ECONOMICS OF INNOVATION IN LESS DEVELOPED COUNTRIES

CASE STUDY: MANUFACTURING INDUSTRY OF COLOMBIA

A thesis submitted to the University of Manchester for the degree of PhD in Economics in the Faculty of Social Sciences and Law

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ABSTRACT

To provide the appropriate type of institutional environment for creative and innovative work is essential for developing countries like Colombia, in particular, for the development of its manufacturing industry. This Thesis studies the evolution of the institutional environment and its appropriateness for the innovative and productive activities and processes within Colombia's manufacturing industry. It focuses in the primary concern of classic scholars like Schumpeter, Veblen, *inter alia*, of the divorce between entrepreneurship and ownership. Evidence shows that the rise of Limited Liability Companies in the industry entails a huge change in structure of the economy creating profound effects over the firms. However, this rise has unfolded as one that blocks access to ownership, and consequentially is inimical to the development of innovative forces within the industry. The origins of the Limited Liability Companies came, among other reasons, from the need for succession when firms began to outlive their original creators and founders. The development of this succession in conjunction with an anti-competitive and oligopolistic structure of the insider ownership structure of the economy, led to an evolutionary stable institution (i.e. private LLCs) that 'locked out' the intrapreneurial and innovative process within firms of the Colombian manufacturing industry. The private legal structure established itself as a *socially habituated way of action* (i.e. *institution*) among firms when big and powerful conglomerates –in order to create bigger and more powerful public companies– absorbed the firms that had adopted a public structure. However, this institutional 'innovation' would backfire because it applies technical principles but leaves the appropriateness principle aside, which translates into a sub-optimal institutional innovation. It is sub-optimal basically because the institutional innovation of setting a private limited liability framework leaves the intrapreneurial forces excluded from the access to ownership. This was the world that the classic political economy and scholars like Schumpeter and Veblen were concerned with: one in which the institutional change would favour the divorce between ownership and entrepreneurship and consequently giving rise to evolving counter-innovative forces. In order to capture this phenomenon, the analysis had to move from a traditional diffusion framework to a new diffusion framework that would account for the evolution of the legal institutional environment. Based on the recent work of diffusion, institutional elements were added to traditional diffusion models by incorporating the institutional change that countries experienced with the rise of the Limited Liability Institution. This is reflected in firms adapting modern institutional environment and firms keeping the traditional one, and, in this way, the latter inherited the constraints from the past. In the traditional diffusion analysis there is no account of institutional change, which is reflected in a single entrepreneurial attitude across firms. The new diffusion analysis focuses on how variety on the institutional environment of firms is important in determining growth. When we include these new institutional elements in the growth analysis, they help us, in return, to account better for growth not only at a theoretical but also at an empirical level.

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No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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He has been a student of the PhD in Economics at the Centre for Research on Innovation and Competition (CRIC), University of Manchester, since September of 1998. He has been awarded a MSc in Economics in the University of Warwick, in January 1999, as well as a MSc in Economics in the National University of Colombia in April, 1995, and a degree of Economist in July, 1993. He has worked as an Assistant Professor in the National University of Colombia since June, 1996, as well as an Assessor of National Planning Department of Colombia, Units of Territorial and Entrepreneurship Development (dec-94 to may-96), Assistant Researcher in the National Comptrollership - UNCTAD of Colombia (jan-94 to nov-94) and Consultant of the National Department of Statistics of Colombia (sep-93 a dic-93). He was born in 1970 in Bristol, England but grew up in Bogotá, Colombia.

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Glossary of abbreviations and concepts

Abbreviations

- ANDI: National Association of Industrialists
- DANE: Colombia's National Institute of Statistics
- ECLAC: Economic Commission for Latin America and the Caribbean
- EDT: Survey of Technological Development of Colombia's manufacturing industry (1996)
- Emp: employment
- GDP: Gross Domestic Product
- ICIPC: Training and Research Institute of Plastic and Rubber
- INE: Spain's National Institute of Statistics
- LDC: Less developed country
- LLC: Limited Liability Companies
- Pr: proprietorship or entrepreneurial companies
- Priv: private companies
- Pub: Public Companies
- RHS – LHS: right (left) hand side
- SMEs: small and medium enterprises
- TDC: Technology Development Centre
- Unco: labour unit cost
- UNIDO: United Nations Industrial Development Organization
- VA: Value added
- Wag: wages

Concepts

- *Counter-innovative forces* will be associated with those human activities that are hindering and resisting directly or indirectly the development the outcome or/and the process of an innovation project within the firm, which ultimately will generate net output transfer or a capacity to transfer net output.
- *Governance institutions*: social structure that exercises authority, direction and control within firms of Colombia's manufacturing industry.
- *Independent entrepreneurship*: the process whereby an individual or group of individuals, acting independently of any association with an existing organization, create a new organization.
- *Innovation project*: it is the commercial or industrial application of something new (a new product, new process or method of production; a new market of source of supply; a new form of commercial business of financial organization).
- *Innovative forces* will be associated to human activities contributing directly or indirectly to develop the process and outcome of an innovation project within the firm firm, which ultimately will generate net output for the firm or to the capacity of the firm to produce additional net output.
- *Institutions*: socially habituated (but not immutable) ways of thought or action that not only constrain but also enable human thought and actions
- *Intrapreneurship* or *corporate entrepreneurship*: the process whereby an individual or a group of individuals, in association with an existing organization,

create a new organization or instigate renewal or innovation within that organization.

- *Legal institutional environment*: the legal ground rules that define the context within which economic activity of business enterprises develops in Colombia's manufacturing industry.
- *Proprietorship or entrepreneurial companies*: firms that have only one owner.
- *Private companies*: firms that have two to twenty five Shareholders and their shares are non-negotiable. The Shareholders are responsible for the firm's social obligations only up to the amount of their equity contributions.
- *Public Companies*: these firms are created by the capital contribution of the Shareholders (no less than 5) whose equity is divided in equally value and negotiable shares. The Shareholders are responsible for the firm's social obligations only up to the amount of their shares.
- *Stakeholder*: any group of individual who can affect or is affected by the achievement of the organization's objectives.

International Standard Industrial Classification (ISIC - 3 digit)

311 – Food including coffee threshing
312 – Food without coffee threshing
313 – Beverages
314 – Tobacco
321 – Textiles
322 – Clothing articles
323 – Leather and its products
324 – Footwear
331 – Wood industry
332 – Wood furniture
341 – Paper and its by-products
342 – Printing, publishing and connected
351 – Industrial chemical substances
352 – Other chemical products
353 – Petroleum derivatives
354 – Other petroleum derivatives and carbon
355 – Rubber products
356 – Plastics products
361 – Earthenware objects, crockery and porcelain
362 – Glass and other glass products
369 – Other non-metallic mineral products
371 – Basic industries of iron and steel
372 – Basic industries of non-ferrous metals
381 – Metallic products, except machinery
382 – Machinery except electric machinery
383 – Machinery, electric artefacts
384 – Equipment and transportation materials
385 – Professional and scientific equipment
390 – Other manufacturing products

CHAPTER ONE

1. PROLOGUE

> *"Although not all capitalisms are equal in performance, the advantages or efficiencies of one type of capitalism over another are typically dependent on their historical path and context and thereby none can be said to be ultimately superior to all the others"*
>
> *Geoffrey Hodgson (1998, p. 215)*

The aim of this thesis is to study the institutional environment for the development of the innovation in Colombian manufacturing industry. The key or defining characteristic that capitalism offers in contrast to alternative systems like socialism, is the access right to private property over the means of production and the product or output of productive enterprise. This, I believe, is the main factor that exerts and induces innovative and productive work. By contrast, the disincentive par excellence of innovative and productive work is the disassociation from any of the material benefits of such work. If there are negative forces (that I term retardant in the main text) that preclude innovative and productive work from being associated with the material and other benefits of that work, this would distort the proclivity toward developing novel forms of work. Certainly, why would agents bother engaging in novel activities that confront them with conflicts, discords, and probably rivalry and envy from their antagonists? Moreover, what would the capitalist system have to offer creative and productive agents if under other systems they would get a ration of produce no matter their effort?

The sense of property over the produce of creative work is the substance of capitalism and the access to ownership constitutes the 'pillars' that found capitalism. The erosion of these pillars is a primary concern of scholars throughout the history economic thought, from Schumpeter's to Veblen to Mill. In particular, Schumpeter was concerned with the fact that a loss in substance of property would make the creative and productive work to cease or die out, given that the substance of property "holds the institutions of capitalism together and drives creative forces".

Creative and productive work for developing countries is important inasmuch as innovation and creativity are needed to develop a manufacturing industry.

Programmes of Science and Technology fomented by Economic Commission for Latin America and the Caribbean (ECLAC) are build up on the presumption innovation and creativity are key in the development of a manufacturing industry. For example, in Latin America technology used in manufacturing plants tend to be idiosyncratic and the implementation of a new technology in such environment is itself a creative act, and not easily describable as purely backward, copied behaviour or a passive process for the recipient country (Fransman 1986, Nelson 1987, Stiglitz 1999).

Hence providing the appropriate type of institutional environment for creative and innovative work is essential for developing countries like Colombia, in particular, for the development of its manufacturing industry. This Thesis will study the evolution of the institutional environment and its appropriateness for the innovative and productive activities and processes within Colombia's manufacturing industry. We will see that the concerns of classic scholars like Schumpeter, Veblen, *inter alia*, with the divorce between entrepreneurship and ownership acquire special relevance in Colombia's manufacturing industry framework.

Has the evolution of Colombia's manufacturing industry unfolded as appropriate for the access of innovative forces to ownership? What were the implications and which mechanisms that this evolution has generated? What type of capitalism is needed that does not imply a society consisting entirely of workers-owners and avoiding the elimination, socialization or sterilization of ownership, introduced with communism, state ownership or common ownership, respectively?

The structure of the doctoral thesis consists of six chapters. Besides prologue (first chapter), and conclusions and future research (sixth chapter), there are Theoretical Foundations (chapter 2), Overview and Evolution of the Manufacturing Industry of Colombia (chapter 3), Model (chapter 4) and Empirical Analysis (chapter 5). Chapter 2 and 3 identify which is the problem and chapters 4 and 5 constitute the methodological chapter that study the problem identified in the previous chapters.

* * *

During the Millennium Schumpeterian Conference held in Manchester, Professor Richard Nelson invited us to "bring institutions to evolutionary thinking", while, less than two decades ago, Arthur Lewis (1984, p. 8) observed that many PhD students in economics came to think "that work on institutions will not count for distinction in PhD exams". Tempted by these incitements and by the fact that institutional change is now an integrated component of economic development in less developed countries[1], I focused the aim of study of this Thesis as the institutional environment for the development of innovation in Colombia's manufacturing industry. The Thesis will attempt to introduce the institutional environment dimension within the innovation and productivity analysis based on the Colombian reality, following the tradition of evolutionary and institutional thinking of Joseph Schumpeter, Richard Nelson Geoffrey Hodgson and Stan Metcalfe and regarding the advice of development theorists like Hirschman, Lewis, Baumol, *inter alia.* Institutional, evolutionary and development thinking, in my interpretation, understand development as an unfolding process of function of entrepreneurship and give key importance to the institutions moulding this function. In this way, it places the fundamental question with respect to the difficulties of economic development, paraphrasing Hirschman (1958), "back where all difficulties of human action begin and belong: in the mind". Given that institutions mould and shape human thought and action, hence, they have a key role in the development process. Or, in words of Hodgson (1998 p. 238), "institutions simultaneously constitute and are constituted by human action: actor and structure are thus connected".

[1] The fact that the last volume of the *Handbook of Development Economics* of Elsevier includes a chapter of *Institutions and Economic Development* (Lin and Nugent 1995) is evidence of the farily recent integration of institutions to the economic development theory.

CHAPTER TWO

2. THEORETICAL FOUNDATIONS

This chapter will review the literature and will provide the theoretical foundations of the Thesis. This will ultimately identify the questions the Thesis wishes to probe.

2.1 Introduction

The aim of the Theoretical Foundations chapter will be to identify the key problem that the literature points at for the development of innovation. It will analyse how the economic system does not only draw from within its operative forces of *change*, but it also generates *from within* the *resistance forces* that drive out entrepreneurial forces, generating the tension characteristic of the development process. The unfolding of this tension, as we will see, heavily depends on the institutional structure that guides and moulds the development process.

The second section of this chapter (section 2.2) studies different institutional and development theorists and their approaches to the development process. It will show that Schumpeter's approach to the development process is concomitant in some key aspects to the approach of several institutionalist and development theorists.

The third section (2.3) starts by carrying out in section 2.3.1 a critical analysis of Schumpeter's theory of economic development. It intends to draw from and extend Schumpeter's theory, by attempting systematically to generate an alternate point of view from the traditional literature. Section 2.3.2 presents recent literature on entrepreneurship, which points out distinctions between categories of entrepreneurship. Sections 2.3.3 and 2.3.4 present the key concern of the classical literature on the main deterrent to entrepreneurship and section 2.3.5 presents the conclusions of the section 2.3.

The fourth section of this chapter (section 2.4) is intended to examine how contemporary literature deals with the problem bequeathed by the classical literature. Section 2.4.1 critically analyses the approach of recent studies on the problem the classic literature bequeathed, trying to bring back the discussion to where classics left it. Section 2.4.2 presents the most recent literature that has brought back to the arena the legacy of the classics, in order to enhance entrepreneurial behaviour. Section 2.4.3 introduces the literature that deals with the appropriate institutional change for entrepreneurship and some problems encountered by and inherent to such institutional change within an economy.

The fifth section of the present chapter (2.5) intends to develop further the problems encountered by institutional change for innovation. Section 2.5.1 studies the economy in which the concern of classics is founded and how the institutional evolution of this economy hinders innovation. It points out how an institutional lock-in gets established and how entrepreneurial agents are left 'locked-out'. Section 2.5.2 explains from a historical point of view the circumstances where the evolution of the institutions leaves not only the system in a lock-in situation but also entrepreneurship 'locked-out'. Section 2.5.3 concludes.

These five sections lay out the elements for the identification of the problem and the research methods in sections 2.6 and 2.7, respectively.

2.2 Entrepreneurship, Institutional and Development Theory

As we can see in table 2.1.1, there are six main approaches to entrepreneurial theory: French (Cantillon 1755 and Casson 1982), Austrian (Kirzner 1973 and Shackle 1979), German-Austrian (Schumpeter 1934, 1943), and Chicago (Knight 1921). This section of the Thesis is in the vein of the German-Austrian tradition led by Schumpeter because it presents a development and institutional theory, in which entrepreneurs are seen not only as innovators and facilitators of problems but also explores the creation of an internal reaction or antagonism within the system.

We will review Schumpeter's thought on innovation and economic progress (namely, the development process) and, in particular, his awareness –as well as from other authors like Weber, Hirshman, Lewis, Mokyr, Landes, *inter alia*– of the antagonism between innovators and others functions that appear in the economic life as a hindrance to innovation. We may say in advance that Schumpeter's thought characterises the nature of innovation not only "shrouded with uncertainty and with the subjective reluctance of individuals to strike out into the unknown" (Schumpeter 1934, p. 76), but also confronted by the "antagonism of non-innovators to the pioneer –in the form of legal and political obstacles, social moves, customs and the like" (Schumpeter 1934, p. 76).

We will analyse how innovation (i.e. novel ideas in production) consists of a constant struggle with the environment, the latter being in constant tension with innovative activities. It is considered that this setting facilitates the co-existence of two forces: innovative and the counter-innovative. Such tension leads to a costly re-adaptation of the system towards the creation of a new internal order. The co-evolution of these two opposing forces describes the development process, which is strongly associated, as we shall see, to an institutional process.

Table 2.1.1
APPROACHES IN THE ENTREPRENEURSHIP THEORY (based on Westhead and Wright 2000, McMullan and Long 1990, Ricketts 1994)

Traditions:	Entrepreneurs: who are they?	How do entrepreneurs operate?	Characteristics
French Cantillon (1755)	Pivotal figures in the market economy as undertakers of activities	– Take actions required in order to make a profit. – Bring about a balance between supplies and demands in markets.	– Have the foresight to assume uncertainty. – React to profit opportunity. – Self-employed with an uncertain return
Casson (1982)	Agent that reallocates resources (see also Kirzner)	Specialise in taking judgemental decisions about the coordination of scarce resources	– Although sharing the same objectives and circumstances to other individuals, they make different decisions – They have different access to information; diff. interpretation; different judgement
Austrian (Kirzner 1973)	Creative middlemen that facilitate exchange between suppliers and customers, moving the economy	– Alert to profitable opportunities for exchanges to occur. – Identify and exploit opportunities for profitable trade	– Possess an ability to obtain knowledge not possessed by others. – Recognize

	towards an *equilibrium* position.		market opportunities and provide intermediate functions.
Shackle (1979)	Imaginative middleman that brings forth new subjective business opportunities	There is no objective deterministic pattern of behaviour because a person's imagination cannot be recorded in a finite list.	– Each opportunity is dependent on the discoverer. – There is no state of full co-ordination between supply and demand – There is no equilibrium representing the final resting place of the economy
German-Austrian (Schumpeter 1934, 1943)	– Innovators that bring about change through the introduction of a new technological process or product. – Dreamers, visionaries, creators, doers, destroyers	– Lead to the creative destruction of existing combinations of resources due to new combinations (i.e. a new product / process / organization) – Find difficulties in financing and getting support of non-entrepreneurs or practitioners of old routines.	– Have an impulse to fight. – They are a threat to the continued viability of many existing products / processes
Chicago (Knight 1921)	– Skillful and calculative risk-takers	– Influenced by factors relating to access to resources and facilities in the local environment – Make judgements surrounding risks and profits – Assess business opportunities and co-ordinate scarce resources	– Prepared to take risks in an uncertain world were risks cannot be transferred by insurance – Profit is their reward for bearing risks

Before we examine Schumpeter's analysis we will first analyse sociological, institutional and economic thinking on the problem of development. Following Parsons' (1967) methodology, the present analysis is intended to give the foundations of a theory and is attempting neither a systematic codification of either available empirical or theoretical knowledge, nor trying to present a critical evaluation of the theoretical literature in the field. The following authors give us a broad introduction to the economic development problem and endorse Schumpeter's approach to the analysis of entrepreneurship.

Max Weber's leading analysis shows how "a flood of mistrust, sometimes of hatred, above all of moral indignation, regularly opposed itself to the first innovator" (Weber, 1983, p. 122). The development of a "spirit of capitalism" was important in order to overcome such counter-innovative forces. Such spirit consisted of a highly developed ethical qualities linked to Calvinistic Protesantism and its special social value for work and time in order to "command the absolutely indispensable confidence of his customers and workmen" (ibid. p. 122). Entrepreneurs found in this religion a way of protecting themselves against social pressures and developed an ability to withstand and overcome opposition. Even critics of Weber, such as Tawney (1926), conceded that Puritan-Dissenter ethic "shielded tradesmen and manufacturers against the slings and arrows of genteel contempt. It gave them a sense of dignity and righteousness, armour in a world of anti-commercial prejudices" (Landes, 1998, p. 176). Weber points out that religion had already served its purpose by the end of the nineteenth century[2]. "At present, under our individualistic political, legal and economic institutions, with the forms of organizations and general structure ... [the capitalistic system] no longer needs the support of any religious forces and feels the attempts of religion to influence economic life, in so far as they can still be felt at all, to be as much an unjustified interference as its regulation by the state" (Weber, 1983, p. 123)[3]. The point is that in the beginning of the development process entrepreneurs sheltered themselves in religion as defence against the attack stemming from the social forces.

In Thorstein Veblen's analysis the tension characteristic of the development process lies not *between* agents, as in Weber's analysis, but *within* agents, who are characterized by differing and antagonistic propensities. Veblen's view is one of

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2 A recent study of Drakopoulou, Dodd and Seaman (1998) confirms that Weber's insight is also true for the end of the twentieth century as well. Low levels of religious belief and practice in a sample of British companies suggests that religion may not be a significant environmental munificence factor for British entrepreneurship in the 90s.

3 Interestingly enough, recent econometric work on economic growth (Sala-I-Martin 1997) finds that neither Protestantism nor Catholicism appears to be positive for growth, contrary to other religions like Confucianism, Buddhism and Muslim.

"cumulative sequence of economic institutions stated in terms of the process itself" (Veblen 1919, p. 77 cited in Dopfer 1994, p. 149). Veblen lamented the fact that traditionally economics has looked for the causal determinants of conduct, particularly with respect to the development process, instead of recognizing the relevance of 'a selectively self-directing life process in the agent' (*ibid.*). Economic institutions are not only conditions for human interaction but also the result of those interactions. So development, from this perspective, is a matter of co-evolution, interrelatedness or co-determination between entities such as agents and environment (Dopfer 1994). This interrelatedness is especially present in Veblen's anthropological perspective. Human beings to him are by nature endowed with antagonistic drives and propensities. According to Ramstad (1994), on the positive side of those drives and propensities, there are the 'instincts' of parental bent, idle curiosity and workmanship, which impel industrious, creative and peaceable labour and, on the negative side, are predatory behaviour and propensity of emulation. Development is understood under this context as the positive impetus that drive humans to find more effective methods to meet generic needs, thus the evolution of technology emerges as the main driving force of human history. The latter anthropological description of agents has deeply influenced Schumpeter's analysis of forces within the firms, as we shall find out in the next section.

Hirschman's linkages theory epitomises the case of LDCs as a struggle between entrepreneurs and opposing forces. The lack of integrated industrial chains, which are basically due to a national scarcity in the production of capital and intermediate goods, would be the stimulus towards investment in such sectors in order to process final goods nationally; this is, namely, the *backward linkages* concept. But entrepreneurs would often find the resistance of "established industrialists who prefer to continue relying on imported inputs for price and quality reasons" (Hirschman 1989, p. 211). Even in the case of stimulus to new production lines that use existent capital or intermediate goods production, namely *forward linkages*, "official policy is not likely to be particularly concerned with [its promotion]" (ibid. p. 211). Forward and backward linkages concepts laid the foundations for Hirshman's *Unbalanced Growth Theory*, theory with which he opposes the *Balanced Growth Theory*[4] that

[4] If all sectors start to grow simultaneously, growth of all sectors follows smoothly.

recognised no positive and complementary tension between existent and non-existent sectors of the economy but only the need to exploit more the pecuniary effects between sectors. On the contrary, Hirshman's strategy of unbalanced growth pointed out that underdeveloped countries' (hidden) entrepreneurial talents, need 'pacing devices' and 'pressure mechanisms' in order to trigger development. According to Hirschman, development depends not so much on finding optimal combinations for given resources and factors of production as on calling forth and enlisting for development purposes resources and abilities that are hidden, scattered, or badly utilized. He agrees with Veblen and Pearson that in order to release potential surpluses available "what counts is the institutional means for bringing them to life … for calling forth the special effort, setting aside the extra amount, devising the surplus" (Pearson (1957, p. 339) Cited in Hirshman 1958, p. 5n; emphasis added). Following Schumpeter's lead, Hirschman (1958) states then that as entrepreneurs are agents breaking through old patterns of finance, production and distribution they need institutional support. The entrepreneur is a "rebel against society [with the] courage imagination, and a certain willingness to defy the old order" (p. 16), but, at the same time, she/he had the ability to engineer agreement and cooperation among the different actors of the production and distribution process i.e. inventor, partners, capitalist, suppliers, officals, staff, etc.. Such a 'revolutionary' and 'facilitator' requires the *institutional means* and, as we shall see below, this will be the key component to trigger economic development[5].

Two important scholars would pose the development process as a tension between either states of development (Gershenkron) or social classes (Lewis). First, Gershenkron (1962), a leading scholar in development theory, pictures development as a tension between the current state and the potential state of affairs, namely, *backwardness*. A LDC begins its development process if, as in the role of Oblomov, it can bring itself to leave its current state "only if the outside weather is irresistibly splendid" (cited in Hirschman, 1958, p. 9), that is if the institutional environment

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[5] Historically entrepreneurs have been aware of the antagonisms, envy and malice of their detractors and other retardant forces of entrepreneurship according to Brenner (1988). But mere awareness is not sufficient. Without the appropriate institutional support, entrepreneurial failure can ensue.