institute of Technology Bombay. She is an Electrical Engineer with Doctorate in Industrial Engineering from IIT Kharagpur followed by a Post Doctorate Fellow from the University of Calgary, Canada. Her active research interest spans across the areas of theorising and applying strategic management of technology and innovation, supply chain management, project management and strategic intellectual property management. She has published extensively on

technology and operations management of these areas in international journals, conferences and national journals (*EJOR*, *JIC*, *PICMET*, *POMS*, *IAMOT*, *DSI*, *ISDSI*, *PMI*).

1 Introduction

Knowledge stocks and flows are interrelated because organisations with higher capacity to absorb knowledge will also have higher propensity to utilise and circulate it (Cohen and Levinthal, 1990). Management expert Drucker (1993) suggests the arrival of new economy and knowledge society. Today, knowledge-based firms, such as consultancy firms, law firms, accounting firms, investment banks, and software developers, have fuelled our economy. Nonaka and Takeuchi (1995) are convinced that knowledge management is an important source of international competitiveness. The 'q ratio' developed by Nobel Prize winner Tobin shows the significance of intangibles. The steel industry and software industry have Tobin's q ratios of 1.00 and 7.00, respectively. In the early twentieth century, it was thought that all the information in the world doubled every 30 years (Bontis, 2001). This affirms the importance of intangible assets (IA) management.

Although IA may represent competitive advantage, organisations do not always fully understand their nature and value. As intellectual property (IP) is comprehensive and the range of assets covered by those rights is diverse and extensive, it is difficult to apprehend their commercial importance and the scope of exploitation. The huge market-to-book ratios, which have increased dramatically for firms like Microsoft, Astra, Rentokil and Oracle during the 1990s, often justify the current interest in intellectual capital (IC) (Stewart, 1997).

The growing difference between firms' market value on the stock exchanges and their book values, or more precisely their equity values, is said to reveal IC. Total worldwide revenues from patent licensing increased from US $10 billion in 1990 to US $110 billion in 2000 (WIPO, 2008). The international anti-counterfeiting coalition estimates that fortune 500 companies spend an average of between US $2 million and US $4 million each year in their attempts to fight counterfeiters (Sie and Fryxell, 2004). Considering the enormous importance of IC and statutory requirements of auditing IA, it is necessary for organisations to understand the position of intellectual property rights (IPR) in organisational capital (OC) for efficient management.

Auditors, lawyers, and technology managers look at IP from different perspectives. Literature available on IPR is diverse, creating confusion regarding the precise position of IPR in OC. Auditors categorise IPR into five categories under financial capital (FC). The five categories are marketing-related IA, customer-related IA, artistic-related IA, contract-based IA, and technology-based IA. According to law, IPR are classified as industrial property which includes four categories patents, copyrights, trademarks and industrial design and other IPRs as semiconductor layout design, geographical indication, trade secrets, and protection of plant varieties and farmers' rights. In a business context, the IC appears in the form of customer lists, magazines, service or supply contracts, packaging design, and so on.

From a researchers' viewpoint, IPR are positioned differently. Sullivan (2000) suggests that IPR are the outcome of IA. Bontis (2001) pronounces that IPR are not IC.

According to Litschka et al. (2006), IPR are codified assets. Narvekar and Jain (2006) provides framework proposing IPR are outcome of IC.

Considering the above-mentioned scenario, the question arises: what are IPR and what is the position of IPR in complex OC? Are IPR a part of IC, are they FC, or are they part of both FC and IC? To answer the above mentioned questions, the paper reviews the literature on IP from the perspectives of IC, FC, technology management, and law, and carries out mapping of innovation process with IP management (IPM) process.

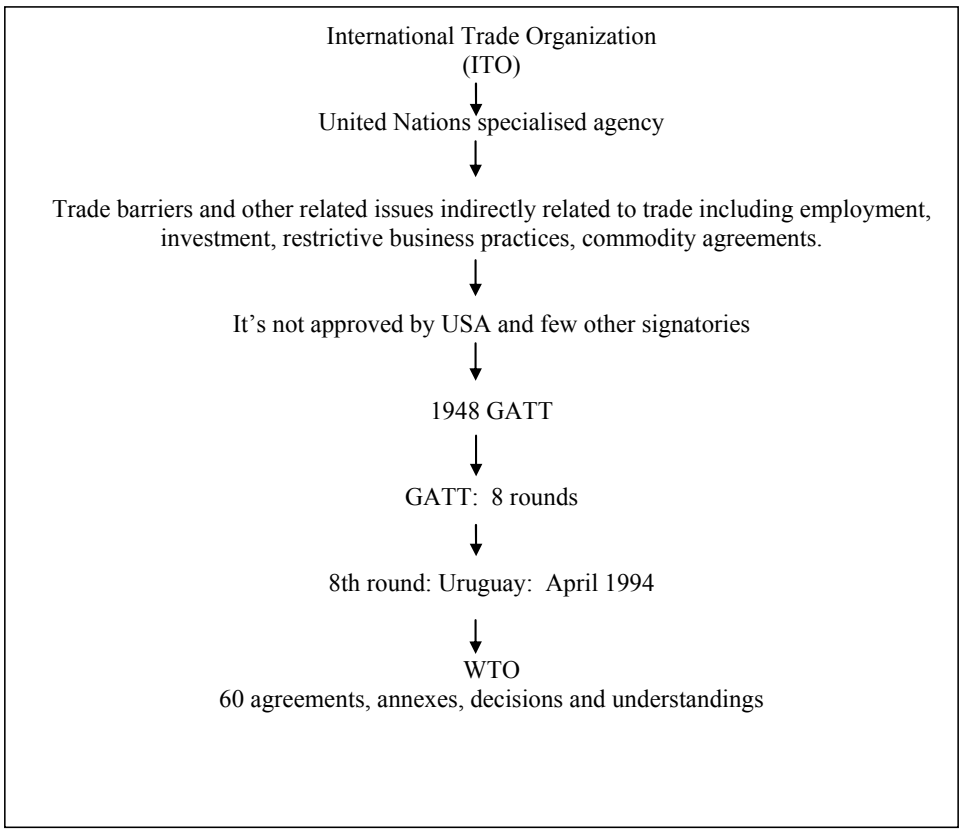
The framework promises to serve as a rich source of concepts, routines and mechanisms to create and sustain competitive advantage among senior leadership and concerned personnel in IPM. This paper is divided into three sections. The first section sets background of IP by sharing the development of IPR system, IPR types, and IPM. The second section analyses the literature on IPR in IC, FC, law, and business perspective. The third section proposes the framework that defines the position of IPR in OC.

2 Development of an IPR system

The IPR system has its roots as far back as 3,200 BC. In 3,200 BC, Potter marks found on fired clay pots, including jars buried in tombs of the First Dynasty Egyptian kings, providing a precursor to trademark protection (Grandstand, 2000). Northern Italy during the Renaissance is thought to be the cradle of the IP system, so the concept is not a new one (Idris, 2003). The first copyright was issued at the time the printing press was invented in the 16th century, and the first patent was issued in Florence in the 15th century to Filippo Brunelleschi for a floating architectural crane (Hall, 1992). A monopoly was granted to the stationers company, which had sole permission to print documents as a means of censorship to control what was printed. Trademarks are the oldest category of IPR (Hall, 1992). Over the years, with the development of science and technology, the world has seen shifts in economy from farming- to industry- to knowledge-based economies. These shifts mirror the shift from local patent law codification to the global patent era. Industrialisation was the driving force behind this global IP system. There are various philosophies behind the IP system development, such as John Locke's labour theory, Plato's collective ownership and common interest theory, Aristotle's private ownership theory, Hegel's holding of property theory, and so on.

Nations all over the world have attempted to develop a single international IPR protection system for over 100 years with a creation of several agreements and treaties, such as the convention of Paris for the protection of industrial property in 1883, the establishment of World IP Organization (WIPO) in 1967, the formation of trade-related aspects of IPR (TRIPS), the General Agreement on Trade and Tariffs (GATT), and the development of World Trade Organization (WTO). Protection is of immense importance because organisations use brands and technological know-how to enter foreign markets or to create competitive advantages from scale economies facilitated through the host country (Gillespie et al., 2002). WIPO and WTO, international bodies for IP governance, assist in harmonisation of IP policies. In alignment with those policies, businesses create their own IP policies and developing strategies to manage IP. Developmental history of WTO and TRIPs is shown in Figure 1, showing the history of IP protection and the implementation of a well-organised global system.

Figure 1 TRIPs history



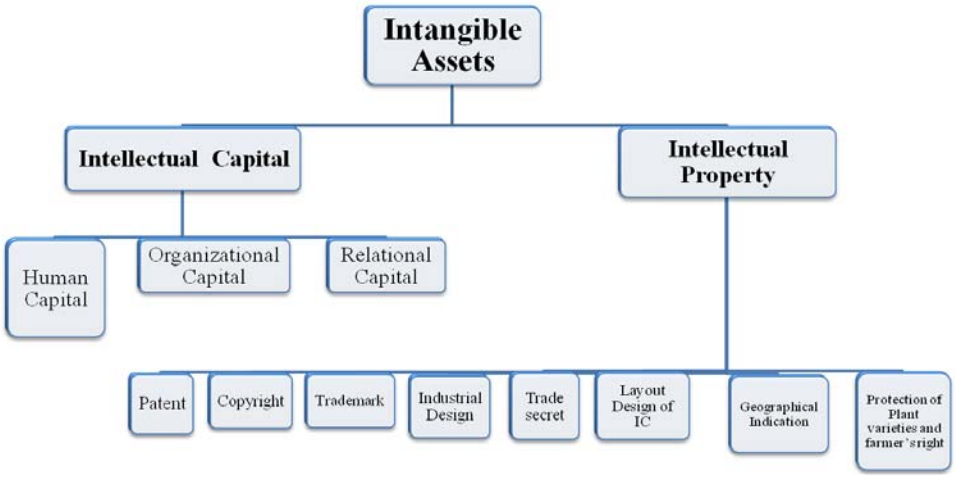
2.1 IPR types

Many organisations have appreciated the importance of IPR, considered to be a power tool for economic development and wealth creation if used proficiently. Global acceptance and utilisation of IP tools confirm that in future there will be greater innovation and economic growth of nations by maximum exploration of IA (Idris, 2003), stronger IP rights in developing countries will increase imports significantly (Maskus and Penubarti, 1995).

Various nomenclatures and arenas are included in IA. Intangible resources are named as knowledge, invisible assets, absorptive capabilities (Cohen and Levinthal, 1990), core competencies, strategic assets (Amit and Schoemaker, 1993), and core capabilities (Zander and Kogut, 1995). IA are also referred to as organisational memory (Walsh and Ungson, 1991). As stated earlier in Section 1, IA are classified differently when viewed from law, financial, and business perspectives. Authors have focused on IPR classification according to law, which is shared in Figure 2. IA are classified into two categories: IC and IP. IC is further classified into human capital, OC and relational capital. IP is classified further as patent, copyright, trademark, industrial design, layout design of IC, geographical indication, trade secrets, and protection of plant varieties and farmer's rights. For each IP, separate Acts are enacted in various countries, under TRIPS

guidelines. For example, in India, patents are protected under the Patent Act of 1970; copyright is protected by the Copyright Act of 1857; and so on.

Figure 2 IPR types (see online version for colours)



2.2 IP management

IP is sometimes referred to as 'hidden value'. Whether hidden or expressly valued, patents, copyright, trademarks, industrial designs, and trade secrets are significant contributors to enterprise value. Possessing and increasing the value of assets is one of the objectives of many firms and these firms are working hard to improve in their current assets section of their balance sheet. However, in a turbulent competitive business environment, strong current assets alone do not guarantee a firm's sustainability (Hall 2011).

In recognition of the impact of IP on the strategic, financial, and competitive aspects of business, IPM is developing a role in business strategy and is receiving due weight. IP strategy is determined by competitive environment, technology position, and size of business and maturity of business. Corporate executives are becoming more aware about IP and their ownership to avoid any financial loss which may arise due to mismanagement of IP. Various corporations have created diverse roles such as IP director, knowledge manager, information scientists, and so on, to address IPM responsibilities. Organisations are allocating parts of their budgets to IP portfolio development. Along with R & D budget, IPM budget is also increasing.

Since 1970, the IPM approach has changed gradually as defensive use, increased licensing activity, IP process management, IP licensing business, IA management, and now the strategy applied is integrated IA management. The objective of IPM is to capture maximum value from IPR compared to value invested. IPM requires planning, creation, time management, portfolio review, and value creation. To create strong IP portfolio, organisations need to identify IPs owned by an organisation. It has been reported that 67% of US companies own technology assets that they fail to exploit (assessed at between US $115 billion to US $1 trillion). About US $100 billion is tied up in such idle

innovation within the IP portfolios of big companies. This demands immediate attention from economists and senior management.

3 Research methodology

The nature of this research is exploratory. The method adopted for the study is combination of literature survey, expert opinion, and case studies. An analytical approach and inductive logic is used in the research. Yin (2009) defines a case study "as an empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident". This report is based on a review of literature in the areas of IC, IPRs, IPM and IP audit systems followed by law firms, and IP audit systems followed at national, industry, and firm level. Based on the literature review, a preliminary IP audit framework is conceptualised and then further developed. The study examined a sampling of firms that are engaged in generation, protection, and exploitation of IP. The responses of the IP and R & D managers and other related staff are captured using qualitative methods.

The framework is validated by the method of case study. Though case study is the best option, it is challenging to perform case study in the IP domain. The major challenge in case study is access to data, as IP data is very confidential. Secondary data sources are available but have their own limitations. In-depth interviews helped to gain insight into the IPM practices at organisations.

4 Analysis of literature

Traditional annual reports have concentrated on reporting tangible assets. It is often difficult for accountants and economists to allocate an orthodox valuation to intangibles. Skandia made efforts to report an organisation's IA, and now various approaches are available (Bontis, 1998). Lief Edvinsson, a prominent figure in the field of IC, insisted on decreasing the volatility of the world's stock exchanges, believing that due to wide fluctuations, the real value of a company remains unknown. According to Edvinsson, decreasing volatility is possible if there is collaboration between the Security Exchange Commission (SEC) and International Accounting Standards Committee (IASC) in mapping the unseen wealth of the corporate world that are not able to be valued accurately.

Managers do not know the value of their own IC. They do not know if they have the personnel resources, or business processes in place to make a success of new strategy (Bontis and Nikitopoulos, 2001). Various models have been suggested for IP valuation, but there is a lack of system to take stock of IP. The reason may be difficulty in understanding and realising the IC and further challenges relating to measurement. As a result of these difficulties, the area remained relatively unattended (Luscombe, 1993).

Therefore, there is need to develop methodologies, processes, and valuation systems that will help to take stock of IC. This is achievable only with a clear understanding of the process of IP generation, protection, and extraction. Researchers have mapped these IPM phases with innovation processes. Innovation is the outcome of IC. Therefore, indirectly, the IC stock of an organisation can be valued.

4.1 IPR and FC

In most fields, including business, past events is examined for the purpose of improving in future. Financial reporting, accounting, and auditing provide perspectives on past performance. Valuation of business provides future perspective. The paradigms of accounting are strongly influenced by tangible assets, which follow recording business items at their price in a commercial transaction. There are multiple challenges in accurately determining the value of IP and their price in commercial transactions. Accounting has always been reluctant to anticipate future gains, but when it comes to IP, this anticipation is the only way to value IP. IA of a corporation are thought to be three to four times the value of tangible assets.

Tangible assets are very well considered and managed by organisations. Fixed assets and current assets fall in this category. These are considered to be the FC of an organisation. Auditing of FC is mandatory for all organisations. The Securities and Exchange Commission (SEC) designated the Financial Accounting Standards Board (FASB) as the organisation responsible for setting accounting standards for FC auditing. The FASB's primary purpose is to develop generally accepted accounting principles (GAAP). GAAP have suggested guidelines for auditing FC (Chang, 2003).

In 2002–2003, IA were considered to be FC and their reporting made mandatory, and IA accounting was a statutory requirement for US organisations. GAAP defines IA as those assets (not including financial assets) that lack physical substance. Since the definition of asset is critical, GAAP Statement 6 provides a carefully worded definition with three essential facets, adds nine paragraphs explaining the characteristics of assets, and devotes a significant part of appendix B to the statement to elaborate upon the concept of assets.

4.2 IPR and IC

IC is conceptualised in numerous disciplines, offering a mosaic of perspectives. IC is an outcome of knowledge management and has been defined as the difference between a firm's market value and the cost of replacing it – that which we normally cannot put a price tag on (Bontis, 1996). Within the category of IC are concepts such as distinctive competence (Selznick, 1957), strategic firm resources (Barney, 1986), invisible assets (Itami, 1987), strategic firm specific assets (Dierickx and Cool, 1989), core competencies (Pralhad and Hamel, 1990), corporate capabilities (Nohria and Eccles, 1991), dynamic capabilities (Teece et al., 1994), combinative capabilities and other just waiting to publish (Bontis, 2001). Measurement of IC is a big challenge. Accountants are interested in how to measure IC on the balance sheet.

Scholars have proposed various frameworks to define IC and its position in OC. According to Steward (1997), IC is intellectual material that has been formalised, captured, and leveraged to create wealth by producing higher-valued asset. The most accepted definition of IC is as follows. IC is defined as encompassing structural capital, human capital and relational capital. A few widely accepted frameworks include the IC framework by Bontis (1998), classification of IA (Litschka et al., 2006), IC of firm (Sullivan, 2000), and the reconceptualisation of IC (Narvekar and Jain, 2006).

4.3 IPR and law

Laws protect the outcome of IC and generate IPR. IA are classified as IC and IPR as shown in Figure 3. As stated above, IP are protected by respective laws such as Patent Act, Copyright Act, and so on. IC includes human capital, relational capital, and OC. The intellectual output of IC is protected by civil law, criminal law, and common law, as applicable, along with laws specific to IP. Civil procedure code (1908), Criminal procedure code (1973), Indian penal code (1860), Contract Act (1872), and tort, among others, protect intellectual output of non-IPR IC. For example, a dispute raised due to breach of contract can be resolved by following Contract Act guidelines in a court of law.

4.4 IPR and business perspective

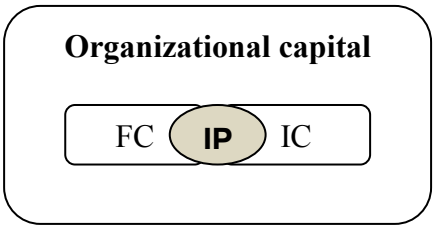
The business outlook on IPR is entirely different than that of law, IC, and FC. IPR are classified in various categories, including business method or plan, software marketing concepts, packaging design, customer lists, customer contracts and related customer relationships, non-competition agreements, databases, advertising, company and business names, logos, slogans, symbols, business idea, secret formulas, processes, recipes, mask works, and so on.

5 The proposed theoretical framework

Considering the relationship between FC, IC, and IPR, it is comprehensible from the above-mentioned literature that IPR be considered FC or that its accounting is a statutory activity of an organisation. Similarly, IPR are part of IC. Various approaches suggested by researchers show the position of IPR in IC. Thus FC, IC, and IPR are interrelated, but their exact relationship is not clear. To resolve this perplexity and to understand the relationship between FC, IC, and IPR and where exactly IPR fits in OC, authors analyse available literature to develop a research framework for further study of IPM.

Literature supports the position of IPR in both FC and IC as part of OC. The abstract presentation of interrelation between IC, FC, and IPR is represented in Figure 3. This forms the basis for further elaboration of the research framework.

Figure 3 IC-FC- IPR framework (see online version for colours)



5.1 Innovation capital

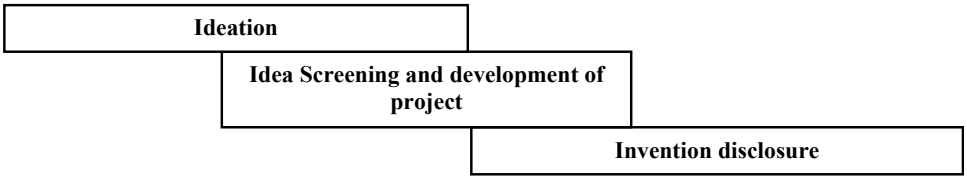
OC includes FC and IC. FC includes traditional tangible assets. These are all documented and audited every financial year in a statutory activity followed by almost all organisations.

IC is divided into three subtypes: human capital, relational capital, and structural capital, along with cognitive capital, conative capital, and affective capital. Conative capital refers to the aspect of mental processes or behaviour directed toward action or change. Cognitive capital refers to the mental process of knowing and includes aspects such as awareness, perception, reasoning, and judgment. Affective capital refers to feelings and emotions about the innovation project, motivated by desires, values, and beliefs. These six forms of capital together make up the innovation capital of an organisation. Innovation capital is responsible for innovations and inventions, and IC generates innovations and inventions through innovation process (Narvekar and Jain, 2006).

5.2 Innovation process

The innovation process comprises the following steps: ideation, selection of ideas for development, pilot plant, scale-up, and the product or process to be practiced at a large scale. Innovation management process is categorised into three stages broadly and can be represented as shown in Figure 4. These three processes are overlapping; that is, before end of the one step, the next step starts.

Figure 4 Innovation process

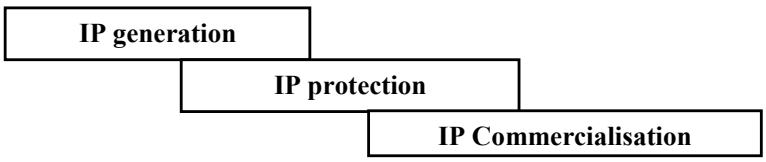


IPR are the outcome of the innovation process. Not all innovations can be converted into IPR. Only those innovations that qualify for the criteria of IP laws generate IPR. IP commercialisation produces tangible assets, and tangible assets produce FC.

5.3 IPM process

IPM process is categorised into three stages broadly: IP generation, IP protection, and IP commercialisation. This process is shown in Figure 5. These three steps of IPM are overlapping; that is, before the end of one step, the next step starts.

Figure 5 IPM process



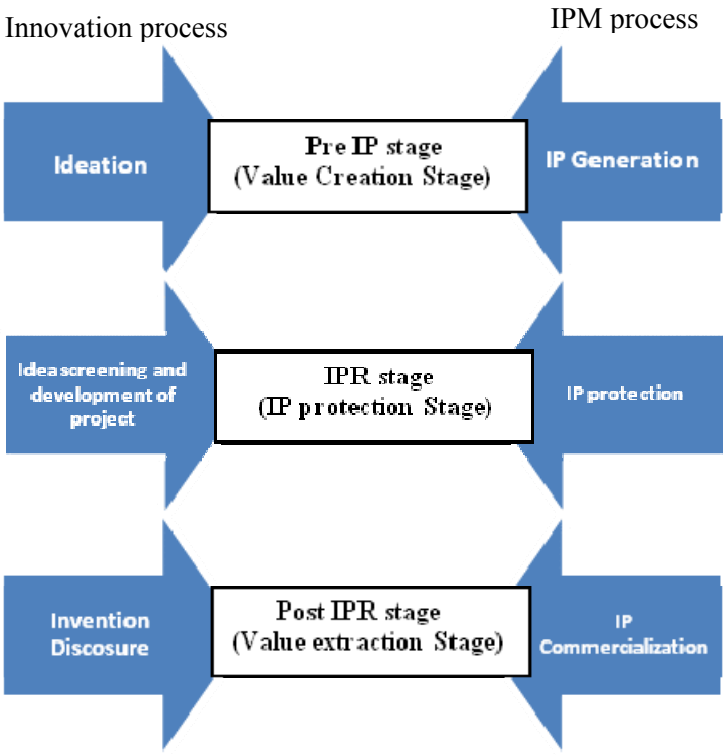
5.4 Mapping of the innovation process with the IPM process

The mapping of both the innovation process and the IPM process shows that the three steps of innovation process and the three steps of IPM process are parallel. The first step of innovation process is 'ideation' and the first step of IPM is the IP generation stage. The second step of innovation process is the idea screening and development of project – that is, the IP protection stage of IPM. The third stage of innovation process is the 'invention disclosure' – that is, the IP commercialisation stage of the IPM process.

5.5 Development of new constructs

The three stages depicted above are named by authors as pre-IPR stage or value creation stage, the IPR stage or IP protection stage, and the post IPR stage or value extraction stage. These three new constructs, presented in Figure 6, divide IPM into three distinct categories. This distinction will help to focus each step of IPM. Careful management at each stage ensures complete IPM.

Figure 6 Three constructs of IPM (see online version for colours)



These three stages produce three categories of IPs: potential IP, unused IP, and used IP. The pre-IPR stage produces potential IP, IPR stage produces unused IP, and post-IPR stage produces used IP. Authors have proposed definitions for these three IPs. Potential IP is defined as "it is an intellectual output of intellectual capital in the form of the concepts or ideas which are having capability to fall in category of at least one type of

IPR". 'Unused IP' can be defined as "idle IP which is not exploited commercially for revenue generation in any form". 'Used IP' can be defined as "IP which is exploited commercially to generate revenue in any form". Used IP may be acquired IP. Figure 7 represents these three constructs with three types of IPR: potential IP, unused IP, and used IP form the integrated IP portfolio of an organisation. For efficient IPM all three types of IPs need to be managed.

Figure 7 Three constructs of IPM with IP types

Pre IP stage (value creation stage)	IPR stage (IP protection stage)	Post IPR stage (value extraction stage)
Potential IP	Unused IP	Used IP

5.6 Mapping innovation process and IPM process with IC component and FC component of OC

The relationship between IPM process and innovation process is well accepted. Both processes have common characteristics and are dependent on each other. The study shows that innovation process is well ingrained in organisational culture and various tools and models like the stage gate model or the jolly model are available for innovation management. IPM processes are still to be established in many organisations. Understanding the relationship between these processes that is IPM and innovation process will trigger the establishment of an efficient IPM process. To understand the relationship between these processes, both processes are mapped in relation to the IC and FC components of OC. This is presented in Figure 8.

In the framework, the pre-IP stage is positioned in the IC component of OC. Pre-IP stage produces potential IP. The second stage, IPR stage, produces unused IP. These may or may not be able to be commercialised, because some IPR might be created as part of the defensive strategy of an organisation or as future prospectus, depending on business strategy of an organisation. At this stage, IPR move slightly towards the FC side of the OC, as shown in framework. The third stage, post-IPR stage, produces used IP. Here, IPR move completely to the FC side of the OC, as shown in Figure 8. Acquired IP may fall in the used IP or unused IP category, depending on its commercialisation status.

Furthermore, IC and FC can be oriented by considering the role of IC in generating FC. For the exploitation of unused IP, IC is required, which involves tacit knowledge and know-how. Once the unused IP is used on a large scale for product or process, it generates the tangible assets of an organisation, known as FC. This FC generates revenue for the organisation. Therefore, IPR are integral parts of IC and FC. Considering the above facts, IPR overlap with both IC and FC.

This framework can be illustrated with an example of process innovation. IC innovation will result in the development of new processes. If a process fits in IP law norms, it will generate a process patent, one form of IPR. This patent, if exploited, will generate revenue, thus creating FC. At the same time, to exploit a new patented process, disclosed in patent document, know how is required, know-how which is part of IC. Thus, IPR are FC and are capable of generating revenues; however, to exploit IPR, IC is required.

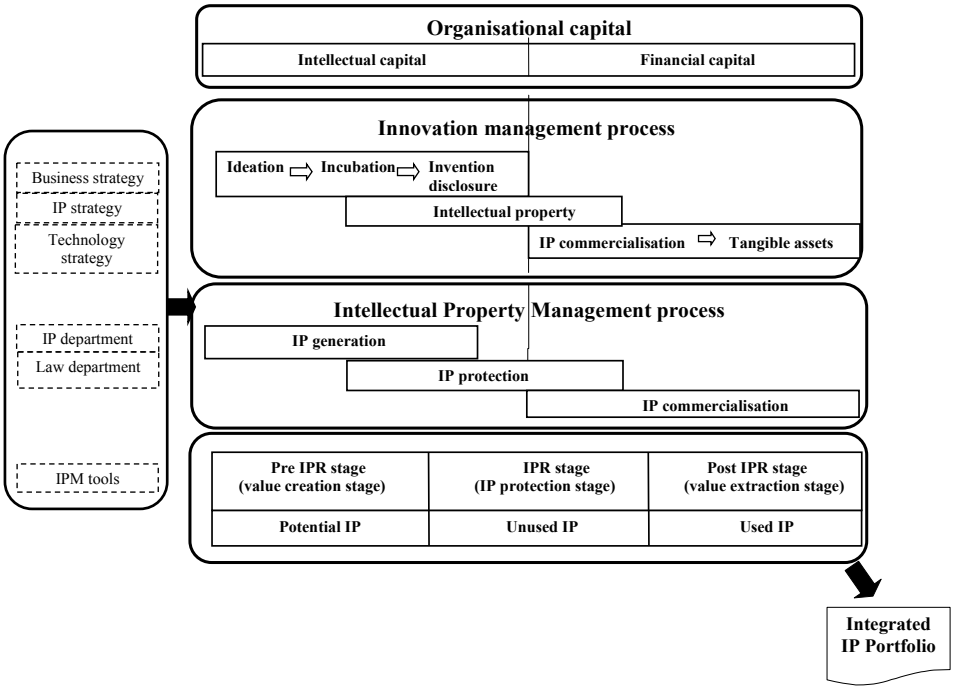
For the successful integrated IP portfolio, adequate resources and robust strategies are needed. Resources include human resources skilled in law and IP, along with financial resources. An IP department takes care of technology and of the IP perspective in the form of competitive intelligence, technology forecasting, freedom-to-operate (FTO) analysis, novelty analysis, and so on. A law department takes care of technology transfer agreements, patent drafting and other IP filing, prosecution, technology transfer, and a commercialisation-related role. The strategies include business, IP, and technology strategies of an organisation. The integration of these strategies and the involvement of top management will help organisations create a strong IP portfolio, which in turn will help organisations to position themselves in a competitive business environment.

Based on this framework, organisations can segment IPM into pre-IPR stage, IPR stage, and post-IPR stage. This segmented IPM design will help focus each stage and can encourage an IP-conducive environment.

Strategy and resources play a major role in IP portfolio development. Some organisations are more innovative but are not IP-savvy, so though highly innovative may not have vast IP portfolio. Other organisations are IP savvy or IP dependent; almost every innovation will be captured and checked for inventiveness, creating a vast IP portfolio. Thus, the business strategy of an organisation plays a crucial role in defining the IP portfolio of an organisation. Similarly, resources play a foremost role in IP portfolio building, as IPM requires financial support and skilled human resources.

The novelty of the proposed framework is that it provides the mapping of an IPM process, taking into account the FC and OC of an organisation. The three constructs provide the three measurement factors as potential IP, unused IP, and used IP, produced at the pre-IPR stage, the IPR stage, and the post-IPR stage, respectively.

Figure 8 Research framework



5.7 Validating the framework

5.7.1 Introduction

IC, innovation, and IP identification are intangible constructs, and measuring these constructs and establishing causal relationships with firm performance is a challenging task. The IP creation and protection system is not neatly organised, but is a full of contradictions, uncertainties, and ambiguities. The process also demands close interaction among law department and R&D, along with other divisions of an organisation with the involvement of a liaison to facilitate the process. Business strategy and organisational culture play a central role in the IPM process. The modern approach is to identify cause-and-effect relationships in this chaotic environment, thereby trying to impose generalised rationality on a phenomenon subject to local rationality, if any. The post-modern approach does not seek universal truths or organising principles, but seeks local knowledge and insights to develop capacity for reflection and reflexivity in managers to address and accept the chaos and, if possible, manage it (Boje, 1996). As stated in Section 3, expert opinion, in-depth structured interviews, and literature analysis are used as the research methodology to develop the framework. The framework developed is validated, using the case study approach. The two major criteria applied for selection of cases are that the organisations are from single sector (the electrical sector in India) and are active in IP generation. The official data from government agencies and various reports from IP authorities in India are used to select the organisations.

5.7.2 Organisation scenario considering IPM

Case studies demonstrate that organisations are struggling for efficient IPM. IPM is becoming a great challenge to these organisations due to lack of understanding of the intricacies of the domain; unavailability of expertise in the three domains of technology, law, and management; lack of readymade IPM tools; and inability of organisational structure to develop IP culture. Organisations considering IPM face various challenges, and IP awareness within an organisation is a biggest challenge Indian organisations face. IPR units of the organisations are active in generating IP awareness. The next major challenge to these IPR departments is the identification of IP (Bishop, 2003).

The case studies demonstrate that organisations pursue IPM activities, spread across various functions. These activities include idea generation drivers, prioritisation of ideas for new development, invention disclosure form (IDF) submissions, IP department assistance to identify IP, liaison, IP education and training to all R&D personnel, IP protection and maintenance-related activities as potential market study, special budget allocation for IP-related activities, maintenance of various types of inventories as IP types, core IP and related IP types, IP and licensing/in-house/sale-out, IP commercialisation activities such as checking and following IP regimes of new markets, and novelty check and infringement analysis, among others. For effective IPM, organisations use these practices as mentioned above. Still, organisations face problems in efficient management of IP. In addition, the development of efficiency check matrices is a challenge for these organisations.

5.7.3 Overview of organisations

The organisation under study, XYZ, is more than 70 years old, with market capital of about US $60,000 million dollars, with business spread over 60 countries across the globe. The organisation is engaged in designing, manufacturing, and marketing electrical products and services related to power generation, transmission, and distribution. The company has more than 20 manufacturing units across India and a large customer base ranging from government bodies to private organisations and individual customers. The organisation has done various successful collaborations and acquisitions, aiming to grow business across the globe. The organisation is IP savvy and won various IP awards from the Indian government and other prestigious bodies. Over time, the company has built the IP awareness within the organisation. At this stage, the organisation is proficient in building IP culture. There is wide scope of quality IP generation and the organisation will make this move in the next few years. The organisation's major concern is implementation of IP right in a country like India, whose legal system is not sufficiently robust to control the imitation of IP-protected technology.

The second organisation in the case study, PQR, is 75 years old and operates in various sectors as construction, electrical, heavy engineering, power, information, and technology. The organisation is active within India and has a global presence in almost all countries. The organisation expanded its presence through mergers and acquisitions, and it is operative in both service sectors and manufacturing. The organisation is technology-driven and is one of the topmost organisations in India in its IP portfolio. Previously, the organisation is focused on quantitative growth of IP portfolio and now the focus is shifted to quality IP generation.

The organisation is able to establish IP culture and is now fully conscious of IP quality. It is thinking of new collaborations and is opting for an open innovation model for further development. The organisation operates in very competitive environment and maintains a top position in the market. The organisation perceives IP as armaments to survive in this technological war.

5.7.4 Validation of framework

The framework developed herein aims to divide whole complex process of IPM into three broad categories. The case study shows that this categorisation of IPM helps organisations to focus on each category. Authors have given three constructs and three types of IPR to organise the IPM. The developed types of IPR are indicators to measure the performance in each stage. IP generation is measured through potential IP developed; IP protection is measured through unused IP developed; and IP commercialisation is measured through used IP. This categorisation helps to develop performance measurement matrices.

As discussed in Section 5.7.2, IPM is a multifaceted phenomenon and the activities related to IPM are vast and overlap with the innovation process. Therefore, the division of activities is an effective approach to focus on maximum utilisation of the available resources. This framework helps the organisation to divide the activities into three categories: potential IP, unused IP, and used IP. The matrices developed to check the efficiency of IPM activities help indirectly to check IC involvement and FC generation.

6 Conclusions

IP, as a key intellectual asset of an organisation, empowers the organisation to collect the complete value of their intellectual input. This paper examines the IP portfolio generation process by providing a description of the position of IPR from the perspective of IC, FC, and OC and with the involvement of drivers in the form of resources and strategies. The three constructs as potential IP, used IP, and unused IP are identified along with their exact stage of creation as pre-IPR stage, IPR stage, and post-IPR stage. This clear positioning of the three classes of IPs and their identification is a key process in creating integrated IP portfolio. Using these three IPM stages, organisations can initiate IPM interventions. This framework can be used to guide the design and management of IP systems in a business environment and can also be used for effective auditing of an organisation's IP.

Acknowledgements

The authors thank the executives, inventors, and managers from the case organisations for sparing their valuable time and providing their input, which helped to build the framework developed herein. The authors remain indebted to IPM experts, technology managers, IP-management and -top organisational authorities, and IP law experts for their valuable inputs and knowledge sharing.

References

Amit, R. and Schoemaker, P.J.H. (1993) 'Strategic assets and organizational rent', *Strategic Management Journal*, Vol. 14, pp.33–46.

Bishop, J.C. (2003) 'The challenge of IP assets', *Northwestern Journal of Technology and Intellectual Property*, Vol. 1, No. 1, pp.59–65.

Barney, J.B. (1986) 'Strategic factor markets: expectations, luck, and business strategy', *Management Science*, Vol. 32, No. 10, pp.1231–1241.

Boje, D. (2006) 'What happened on the way to postmodern?', *Qualitative Research in Organizations and Management: An International Journal*, Vol. 1, No. 1, pp.22–40.

Bontis, N. (1996) 'There's a price on your head: managing intellectual capital strategically', *Business Quarterly*, Summer, pp.40–47.

Bontis, N. (1998) 'Intellectual capital: an exploratory study that develops measures and models', *Management Decision*, Vol. 2, No. 2, pp.63–76.

Bontis, N. (2001) *World Congress on Intellectual Capital Readings*, 1st ed., KMCI Press, Taylor & Francis, Boston, USA.

Bontis, N. and Nikitopoulos, D. (2001) 'Thought leadership on intellectual capital', *Journal of Intellectual Capital*, Vol. 2, No. 3, pp.183–191.

Chang, K.Y. (2003) 'Reforming U.S. disclosure rules in global securities markets', *22 Ann. Rev. Banking & Fin. L.*, p.237.

Cohen, W. and Levinthal, D. (1990) 'Absorptive capacity: a new perspective on learning and innovation', *Administrative Science Quarterly*, Vol. 35, No. 1, pp.128–152.

Dierickx, I. and Cool, K. (1989) 'Asset stock accumulation and the sustainability of competitive advantage', *Management Science*, Vol. 35, No. 12, pp.1504–1513.

Drucker, P.F. (1993) *Post-Capitalist Society*, Butterworth Heinemann, Oxford.

Gillespie, K., Krishna, K. and Jarvis, S. (2002) 'Protecting global brands: toward a global norm', *Journal of International Marketing*, Vol. 10, No. 2, pp.99–111.

Granstrand, O. (2000) 'Corporate management of intellectual property in Japan', *International Journal of Technology Management*, Vol. 19, Nos. 1/2, pp.121–152.

Hall, R. (1992) 'The strategic analysis of intangible resources', *Strategic Management Journal*, Vol. 13, No. 2, pp.135–144.

Hall, R. (2011) 'Capabilities differentials as strategic assets of firms: a pragmatic review', *SEGi Review*, Vol. 4, No. 1, pp.143–164.

Idris, K. (2003) *Intellectual Property: A Power Tool for Economic Growth*, 2nd ed., WIPO Publication No. 888.1, ISBN 92-805-1231.

Itami, H. (1987) *Mobilizing Invisible Assets*, Harvard University Press, Boston, MA.

Litschka, M., Markom, A. and Schunder, S. (2006) 'Measuring and analyzing intellectual assets: an integrative approach', *Journal of Intellectual Capital*, Vol. 7, No. 2, pp.160–173.

Maskus, K. and Penubarti, M. (1995) 'How trade related are intellectual property?', *Journal of International Economics*, Vol. 39, Nos. 3/4, pp.227–248.

Narvekar, R.S. and Jain, K. (2006) 'A new framework to understand the technological innovation process', *Journal of Intellectual Capital*, Vol. 7, No. 2, pp.174–186.

Nohria, N. and Eccles, R. (1991) 'Corporate capability', Working Paper No. 92-038, Harvard Business School, Boston, MA.

Nonaka, I. and Takeuchi, H. (1995) *The Knowledge-Creating Company*, Oxford University Press, New York, NY.

Pralhad, C.K. and Hamel, G. (1990) 'The core competence of the corporation', *Harvard Business Review*, May–June, Vol. 68, No. 3, pp.79–91.

Selznick, P. (1957) *Leadership in Administration*, Harper and Row, New York.

Sie, A.K.Y. and Fryxell, G.E. (2004) 'Anti-counterfeiting strategies and managerial confidence in the IPR regime: an empirical examination of foreign brands in Chinese markets', Paper presented at *The Meeting of the Academy of Management*, New Orleans, LA.

Steward, T.A. (1997) *Intellectual Capital: The New Wealth of Organizations*, Doubleday/currency, New York.

Sullivan, P.H. (2000) *Value Driven Intellectual Capital*, John Wiley and Sons, New York.

Teece, D.J., Pisano, G. and Shuen, A. (1994) 'Dynamic capabilities and strategic management', Working paper, Center for Research in Management, University of California at Berkeley.

Walsh, J.P. and Ungson, G.R. (1991) 'Organizational memory', *Academy of Management Review*, Vol. 16, No. 1, pp.57–91.

WIPO (2008) *Intellectual Property Audit Tool*, IP Assets Management Series, WIPO Publication No. 927E, WIPO Summer School, Geneva.

Yin, R.K. (2009) *Case Study Research-design and Methods*, 4th ed., SAGE publication, New Delhi.

Zander, U. and Kogut, B. (1995) 'Knowledge and the speed of the transfer and imitation of organizational capabilities: an empirical test', *Organization Science*, Vol. 6, No. 1, pp.76–92.