Small Business and Intellectual Asset Governance: An Integrated Analytical Framework

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***Abstract*— Having identified that there exists, as yet, no Maturity Model for Intellectual Asset (IA) Governance in Small and Medium Enterprises (SMEs), the authors have attempted to develop theoretically one such Model and present it in this paper. Twelve dimensions of IA governance and enterprise infrastructure for IA governance were identified. The model also distinguishes among five archetypes according to their level of sophistication. Initial testing of the model with small and medium enterprises indicates that it provides insights into how enterprises approach intellectual governance and could be of use to businesses and policymakers alike.**

Keywords- Intellectual Asset Governance; Maturity Model; SME

I. INTRODUCTION

The increasing dependence on non-material assets for the construction and defence of strong business models poses challenges not just to high technology businesses but also to enterprises operating in more traditional sectors. In order to survive, grow and prosper in a knowledge intensive economic environment, managing knowledge assets effectively is critical; as it is precisely these assets which may represent the source of necessary competitive advantages [43]; [44]; [45]. We focus on the challenge this represents for small and medium enterprises (SME) for a number of reasons. First, relative dependence on intellectual capital tends to be higher the smaller the company and the higher the service content of a firm´s offer – the latter in turn a characteristic more often associated with smaller firms [46]. Second, SME make a significant contribution to the economy both to employment in particular [47]; [48] and to GDP overall, making them of critical importance to policy makers around the world. Third, despite the importance of this topic, research is somewhat piecemeal and lacks an integrated approach, making it of interest to both researchers and the small business community.

We seek to understand the strategies – explicit or otherwise – that SME employ to manage, protect, and exploit their intellectual assets in order to enhance their competitiveness or market position and to contribute to more robust and defensible business models. The heterogeneity of the SME population combined with the widely differing strategies they may employ in managing their intellectual assets leads us to conclude that the most fruitful approach to achieving a step change in our understanding of the phenomenon is through the development of a maturity model grounded in the existing literature and the subsequent exploration of this model in the field. A strategic approach to the management of intellectual assets is not generally widespread within the SME community and the literature provides little insight into the process of assimilation of intellectual asset management practices in small and medium enterprises.

II. MATURITY MODELS AND THE DOMAIN OF INTELLECTUAL ASSET GOVERNANCE

The maturity model seeks to capture different behavioural patterns related to intellectual asset management by means of the characterisation of a number of archetypes according to the degree of sophistication of their IA management practices. An important objective is to understand the inter-relationships among the different dimensions as well as the potential impact of the principal driving forces. Originating in the field of quality management [1], maturity models have been developed for a wide range of business areas since they were first introduced [2], [3], [4]. Maturity models can be "staged" or "continuous" [5] or combine both elements [2]. In the field of intellectual assets and rights, attempts to characterise company behaviour first appeared almost two decades ago. Most portrayals of the different behaviour patterns are either progressive in nature varying from 3 to 6 stages or are based on a typology. Many of them focus on the behaviour of larger companies; some are focused on SME while others are more generic or derived from the practices of larger enterprises [6], [7], [8], [9], [10], [11], [12]. The only framework that can be considered a maturity model is recent, narrowly focused on patents, applied to a single industry and which considers the strategic planning attitude of companies towards patent management. [13]. From this review we may conclude that there is still a significant amount of ground to be covered in order to develop in order to develop a more comprehensive and integrated approach.

FIGURE 1 HERE

III. INTRODUCING THE MATURITY MODEL

Drawing on the literature on intellectual asset management and the above mentioned typologies, we develop a comprehensive Maturity Model for Intellectual Asset

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Governance; a five stage model characterising the increasingly sophisticated governance behaviour of firms along 12 dimensions (see Figure 2).

FIGURE 2 HERE

A. An operational approach to Intellectual Asset Governance

The first six dimensions of the model relate to IA Governance at the operational level and are described below (Annex I).

- **Identification/valuation and valuation of intellectual assets**: Referred to as opportunity evaluation [12], conspicuous by its absence in many frameworks [14], [15] and apparently infrequently practiced [16], it is nonetheless an important prerequisite for the effective governance of IA.
- **Exploitation of intellectual assets and rights**: Although the strategic and systematic exploitation of IA is a critical capability, SMEs frequently lack the appropriate knowledge or experience to develop successful exploitation strategies [17], [18]. There is some evidence that they obtain lower returns on their patents than larger firms [19].
- **Informal Protection of intellectual assets and rights**: Although the degree of legal defence mechanisms that underpin these methods varies significantly, the literature generally agrees that SME tend to rely more on informal protection [20], [21], [22], [23]. Cross country (UK and USA) and cross industry similarities have been found [24], [7]. Formal and informal means may be used to complement one another [25], [26].
- **Formal protection of intellectual assets and rights**: With some exceptions [27], [28], generally SME were found to use formal IPR instruments much less than their larger counterparts [22], [20], [7], [23] and be less effective users of the system [27]. Despite the growing internationalisation trends among small and medium enterprises, SME tend to patent abroad less often than larger companies and in fewer countries [20].
- **Enforcement of intellectual assets and rights:** Recourse to full legal action in order to address infringement was found to be rare for smaller companies [7]. Although SME appear to suffer greater levels of infringement of their IPR, they are less likely to be in a position to do anything about it (Koen 1992, quoted in [21]).
- **Manage portfolio of intellectual property rights:** The portfolio of intellectual assets and intellectual property rights should be dynamic and evolving, with specific decisions about assets considered within the existing portfolio [13]. Following internationalisation, the portfolio becomes more complex as decisions acquire a geographic dimension and must be taken within a context of differing legislative frameworks [11].

B. Strategic Intellectual Asset Governance

The second group consists of a further six dimensions which are more strategic in nature and are related to the development of the company infrastructure for IA Governance, which are enumerated below (Annex II).

- **Inter-organisational Collaboration**: The increasing pervasiveness of open innovation systems [29] has significant implications for the way in which IP may be managed effectively. Almost 6 in 10 patents registered with the European Patent Office (EPO) involve co-patenting activity, though generally with partners from the same member states [30]. However, SME not only find collaboration more difficult than their larger counterparts, they are also less likely to turn outside for help and advice on managing their intellectual assets [22], [14].
- **Environmental Scanning**: Environmental Scanning has been found to be significantly related to firm performance [31]. SME are less inclined to make use of the information that is available in patent databases for research purposes, though they do so more actively as the company increases in size [32]. They are less well informed about the services offered by the patent offices and generally consider those they know about inadequate [33].
- **Alignment of human resources:** Irrespective of the processes and systems to manage intellectual assets effectively, it is important to ensure that all members of the company buy into the idea [11], [12], [13].
- **Financial investment in the governance of intellectual assets and rights:** to cover both the initial "investment" and recurrent costs related to the implementation of the IPR management plans of a company will be necessary. Often cited as a barrier [22], reducing fees for patent registration may not result in an increase in registrations [21]. Furthermore, SMEs limited resources can also inhibit their ability to commercialise their patented inventions [20].
- **Presence of Structures and processes to underpin governance**: The creation of the appropriate structure and processes is important in order to embed the governance of intellectual assets within the company. Staff must develop the necessary competence, something which is more likely to be missing in SME [34]. A persistent lack of knowledge among SME in developed countries continues to be noted also by the international organisations [35].
- **Formalisation of strategy (Policies):** There should be explicit guidelines available on how to deal with intellectual assets and the patent function should be incorporated within the organisational structure, with clear indications as to its roles and functions and the human resources required, both in-house and in terms of outsourcing [11].

IV. Key Behavioural Patterns

The aforementioned 12 elements make up the dimensions of the Maturity Model against which to benchmark companies. Our model has five levels of maturity, corresponding to the following archetypes.

- **Dormant:** The enterprise is generally unaware of the potential relevance or importance of IP to their business. Any informal activity to protect the business is involuntary rather than the product of conscious intent. Basically the enterprise does not engage in any of the primary or support activities that form part of the IA value chain. This broadly corresponds to the "inactive" archetype of Kern & van Reekum [13].
- **Ad-hoc:** Although the enterprise may be engaging in some of the activities of the value chain, these are ad-hoc, more likely in response to an external stimulus than to the internal motivation to engage in IP management, in line with the "reactive" archetype of Kern & van Reekum [13]. Actions are likely to be defensive, focused on protection, informal in the majority of cases and not coordinated or monitored. Although this in many ways conforms to the "defensive" archetype of Harrison & Sullivan [12], it also strays into the "cost-centre" focus since SME from the start are conscious of their limited resources.
- **Dynamic:** An enterprise representing this archetype has made a conscious commitment to the management of intellectual assets and has a clear strategy for doing so. Insofar as we are dealing with an entrepreneur-led SME, it incorporates elements of the "visionary" archetype of Sathirakul [11]. It may not be performing the entire set of primary and supporting activities of the value chain, but it will have identified those which are critical to the current situation of the enterprise and will be dealing with these in a dynamic and pro-active manner, although each one may be being managed in relative isolation. There is a certain level of sensitivity to outside forces and to keeping up to date with what is going on, though the company may be some distance from "best practice".
- **Ambitious:** At this point the company has a pro-active strategy for dealing with the management of intellectual assets and is carrying out most if not all of the primary and supporting activities with a degree of competence. The IP strategy is coordinated with the general strategy of the business. There is probably a department or at least a specific individual in charge of IP issues, depending on the size of the company and the centrality of intellectual assets to their business model. In terms of our existing typologies, it is closest to the "proactive" archetype of Kern and van Reekum [13] and the "integrated" archetype of Harrison & Sullivan [12].
- **Pioneering:** This is the most sophisticated archetype, where one would expect the company to be fully in control of all primary and supporting activities of the value chain. Furthermore it will have integrated these activities with both the overall business strategy and business model and they will be seamlessly embedded within the enterprise as a whole. Possibly the company transcends the need to have a separate IP department. A strong IP culture permeates the company. Intellectual assets are created, used, shared, protected, reconfigured and exploited in a continuously evolving manner, anticipating market trends and staying ahead of the pack. One would expect to find a strong level of cooperation with others. Generally this appears to go beyond the "proactive" archetype of Kern & van Reekum [13] and has much in common with the "visionary" archetype of Harrison & Sullivan [12] and the management of IP as a strategic asset advanced by Chesbrough [9].

V. The Role of Influencing Factors

The literature provides us with some indications about how certain contextual factors influence the decisions and behaviours of the companies related to the adoption and assimilation of intellectual asset management practices. These are identified in order to complete the model, with an indication of how these factors are likely to be associated with the different maturity levels. Drawing our inspiration from Blili and Raymond [36] and based on our analysis of the literature, we identify the following elements which appear to influence the decisions and behaviours of companies related to the adoption and assimilation of intellectual asset management practices.

- **Centrality of intellectual assets and rights within the strategic group:** The sector in which a company operates influences its intellectual property management practices [22], [14], [37], with the type of intellectual property requiring protection and the instruments employed differing to an extent [28]. To explain different patterns of protection, Burrone [14] distinguishes between "discrete product industries" and other sectors in which innovation tends to consist of incremental adaptations and innovations, rendering utility models, industrial design and trademarks the more likely choices, complemented by the range of informal methods available.
- **Research & Development and innovation centre of gravity** of a company will influence its behaviour. Goldrian´s aforementioned typology provides an example of this [6]. Chesbrough links behaviour to innovation distinguishing among different approaches to innovation, ranging from the absence of innovation process, through ad-hoc, planned and externally supported processes, with the more sophisticated type connecting innovation processes to the business model and even going further still[9]. A recent study of German and French companies also found that behaviour varied according to the company´s propensity to innovate [37].

- **Technology as a competitive weapon:** The more central technology or knowhow to the business model, the more likely that IP is an important component of the company strategy. The stage of technology life cycle also influences the way in which IP is managed [9].
- **Sensitivity of the business model to intellectual assets and rights:** Irrespective of their actual behaviour, the lack of a plan is especially prevalent among smaller companies [25]. Companies with higher levels of strategic orientation are more likely to perceive the need to adopt IA governance practices, especially if the strategic orientation of the company is international in character. Where relevant, ensuring coherence between the patent strategy on the one hand and the business model and strategy on the other is important [40].
- **Brand as a leverage for competitiveness:** We would also expect to find market leadership, marketing orientation, and brand-focused companies to be associated with a more explicit and proactive management of intellectual assets. Lalleman in the study of French and German companies identified differences in behaviour depending on degree of international competitiveness [37]. We would expect internationalised companies to consider the potential for recycling intellectual assets across different geographical zones.

VI. Discussion

In order to explore the applicability of the Maturity Model in the field, a multiple case study approach [41], [42] was adopted, selecting cases in order to represent the different archetypes identified. Data obtained through the interviews, together with other documentary evidence where appropriate, was analysed in order to assess the applicability of the Maturity Model. Preliminary results indicate that this is a useful tool for understanding the way in which SME and their leaders conceptualise and manage their intellectual assets.

This paper has sought to develop an integrated approach to the governance of intellectual assets by SME that takes into account the characteristics of such companies as well as the potential barriers they may face. The conceptual model has important implications for managers and entrepreneurs, providing them with a framework with which to evaluate their current stance and use it as a basis for evolution. The model reflects the dynamic process of becoming increasingly sophisticated about intellectual asset governance. It reflects both the iterative nature of the process and builds in sufficient flexibility to accurately assess the current state of an enterprise which may not be managing all dimensions with the same behavioural pattern.

The model can be converted into a dashboard that will be used by the enterprise to track its progress over time. At the highest level of aggregation, the dashboard can display the company´s overall performance on all 12 dimensions, enabling it to identify the overall imbalances and weaknesses as well as to drill down to identify specific scores and behaviours as well as a dynamic view over time.

Our conceptual framework is context specific, with the perception of the impact of the identified drivers and the company´s response moderated by the leadership paradigm and the dominant learning model. These are explained in greater detail elsewhere [51]. They in turn influence the way in which the 12 dimensions are handled. The dashboard enables us to identify the profile which most accurately characterises the current approach of a given company to the management of its intellectual assets.

Assessing a company at different points over time can provide a dynamic picture that is capable of capturing setbacks as well as leaps forward as an enterprise bypasses one of the stages. The model can be helpful to leaders of institutions supporting SME, as well as assisting their staff dealing directly with the business community to understand the needs of their clients. Policy makers should find the model helpful in orienting both policy studies and the identification of appropriate responses. At the same time the model represents a strong foundation for the development of further empirical research in order to understand better how companies progressively adopt and internalize practices related to the effective governance of intellectual assets and rights.

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FIGURE 1: Existing typologies and maturity models

Author	Approach	No. of types/stages	Focus	Detail	Sector	Type
Goldrian (1993)	Progressive	3	Intellectual Property Rights management	Links progressively proactive management of IP to the degree of R&D in the organisation	Not specified	Conceptual
Kitching & Blackburn (1998)	Typology	4	Informal and formal protection of intellectual property rights	Progressive from “do nothing” through informal protection to increasing levels of formal protection	Computer software, design, electronics, mechanical engineering,	Empirical; SMES; telephone survey of 400 owner-managers; 101 interviews
Hall et al (2000)	Typology	3 (6 subdivisions)	Use of patent information	Identifies three broad categories and then subdivides “aware” companies into 6 sub-types	Range of sectors, companies chosen for patent search behaviour	Empirical; SME; interviews; 23 companies
Thrumm (2003)	Typology	3	Patenting behaviour	Identifies three general profiles depending on protection methods used.	Biotechnology industry	Empirical; based on survey of 53 companies and institutions (29 SME)
Chesbrough (2006)	Progressive	6	Intellectual property management	Links business model, open innovation and intellectual property for an increasingly sophisticated approach	Generic	Conceptual
Sathirakul (2006)	Progressive	5	Predominantly intellectual property, formal and informal	Adapts Davis and Harrison 2001 (forerunner to Harrison and Sullivan 2011)	Range of sectors	Empirical, mix of sectors, SME and larger enterprises surveyed as well as expert interviews
Frieseke et al (2008)	Typolgy	3+2	Limited to formal protection only	3 types of users of formal methods and 2 non-user profiles (of formal methods)	Range of sectors	Empirical; 24 case studies
Kjaer (2009) Danish Patent and Trademark Office	Maturity Model	4	Intellectual property practices and knowledge	Based on adapted AIDA framework to measure maturity	Wide range of sectors	Normative, Empirical, 320 interviews, 80 from each stage
Harrison and Sullivan (2011)	Progressive	5+1	Predominantly intellectual property, formal and informal	Progressively more sophisticated management of intellectual property	Larger companies, range of sectors	Conceptual based on information about company practice
Van Reekum and Kern	Maturity model	4	Patent focused	Increasingly active levels of intellectual property management, elements of governance	Biopharma companies	Empirical

FIGURE 2: Mapping IA Governance Practices – An integrated Diagnostic Framework

	Dormant	Ad-hoc	Dynamic	Ambitious	Pioneering
Valuation of intellectual assets and Rights	No	Occasionally Reactive	Inventory, updated Not systematic Short term / tactical advantage	Regularly reviewed inventory Broad range of assets Standard approaches Strategy driven	Systematic and consistent Assets in broadest sense Innovative approaches Synergy seeking & proactive
Exploitation of intellectual assets and rights	No	Occasionally Reactive	Proactive Driven by immediate gains	Strategic perspective Proactive Medium term gains	Creative & strategic leverage Long term view Seek new business models Non-financial benefits also
Informal protection of intellectual assets and rights	Not deliberately	Some protection Reactive	Consider most methods Conscious decision For tactical advantage	Consider strategic implications Complement formal protection	Strategic choice Coherent with business model Integrative approach Regularly questioned
Formal protection of intellectual assets and rights	Not relevant	Reactive Legal asset	Driven by immediate needs Look for financial return Only in selected markets	Mix of tools Driven by strategy Considered strategic assets Secure value and access	Holistic approach & evolves Enabling asset for future development Global approach
Enforcement of intellectual assets and rights	No	Not aware Normally do nothing	Regular scanning Case by case – cost benefit	Active tracking Strategic threat Medium term horizon Consider overall portfolio	Strategic and proactive tracking Anticipatory approach Look for creative solutions Will litigate strategically to achieve long term aims
Management of portfolio of intellectual assets and rights	No	Individual Decisions rarely revisited	Seek complementarity Decisions may relate to other assets Tactical and short term	Inclusive, integrated Medium term perspective Driven by business needs Regular review and update	Constantly evolving Wide range of assets Long term strategic view Tool for future options
Inter-organisational cooperation	No	Sporadic Reactive	May initiate in response to specific need Case by case decision Some use of network	Considered important & strategic Seek out opportunities Coordinate various relations	Partnership approach Open systems favoured Assume lead in cooperation
Environmental scanning	No Lack awareness	Reactive, problem focused Isolated champions	Routine scanning Permanent but passive alertness Strategic rather than environmental scanning	Permanent and relatively sophisticated Some environmental scanning in evidence	Permanent and sophisticated, boundary spanning Makes non-obvious connections Scanning environment driven
Alignment of human resources (culture)	General lack of awareness Myths and misperceptions	Limited and patchy awareness Isolated champions, limited impact Usual responsibilities priority	More consistent awareness Community of champions Still work in silos IAG work is valued	General awareness throughout Critical mass of believers Internal cooperation, cohesion Appropriate behaviour rewarded	Importance internalised Permeates business philosophy Exchange facilitated Sophisticated reward system
Financial investment in the governance of IAR	No budget	No formal budget but resources found if justified appropriately	Included in budget, cost focus May be considered inadequate	Department budget, profit focus Economies of scale and scope	Budget may not be centralised Considered investment
Presence of specific under-pinning structures & processes	No related structures No related processes	Individuals take on responsibility Processes idiosyncratic	"department of one" Emerging processes, shared	Dedicated department Processes formalised, shared	Embedded in structure Processes assimilated coy-wide
Formalisation of strategy (policies)	No policies No relevant strategy	Some debate about need At best an action plan	Emergent policies, some resistance Standalone IA management	Comprehensive processes/policies Linked IAG strategy	Policies invisible, assimilated IAG embedded