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# Entrepreneurship, stages of development, and industrialization

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# Entrepreneurship, Stages of Development, and Industrialization

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**Abstract**

Unlike in the past where industrial policy was either focused on creation and growth of state-owned firms or alternatively consisted merely of broadly functional policies without consideration for firm or entrepreneurial specifics, the requirement now is that future industrial policy ought to be a nuanced partnership between entrepreneurs and the state. In this paper we outline some considerations for such an industrial policy where the entrepreneur–state nexus is paramount. Moreover, we argue that such an industrial policy will need to take into consideration that the entrepreneur–state nexus is evolving, and that it depends on the stage of development of a particular country.

Keywords: entrepreneurship, industrialization, structural change, industrial policy, innovation, development

JEL codes: O32, L52, L53, M13

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## 1 Introduction

Entrepreneurs play an important part in economic growth and development. This has been a key insight since the contribution of Schumpeter (1911) and others (for a discussion, see Naudé 2011a). Entrepreneurs are also vital in the process of structural change or industrialization (Gries and Naudé 2010), a process without which development is not possible. As formalized in Gries and Naudé's (2010) model of entrepreneurship and structural change, entrepreneurial innovation leads to the reallocation of resources from the traditional (agricultural) sector to the modern (manufacturing) sector. There is substantial agreement that recovery after the 2008–09 global financial and economic crises[1] and the challenge of climate change will require more, not less, of such entrepreneurial innovation. What are needed are quality jobs through low-carbon industrialization (Mayer 2010; Naudé 2010b). There is now a growing rediscovery of industrial policy (IP) as being necessary to overcome a number of market failures that inhibit entrepreneurial innovation in job creation and low-carbon industrialization. This implies an industrial policy where the relationship between government and entrepreneurs (the private sector) is important. Unlike in the past where industrial policy was either focused on creation and growth of state-owned firms or alternatively consisted merely of broadly functional policies without consideration for firm or entrepreneurial specifics, the requirement now is that industrial policy ought to be a nuanced partnership between entrepreneurs and the state.

In this paper we outline some considerations for such an industrial policy where the entrepreneur–state nexus is paramount. Moreover, we argue that such an IP will need to take into consideration that the entrepreneur–state nexus is evolving, and that it depends on the stage of development of a particular country. This builds on the recent contributions of Ács (2010) and Ács and Szerb (2010) where the different role of entrepreneurship across a country's stages of development is recognized.

In the next section we discuss the role of entrepreneurs in industrialization. Then in Section 3 we analyse the role of entrepreneurship across various stages of development, with particular consideration on the empirical evidence and on using the Global Entrepreneurship Development Index (GEDI) as a guide to inform industrial policy aimed at entrepreneurial innovation. This section relies heavily on Ács and Szerb (2010) and Ács (2010). In Section 4 we bring together these two strands of thinking and tease out the implications for industrial policy across various stages of development. Section 5 concludes.

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1 As put by *The Economist* (14 March 2009: 3) 'The lights may have gone out on Wall Street, but Silicon Valley continues to burn bright'.

## 2 Entrepreneurship and industrialization

Gries and Naudé (2010) provide a model to illustrate the role of the entrepreneurial innovation in industrialization. Here entrepreneurs provide essential roles. First, they create new firms outside the household, offering new products and introducing new processes that provide information as a 'lead' activity. Second, they grow firms (and wage employment) by making use of scale economies. Such larger firms tend to specialize, and the clustering of specialized firms can give rise to localization economies, further encouraging innovation and specialization. Third, entrepreneurs can raise the returns to human and physical capital and so provide incentives for further investment and education.

Entrepreneurs may not automatically provide these functions, as they will be constrained by market failures. Industrial Policy (IP) may thus be justified. Rodrik (2007) recognizing this, discusses a number of such entrepreneurship inhibiting market failures. This can occur in financial, labour, product and knowledge markets. He remarked that in developing countries 'the deck is stacked against entrepreneurs who contemplate diversifying into non-traditional areas' (ibid. 7).

Consider first the creation of new firms and the market failures due to the information it generates. Early or lead entrants into a market or production process reduce the uncertainty for followers by providing information as to its profitability (Hoff 1997). It has been described as a 'cost-discovery' function by Hausmann and Rodrik (2003).[2] An IP that facilitates this cost-discovery function of entrepreneurs needs to be flexible, and moreover encourage experimentation. According to Aghion (2009: 15) entrepreneurially consistent IP need to be able to facilitate experimental state intervention, but must be able to 'stop the intervention if it turns out not to be efficient'. There is wide opposition against IPs that by eschewing an approach consistent with entrepreneurship has few mechanisms to get rid of inefficiently protected firms. Just as firm entry is to assume new opportunities, to provide higher returns to human capital, and to signal what an economy may be good at producing is important, so firm exit, once a firm has failed, is important. According to Campbell (2009: 1), citing the case of Pakistan, IP can fail when governments lack the strength 'to cut support to unsuccessful companies and industries' which are politically well-connected.

Second, market failures often prevent firms from growing. An empirical regularity associated with the failure of industrialization in much of Africa is the failure of small firms to grow. In contrast, the growth in firm size as a country industrializes is a 'stylized fact' of economic development. It depends, however, crucially on entrepreneurship—specifically entrepreneurial

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2 The current European IP (EC 2005, 2007) recognizes this role of lead entrants. For example it has adopted a 'lead market initiative' which consists of 'legal and regulatory frameworks, fostering of open-innovation mechanisms, standards, public procurement practices, intellectual property protection, or the availability of venture capital' with the aim to 'lift obstacles that hinder the development of new markets' (EC 2007: 7-8).

talent or ability as illustrated by Murphy, Shleifer, and Vishny (1991). Market failures result in the misallocation of entrepreneurial talent.

The role of entrepreneurial ability in the industrial success of the newly industrialized economies (NIEs) has been emphasized by Nelson and Pack (1999). They offer a dual economy model to explain the structural transformation of economies such as Korea and Taiwan from being characterized by a 'craft' sector to a 'modern' economy. They assign a key role to the 'effectiveness of entrepreneurship' (or entrepreneurial ability), which they see as a vital determinant of the rate of assimilation of technology (ibid. 1999: 420). They stress the imitative role of entrepreneurship as well as its role in taking on uncertainty, given that the adoption of (mostly) foreign technology by entrepreneurs in these countries entails significant risk-taking (ibid. 1999: 418). By performing this task, the entrepreneur is the essential mechanism causing new knowledge, as embodied for instance in foreign technology, to 'spill over' (Braunerhjelm, Ács, and Audretsch 2010).

The third role of entrepreneurship inhibited by market failures is that of creating incentives for further investments in human capital formation. Since the process of industrial catching up requires a higher level of skilled labour, entrepreneurs cause an increase in the demand for educated labour. This leads to an overall improvement in human capital in a country, in turn facilitating the imitation and adoption of foreign technology.[3] Nelson and Pack's model implies that a 'rapid' expansion of skilled labour can only be absorbed if entrepreneurial ability is high, and that without entrepreneurial ability the returns to physical and human capital is low (Nelson and Pack 1999: 423). Entrepreneurial ability therefore has positive externalities which could justify support for it within IPs.

## 3 Entrepreneurship across the stages of development

In his classic text, Rostow (1960) suggested that countries go through five stages of economic growth: (1) the traditional society; (2) the preconditions for take-off; (3) the take-off; (4) the drive to maturity; and (5) the age of high mass consumption. While these stages are a simplified way of looking at the development of modern economies, they identify critical events. When the Soviet Union did not develop into a mass consumption society (in part due to a lack of total factor productivity), the stages approach to economic growth went out of fashion.

However, influenced by recent developments in economics, Porter, Sachs, and McArthur (2002) have provided a modern rendition of this approach by identifying three stages of development as opposed to growth: (1) a factor-driven stage; (2) an efficiency-driven stage; and (3) an innovation-driven stage and two transitions. While Rostow (1990) focused on the *age of high mass consumption*, Porter, Sachs, and McArthur (2002) following recent developments in the economics of innovation focuses on the *innovation-driven stage*. Historically, an elite entrepreneurial class appears to have played a leading role in economic development. Today we

[3] Keller (2004: 752) points out that for most countries, foreign sources of technology account for 90 per cent or more of local productivity growth.

believe that they are also crucial for the innovation-driven stage. The transition to the innovation-driven stage is characterized by increased activity by individual agents. In the innovation-driven stage knowledge provides the key input. In this stage the focus shifts from firms to agents in possession of new knowledge. The agent decides to start a new firm based on expected net returns from a new product. The innovation-driven stage is biased towards high value added industries in which entrepreneurial activity is important.

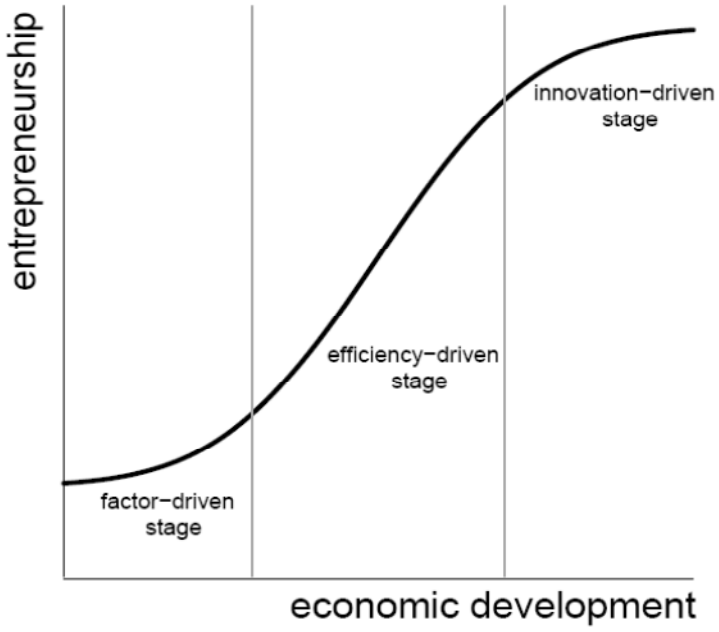
Institutions dominate the first two stages of development. In fact, innovation accounts for only about 5 per cent of economic activity in factor-driven economies and rises to 10 per cent in the efficiency driven stage. However, in the innovation-driven stage when opportunities have been exhausted in factors and efficiency, innovation accounts for 30 per cent of economic activity. We see an S-shaped relationship between entrepreneurship and economic development because in the first transition stage entrepreneurship plays a minimal role in productive entrepreneurship. It increases in the efficiency-driven stage. However, as we move from the efficiency-driven stage to the innovation-driven stage (the knowledge-driven stage) entrepreneurship plays a more important role at an increasing rate, then levelling off as economies become fully developed.

Figure 1 shows the relationship between entrepreneurship and economic development. Entrepreneurship is considered to be an important mechanism for economic development through employment, innovation, and welfare. The intersection of the S-curve on the vertical axis is consistent with Baumol's (1990) observation that entrepreneurship is also a resource, and that all societies have some amount of economic activity, but that activity is distributed between productive, unproductive, and destructive entrepreneurship.

What is crucial is to determine how much productive entrepreneurship do we have in countries at different stages of development?' The S-curve suggests that in the factor-driven stage a relatively small amount of entrepreneurial activity is productive, that is, it creates economic and/or social value. As mentioned earlier, this increases sharply through the efficiency-driven stage and levels off in the innovation-driven stage of development. As institutions are strengthened more and more entrepreneurial activity is shifted towards productive entrepreneurship strengthening economic development. We will discuss the implications of this for IP in the next section.

A related question is 'What are the other entrepreneurs doing?' The answer is that if the supply of entrepreneurship is constant, then the majority of entrepreneurs are engaged in either destructive entrepreneurship (destroying social value) or unproductive entrepreneurship (not increasing social value). For example entrepreneurship may thrive on and encourage the existence of a black market, the best and the most talented may be engaged in bureaucratic rent-seeking or risky and (at times) illegal ventures that destroy social value even when adding to the wealth of the individual in concern. If a constant proportion of the population, *X*, is engaged in entrepreneurship and only a small fraction of this is in productive entrepreneurship, the rest are destroying value. Building better institutions and changing the incentive structure of the society can only eliminate this valley of backwardness above the S-curve. All of this requires good government and governance and IP focusing on the broader institutional environment may play a crucial role in this case.

Figure 1: Entrepreneurship and the corresponding stages of development




Source: Ács and Szerb (2009).

To identify the level of entrepreneurial activity in a country corresponding to the stage of development and its role in IP we need good measures for entrepreneurship. The existing measures do not fully capture the essence of entrepreneurship, empirically or conceptually. GEDI is an independent index to provide a comprehensive measure of entrepreneurship. The index draws on previous measures of economic freedom, competitiveness, and entrepreneurial activity but improves on each of these by providing a more focused and quality-oriented approach.

As illustrated in Table 1 three sub-indexes of activity, aspiration, and attitudes combine to constitute the entrepreneurship super-index. While other indices have focused on entrepreneurship at the innovation-drive stage, the newly created GEDI takes into account entrepreneurship at all stages of development. First, the three entrepreneurial sub-indices are not of equal importance. The attitude sub-index measures society's basic attitudes toward entrepreneurship through education and social stability. The activity sub-index measures what individuals are actually doing to improve the quality of human resources and technological efficiency.

Table 1: The global entrepreneurship and development index

| Global entrepreneurship and development index (GEDI) | | |
|---|---|---|
| Entrepreneurial attitudes sub-index | Entrepreneurial activities sub-index | Entrepreneurial aspirations sub-index |
| Opportunity perception MARKETAGGLOM | Competition MARKDOM | Risk capital *INFINV* |
| Start-up skills EDUCPOSTSEC *OPPORTUNITY* | Quality of human resources *HIGHEDUC* | Internationalization VENTCAP *EXPORT* |
| Non-fear of failure BUSINESS RISK *SKILL* | Technology sector STAFFTRAIN *TECHSECT* | High growth GLOB *GAZELLE* |
| Networking INTERNETUSAGE *NONFEAR* | Opportunity start-up TECHABSORP *TEAOPPORT* | New tech BUSS STRATEGY *NEWT* |
| Cultural support CORRUPTION *KNOWENT* | FREEDOM *CARSTAT* | New product INNOV *NEWP* |
| | | GERD |

Source: Ács (2010).

The aspiration sub-index measures how much of the entrepreneurial activity is being directed toward innovation, high-impact entrepreneurship, and globalization. The sub-indexes are based on their constituent pillar scores. The pillars, in turn, are based on the interaction between their constituent individual and institutional variables. The incorporation of institutional variables is a unique feature of the GEDI and reflects the qualitative aspect of entrepreneurship. Understanding the sub-indexes and their changing importance towards entrepreneurial development across stages of development provides a useful approach towards informing a more appropriate set of IPs.

## 4 Entrepreneurship and industrial policy across stages of development

Despite the threefold important role played by individual entrepreneurs as was discussed in Section 2, and despite the clear evidence that the role of the entrepreneur differs across stages of development, many earlier IPs had largely failed to explicitly incorporate the entrepreneur and to pay attention to the developmental stage of a country. This is especially the case in Africa where

IP is now seen to be largely unsuccessful—with the possible exception of South Africa.[4] In Africa market and government failures resulted in a much larger misallocation of entrepreneurial ability towards unproductive, and even destructive activities as we mentioned earlier (see e.g. Baumol 1990; Baumol, Litan, and Schramm 2007) and in an inappropriate emphasis on stimulating economic activities and growth in a manner that was not optimal for entrepreneurship given these countries' levels of development.

In contrast, there is considerable evidence that in the countries where IPs have been more successful—such as the NIEs and China—that IP more properly considered the nature of a country's entrepreneurs and their relation to the state. Thus for instance in Singapore and Korea, where the entrepreneurial base was judged to be lacking, IP was at first aimed to complement and strengthen the domestic entrepreneurial base, through allowing in much more foreign entrepreneurship and by providing much financial support to allow entrepreneurs to take on more risk in imitation and foreign technology adoption (Nelson and Pack 1999). And in Taiwan and Japan, where the entrepreneurial base was fairly strong to begin with, more limitations were placed on foreign entrepreneurs.

China's economic transformation since the late 1970s also shows a measure of consideration towards entrepreneurship. Thus, for instance, Siebert (2007: 899) remarks that 'the Chinese now show a larger acceptance of the market economy than the three large continental countries of Europe'. He describes how the Chinese reforms fostered the emergence of more productive enterprises not by dismantling or privatizing state-owned enterprises upfront (as in Eastern Europe or some African countries) but of maintaining these and 'simply by letting new economic activities develop outside the government controlled sector' (ibid.: 900). China also allowed the growing class of private sector entrepreneurs to influence the evolution of the institutional framework shaping its IP—described as 'institutional entrepreneurship'.

Reasons for the neglect of the entrepreneur in IP in the past may be due to the likelihood that the nature of the firm was not always adequately understood (Lazonick 2009); that early development economics did not see entrepreneurship as a binding constraint on economic development (Naudé 2011b). We can also add to this the argument of this paper, namely that the measurement of entrepreneurship was a neglected area, and that the nature of the contribution of entrepreneurship across various stages of development was not properly recognized.

Understanding the nature of the firm as described should be seen in conjunction with the advances in recent years of distinguishing the role of entrepreneurship across various stages of development. This recognizes that different types of industries develop or evolve over the course of a country's development path (Lin and Chang 2009) and that different types of industries and firm heterogeneity entail different types of entrepreneurship, which in turn requires different types of support from the government. Hart (2001), for instance, makes a distinction between a

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4 Central in the country's IP was the state-owned creation of the largest venture capital fund for manufacturing on the African continent, the Industrial Development Corporation (IDC) of South Africa in 1940. In the following sections we will stress the potential importance of an entrepreneurial approach to IP of promoting venture capital in developing countries.

'developmental state' and a 'regulatory state', arguing that a developmental state, which is more hands-on and leading in the process of industrialization, is more suited when a country's industry will benefit from centralization and intervention—i.e. where the firm and the entrepreneur is still operating well within the technological frontier. A similar argument is made by Phan, Venkataraman, and Velamuri (2008) in a study of entrepreneurship in emerging countries. They conclude:

> … studies of entrepreneurial regions across the world … have underscored the critical role of governments at different levels in the emergence of these regions … the magnitude of government influence, which is significant in the early stages of development, seems to decline in later stages relative to other factors … The explanations for this vary from the traditional factor substitution wherein government kick-starts the development of a sector, which then becomes attractive for private capital to accumulate, to the post-modern institutionalization, in which the development of such institutions as intellectual property regimes engender capital accumulation (ibid.: 325).

Thus, they find that in early stages of development, government intervention is needed in addressing market failures and kick-starting growth which they see as a prerequisite for the later development of an entrepreneurial economy.

The discussion so far suggests very strongly that there is no 'one size fits all' as far as IP is concerned. Because innovation, as the fundamental driver of economic growth makes a different contribution across stages, IP should be closely aligned (consistent) with innovation policy. Indeed it is recognized in the innovation literature that that 'innovation ambitions and policies have to be adapted to levels of development' (Aubert 2004: 14).

The relationship between entrepreneurs, government and the implications for IP and innovation (also informed by the GEDI) through various phases of development is summarized in Table 2 – see the Appendix below).

In the table the left-hand column refer to three stages of development: the factor-driven stage, the efficiency-driven stage, and the innovation-driven stage—as described in the previous section. In the second column this is set against the dominant private sector mode, in the third column against the characteristics of the innovation system (given that IP should support primarily innovative entrepreneurship) and on the far right-hand side column against the type of state orientation most conducive for the development of the private sector mode.

The table indicates that at an early stage of development the entrepreneurial base is still small, and that private sector activity is mainly in dispersed, low-productivity traditional activities. In such a stage of development, states are very often fragile (see Naudé, McGilivray, and Santos-Paulino 2011) and the major development challenge is to move the state from being fragile to being facilitating. In other words, the state establishes legitimacy, authority and capacity, and starts to put in place basic framework conditions for investment and productivity growth. This

will enable a core of entrepreneurship to emerge, most often in accordance with the country's comparative advantage[5] and will prepare the economy for the efficiency driven path.

To fully embark on this path of efficiency-driven growth, however, the state needs to expand its intervention in the economy to 'defy' the comparative advantage through selective IPs. This will for instance allow economies of scale to be reaped, which will encourage self-reinforcing agglomerations, facilitate growth in firms size, and will see a greater role for instance for state-owned enterprises (SOEs) and multinational enterprises (MNEs) as the latter makes of special economic zones and other incentives.

During the efficiency-driven stage, innovation policies as sub-set of IP increase in importance. Thus for instance as suggested in column 4, row 2, intellectual property (IP) protection is often not seen as being of such great importance in earlier stages of development, become more important only when a country has already entered a rather more advanced stage of development (Aubert 2004). Thus as shown in the efficiency-driven stage of development public R&D starts to play a more important role, while it is less important in the factor-driven stage. Impact evaluations have found that public R&D can stimulate total investment in R&D and can thus crowd-in private R&D (Taymaz and Ucdogruk 2009).

In earlier phases of development, the adoption and eventual adaptation of technologies are important to encourage. Policies that can do this include those improving skills, organizational learning, and attitudes and culture (Lindahl 2005). Aubert (2004) focuses on the obstacles to entrepreneurial innovation in developing countries in earlier stages of development. He recommends measures and reforms to address broad or 'functional' obstacles, such as business environment constraints. This is indeed what typical private sector development initiatives attempt to improve.

At some point, the country's sectoral development will be such that it would need a flexible IP to shift again towards being less interventionist, more functional but also perhaps surprisingly, more selective. Many countries embark on trade liberalization during this phase of their development. Examples given in this paper include the EU, the USA, and India. China's two-track approach since 1978 can be seen as a variant of this shift, whereby the shift is gradually introduced by allowing a more liberalized private sector economy to develop whilst not disbanding state-owned enterprises.

As is shown in column 4 of Table 3, and based on the GEDI, entrepreneurially-oriented IPs should at different stages focus differently on attitudes, activities and aspirations. Attitudes are an essential prerequisite for either activity or aspirations. This is in part cultural, as certain societies (e.g. communism and feudalism) outlawed entrepreneurship. Attitude is followed by activity, and after activity, aspirations become important. In some sense, this process is

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5 Indeed, Lin defines a 'facilitating state', as a 'state that facilitates the private sector's ability to exploit the country's areas of comparative advantage' (Lin and Chang 2009: 484).

cumulative over time; however, it has large overlaps as well. In a factor-driven (agricultural economy) the focus needs to be on entrepreneurial attitudes in the population. In an efficiency-driven economy (manufacturing) individual entrepreneurs need to be encouraged to start businesses. In an innovation-driven economy (knowledge-based economy) some people need to create very large and successful businesses. The role of institutional and individual variables used in the construction of the indices is also an important aspect of the development process. While institutional improvement is vital for factor-driven countries to advance to the next level of development, the enhancement of individual characteristics is increasingly critical for innovation-driven economies. Thus important policy implications for the countries at different levels of development emerge from the GEDI rankings.

Table 3: Industrial policy emphasis for economies at different stages of development

| Stage of economic development | Sub-index | | |
|---|---|---|---|
| | Attitudes | Activity | Aspirations |
| Factor-driven economy | Key focus | Develop | Start enabling |
| Efficiency-driven economy | Continuous improvement | Key focus | Develop |
| Innovation-driven economy | Continuous improvement | Continuous improvement | Key focus |

Source: Ács and Szerb (2010).

Factor-driven economies need to focus on entrepreneurial attitudes, start to develop activity, and begin the process of enabling entrepreneurial aspirations. Here an instructive example is from India where entrepreneurship has been resurgent since the early 1990s. It has made strong contributions to growth through innovation—as has been witnessed by the country's vibrantly growing ICT sector. A number of policy initiatives have been important in facilitating this growth. Das (2009) identifies in this regard most importantly a change in culture and attitudes towards entrepreneurs.

The key focus of efficiency-driven economies should be on entrepreneurial activity. Here it is also important that entrepreneurs started to be more socially responsible—making increasing contributions to health, education, and welfare, so that 'the business community sees development issues as their problem, too' (Das 2009: 3), and that governments start to provide more supported entrepreneurship and innovation through creation of venture capital funds as they did for instance in India (Mani 2011).

However, continuous improvement of attitudes and the development of entrepreneurial aspirations are also important. In innovation-driven economies, the key focus should be on

aspirations. However, both attitudes and activity need to be improved to maintain balance across the three sub-indices. This is also highlighted in Table3.

These policy recommendations are reflected in column 4 of Table 3. It is important to note that there is bidirectional causality between innovation, industrialization, and stages of development. At a high level of per capita GDP, governments spend more on R&D and universities, creating a supporting environment for creative pursuits, including technological innovation which spurs further industrial sophistication.

The greater selectivity during the innovation stage (and to an extent already during the efficiency-driven growth stage) stems from the requirement of focusing on the small sub-set of firms that are really innovative. Not all firms are innovative. Innovative entrepreneurship is sometimes also seen as synonymous with high-impact or high-growth entrepreneurship (HGE) (Lerner 2009; Shane 2009; Wong, Ho, and Autio 2005), and their firms described as 'gazelles' (Stam et al. 2009; Teruel and De Wit 2011). These HGE firms are disproportionately important for economic growth and development—as put by Shane (2009: 145) 'a tiny sliver of companies accounts for the vast majority of the contribution to job creation and economic growth'. Selectivity and targeting have the benefits of overcoming shortcomings of past efforts, raising the effectiveness and sustainability of IPs, and conserving resources (Stam et al. 2009).

For countries in the factor-driven and efficiency-driven stages of development it is often reckoned that the informational requirements for selective IP is too great—and that government failure will result if they do attempt such selectivity (Coad and Rao 2008; Stam et al. 2009). For advanced economies on the production possibility frontier the challenge is also how high-growth potential firms can be identified ex ante (Hölzl 2009).

Shane (2009) also cautions against targeting potentially HE, but points out that these types of firms very often, at least in advanced economies, tend to be financed disproportionately by venture capital. He refers to data that show that in the USA in 2003 firms that were supported by venture capital employed almost 10 per cent of all the private sector. Of course the difficulty is that venture capital funding is still very underdeveloped in developing and emerging economies in the first stages of development, where innovative entrepreneurs rely more on internal funding, and where many donor and other entrepreneurship programmes have aimed at expanding debt financing to firms. This implies that if in future the benefits of selectivity are to be gained, that perhaps support for the emergence of venture capital across the developing world should be a priority.

If specific firms are difficult to target due to informational problems, some have argued that a second best option is to target not firms but clusters or agglomerations of firms, noting that knowledge generation, learning, innovation, and economic activity tend to be localized processes (Braunerhjelm 2010: 6). Hence, cluster approaches to entrepreneurship are important. The groundwork for such an approach needs already to start during the factor-driven stage of development, as Table 3 implies.

Entrepreneurs are the essential drivers of innovation as Schumpeter recognized, and the 'filters' through which knowledge externalities spill over. It therefore makes sense for IP support for

entrepreneurship to consider the formation, function of regional clusters (because of the localization of spillovers), and their linkages with the rest of the economy—and to ensure venture capital support at clusters. In such an environment an open economy which stimulates creativity and the attraction of the 'best and the brightest' receives priority in IP.

## 5 Concluding remarks

A perennial challenge for industrial policy concerns not the 'why' but the 'how' (Rodrik 2007). In this paper we have argued that an entrepreneurial approach to industrial policy offers an answer to the 'how' of industrial policy. This stands in contrast to past approaches that have been characterized by heavy government interference and management of the economy; that have been characterized by the adoption of policies and strategies that were inappropriate for a country's level of development; and that ignored the important role of innovation in economic growth and catching up.

There is as yet no substantial literature on the relationship between the stages of development, the evolving nature of entrepreneurship, and the orientation of the state—indeed this paper is one of the first to make this link to argue that this, as yet emerging paradigm, is essential in any future pathways to industrialization. However, we recognize that it is likely to be confounded by difficulties for governments and international development organizations to identify their stage of development, by the fact that stages overlap (as the third column in Table 1 suggests), that some countries may leapfrog stages, and that the instruments and measurements to guide industrial policy in each stage is not well understood. We have argued that the GEDI which we described in Section 3 may be instructive in this regard.

Where a country ranks on the GEDI and what scores it has on the different institutional and individual level pillars can be indicators of the relative strengths and weaknesses that face the country. These scores can be used to design industrial policy, focusing on weaker pillars, and concentrating on features that respond better, given which stage of development that country is in. The sequence of the sub-indices of the GEDI in the development process is important to note and offers indications for the aims of industrial policy.

We believe that industrial policy can play a role in fostering entrepreneurship for economic development. It can be used as a tool to overcome the market failures that concern entrepreneurs by ensuring that inefficient forms exit the market, by helping small firms grow, and by ensuring investment in human capital development. The GEDI illustrates the quantitative and qualitative levels of entrepreneurial activity across the nations and countries at different stages of development. The different policy requirements needed to boost entrepreneurship and to generate growth at the three stages of development necessitate IPs that recognizes the different kinds of entrepreneurial activity that may exist at different stages of development. The examples of countries like Korea, Singapore, and China are illustrative in this regard. The GEDI rankings can be an indicator of whether a country needs to focus on improving its entrepreneurial attitudes, activities, or aspirations.

The distinction made between various stages of development is of course one that should be made carefully, as a watertight demarcation or classification of countries is difficult. As the OECD (2011: 39) remarks 'development has become more compressed, not only in terms of a higher pace but also because different development stages are pursued concurrently by emerging economies'. This means that care has to be taken to understand the way in which a particular economy is characterized in terms of these stages, where its industries and sectors are in terms of sources of growth, and how to ensure a policy differentiation. The demarcation of stage is thus still useful as it provides a basis for this demarcation of policy which would otherwise have been difficult. It allows various stages of development and firm growth to be considered in the fine-tuning of IP.

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APPENDIX – Table 2

Table 2: Stages of country development, entrepreneurship, and industrial policies

| Stage of country development | Private sector mode | Innovation system characteristics | Industrial policy orientation |
|---|---|---|---|
| *Factor-driven*<br>Production most intensive in unskilled labour and natural resources | *Traditional economy*<br>Dominance of primary sectors<br>Specialization in cash crops, mineral extraction<br>Spatially dispersed production<br>Small entrepreneurial base<br>Largely small, informal and low and minimal technology SMEs | *Low Science and Technology Capabilities*<br>Innovation may account for only 5 per cent of economic activity<br>Adoption of existing technology to local conditions main challenge<br>'Brain drain' and outflow of skills<br>Low technology absorption capability<br>Little private sector R&D<br>Little incentive for indigenous knowledge commercialization | *Fragile or Facilitating*<br>Establishing authority, capacity and/or legitimacy important to move from fragile to facilitating<br>Facilitating state aims at establishing conducive business environment (property rights, stability, rule of law, accessibility)<br>Demonstration of 'basic innovations' that can contribute to development<br>Basic investment in technology infrastructure<br>Start addressing broader environment for innovation (education, trade, finance) and industrialization<br>Gather data on local indigenous knowledge.<br>Promote positive *attitudes* towards entrepreneurship |
| *Efficiency-driven*<br>Production more efficient and movement towards technology frontier starts. | *Managerial economy*<br>Manufacturing sector grows<br>Greater product diversification<br>Larger firms, SOE and MNEs start to dominate<br>'Fordist' production by obtaining productivity growth through economies of scale<br>Growing spatial clustering and | *Medium Science and Technology Capabilities*<br>Innovation becomes more important and could contribute to around 10 per cent of economic activity<br>Growth in private and public sector R&D<br>IPR protection becomes more important | *Developmental or Facilitating*<br>Developmental state to use policies to encourage domestic technological capability formation<br>Use of government procurement for innovation capability building and industrial capacity<br>Attract appropriate FDI<br>Develop autonomous innovation promotion institutions / Improve the science base<br>Policies aimed at high-technological innovation |

| | | | |
|---|---|---|---|
| | urbanization<br>More technologically competent enterprises | | Promote entrepreneurial *activities* broadly, including through start to promote venture capital<br>Public R&D to compliment and crowd-in private R&D<br>Trade liberalization, openness, international research collaboration<br>Use of Diaspora's (and reverse the brain drain)<br>Indigenous knowledge utilize, protect |
| *Innovation-driven*<br>Production of high-tech goods and innovative to expand the technological frontier | *Entrepreneurial economy*<br>Rise in services sector share in GDP<br>High value added manufacturing activities dominate with greater specialization<br>High tech clusters stabilizes and R& D rich firms to be found<br>Reemergence of (advanced) small businesses on both national and international markets | *High Science and Technology Capabilities*<br>Knowledge becomes the main driver of growth<br>Innovation can contribute to more than 30 per cent of economic activity | *Facilitating*<br>The state promotes basic framework conditions<br>Substantial focus on innovation, technology, also regional focus<br>Strengthen research base<br>Promote entrepreneurial *aspirations*<br>Market competition, market development through entry of new entrepreneurial firms important<br>Ensure well-functioning venture capital markets<br>Careful selectivity on potential high-growth entrepreneurship |

Source: author's compilation based on the discussions in Altenburg (2009); Ács and Szerb (2009); Aubert( 2004), and Porter (2004).

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