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# A New Paradigm To Help Accelerate The Transformation of Resource-Rich Nations into Sustainable Knowledge Economies

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ABSTRACT The discovery of hydrocarbons in a number of countries especially in the Middle -East has enabled these nations to develop and generate significant wealth. However, long-term sustainability within these countries' transforming economies has not been addressed in full, with oil revenues still accounting for the vast part of the countries' income. In this paper we introduce a novel open innovation concept, the Companion Direct Investment (CDI). By using the Emirate of Abu Dhabi as a case study, we discuss CDI's potential as a complimentary approach to enable value exchange leading to the location and nurturing of knowledge enterprise as a means to accelerating the transformation of these nations into knowledge-based economies.

*Keywords:* Knowledge Economy, FDI, Companion Direct Investment, CDI, Innovation, Absorptive Capacity

## Introduction

It is often said that countries abundant in natural resources have found it a curse impeding their economic growth (Bleischwitz, 2010); however, certain Natural Resource-Rich Economies (NRREs) have experienced substantial growth in wealth over the past 50 years (Peterson, 2009). Positive effects of natural (and non-agricultural) resources on nation's economic growth rate are also supported by econometric and estimation analysis conducted, amongst others, by Collier *et al.* (Collier and Goderis, 2009). The exploitation of oil and gas in particular has been instrumental in propelling the Gross Domestic Product (GDP) per person, of some of these economies to levels which are now amongst the worlds' highest (Bank, 2013). The availability of increased liquidity from resource revenues has enabled these countries to enjoy a lower rate of taxation, a rapid development of infrastructure, and decreasing debt levels (Van der Ploeg and Venables, 2011). In order to meet the increased demand of workforce these countries increasingly open to foreign low-skilled workers (Muysken and Nour, 2006), as well as tried to attract a skilled expatriate workforce (Birks and Sinclair, 1979; Naithani and Jha, 2010).

If we consider the space represented by the Gulf Cooperation Countries (GCC), those which are rich in natural resources, especially oil and natural gas, have made significant

strides in transitioning from primarily oil based economies to laying the foundations for becoming innovative and diversified knowledge based societies (2010). Qatar has embarked on a journey of economic diversification beyond Oil and Gas and rests its vision for 2030 on four pillars; human, social, economic and environmental development (2008b). Likewise Bahrain seeks to enhance its position as the financial centre of the region and Saudi Arabia has begun a process to create 'Mega Knowledge'cities that will bolster innovation and enterprise, facilitating the creation of millions of jobs and delivering economic growth (Authority, 2009). Another interesting example of resource, and, particularly, oil-rich nations which is currently embarking in a journey of Economic Development aimed at sustainably modernising the Country - as well as decreasing its dependence on natural resources and diversifying its economy, is represented by the Emirate of Abu Dhabi, part of the United Arab Emirates. We will discuss Abu Dhabi in more detail throughout the following sections of this document.

Implementing these bold and ambitious visions requires a high level of strategic commitment. Many strands of their respective visions are being implemented which are fully encouraging and provide optimism that the goals may be achieved. However, there is much scope for open and collaborative approaches which can sit harmoniously within the grand vision of these countries. In this paper we discuss the growing importance of Knowledge Economy and Innovation as key enablers of economic development and economic growth, respectively (Feldman, 2004). We then focus on the importance and limitations of Foreign Direct Investment (FDI) (Apaydin, 2009; Borensztein E, 1998; Moses, 2011; Usha Nair Reichert, 2001) as a tool to enable growth and development. Despite the great potential for Multi-National enterprises (MNEs) in the Middle East many barriers to foreign direct investment still exist such as its cultural differences and its restrictive regulatory systems (UNCTAD, 2013). Whilst there has been an increasing trend in FDI inflows to the region, the Middle East is still one of the most underperforming regions of the world when it comes to attracting FDI (Mellahi et al., 2011), with total share of world FDI inflow in 2007 equal to only 8%; GCC countries were the least attractive in the region having 2.3% of the worlds FDI inflows in 2007 (Hussein, 2009). Furthermore, the performance of Small to Medium Enterprises (SMEs) within the Middle East and GCC regions lags behind their counterpart regions such as Europe (ECORYS, 2012). In order to complement traditional and more established interventions and overcome some of the current limitations of present measures, we introduce a novel concept - Companion Direct Investment, or CDI. We discuss CDI and its performance compared to a traditional FDI approach, utilising the Emirate of Abu Dhabi as a test bed; finally, we discuss benefits and implications for policy which CDI can bring to a transforming NRRE.

## Innovation, Open Innovation and the Knowledge Economy in the 21st Century

Innovation is a term replete with complexity. On one hand can be defined as "the commercial realisation of the value of an invention or the receipt of an economic return"(Feldman, 2004), on the other hand presents facets which cannot be characterised directly in monetary and product terms, but involve underlying aspects relating to society and culture. There is a growing evidence and support for the idea that innovation and innovation processes and systems are fundamental to a healthy and sustainable development of firms as much as it is of nations and regions aspiring to build and sustain progress and competitiveness, and therefore need to be embedded within an holistic government policy approach, as an utmost priority (OECD, 2007). As economies develop and evolve, increasingly closer attention is being

given to the so called 'open innovation'(OI), as a means of overcoming the limitations posed by the traditional internal close development within firms.

Open innovation is defined as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively"(Chesbrough et al., 2008). OI operates a decentralisation of innovation, with potential accelerated learning to originate during the process. To do so, organisational boundaries between firms become porous, and access to a widely dispersed creative energy finally becomes theoretically possible (Huff et al., 2013). This, in turn, underlines the need for firms and economies to be open to interact and accept external sources of potential innovation to gain a long-term competitive advantage (Rohrbeck et al., 2009). Whilst open innovation deals primarily with innovation systems at a firm's level, the ability of a government to understand, internalise and embed the concept within its wider agenda is important for OI to act effectively: at firm's level - as an enabler of growth; and at a nation's level - as an enabler of economic development.

Knowledge Economy can be defined as "production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence" (Powell and Snellman, 2004). The term spun from the realisation that society is changing and developing in to what has been characterised by Peter Drucker as the "Knowledge Society"(Drucker, 1994). This term naturally morphs in to that of "Learning Society", owing to the fact that the knowledge society maximises learning and its outcomes through new ways of processing the ever increasing amount of data and information available, "stimulate ingenuity and invention and develop the capacity to initiate and cope with change" (Hargreaves, 2003), whilst enabling exploitation of value from already established knowledge to enable growth (Döring and Schnellenbach, 2006). The latter statement is in contrast to neoclassical economics theory which subjects growth to the development of new knowledge stock (Rosenberg, 1963). The close relationship of knowledge with learning as a necessary ingredient to enable sustained growth within an economy – a "Learning Economy" (Lundvall and Johnson, 1994), has originated substantial discussion and interest, among policy makers, in the role of education and skills to enable the Knowledge Economy to flourish (Hargreaves, 2003; Houghton and Sheehan, 2000; Peters, 2009) and Government policies on education, skills and labour – see, for example, (Warhurst, 2008), as well as in the role of Academia and academic R&D (Bo Carlson, 2009). Moreover, it has created a fervid debate on the identification of key learning enablers within economy and society, and has prompted analyses of the levers of influence as well as potential barriers which may hinder a successful deployment of a Knowledge Economy within certain otherwise wealthy regions and nations, such as the UAE (Muysken and Nour, 2006).

Albeit focus of policy makers has been towards prioritising the advancement of the Knowledge economy as being constituted mainly of High Technology (HT) activities and entities, strong evidence suggests that in developed regions such as Europe, the Low to Medium Technology (LMT) sector is responsible for an overwhelmingly major (~97%) share of economic activities (Hirsch-Kreinsen et al., 2003; Hirsch-Kreinsen et al., 2005b; Hirsch-Kreinsen et al., 2006). At firm level, the focus is on the fact that innovation can happen in the absence of substantial R&D, but "through acquisition of tacit and practical knowledge, and through formal and informal diffusion between firms" (Hirsch-Kreinsen et al., 2005a). This, on one hand, confirms that the processes and avenues through which innovation is created and exploited do not necessarily depend on high-technology paradigms, but can draw upon external inputs, network and the suppliers as key elements and providers of information and knowl-

edge; on the other hand, evidence of innovation activities related to LMT is no guarantee of effective growth rates. In fact, research shows LMT industries display a lower growth rate than High-Tech ones, a lower level of "customer-driven" innovation and have the propensity of being recipients of innovation rather than engines of growth, albeit, at regional level, the economic potential of industrial regions (possessing high number of both LMT industries as well as, interestingly, HT manufacturing industries) is lower than that of urbanised regions with highly skilled knowledge workers providing knowledge intensive services (Heidenreich, 2009).

From the above, it is therefore clear that linking innovation to economic growth, through the creation of an economy based on knowledge, is paramount to building long-term value. A number of ingredients, such as: R&D investment; a skills agenda which is cognisant and supportive of entrepreneurship and of the creation and sustaining of an educated and skilled population; advanced financial tools and assistance; regulatory and legal frameworks; access to basic and applied science and technological know-how; a socio-economic agenda to channel information, knowledge, knowhow and the outputs of R&D, as well as a thorough analysis of a country's strengths and weaknesses have therefore been identified as key to the success of modern economies.

Utilising the World Bank's Knowledge Assessment Methodology (KAM), and its related set of metrics, the Knowledge Economy Index (KEI) - representing the overall level of development of a country or region as it strives to establish its Knowledge Economy (Bank, 2012) and a measure of effective use of knowledge for economic development, four "pillars" of the knowledge economy have been defined (Aubert and Reiffers, 2003):

- Economic and institutional regime
- Education and skills
- Innovation system
- Information and Communication Infrastructure

As we can see from Table 1, showing the performance of a selection of NRREs and reference countries against the KEI, the UAE (data from Abu Dhabi alone is not available on the World Bank's online database) shows a relatively stable index across the period 1995-2012, with the 'Economic Incentives and Institutional Regime' pillar showing a decrease, a factor common to many transforming economies, especially those belonging to the Gulf Cooperation Countries (GCCs).

The KAM chart shown in Figure 1 describes the relative performance of the UAE to that of another NRRE (Norway) and our economy of reference (the United Kingdom). Aside from indicators such as number of mobile phones/1000 people and the diffusion of computers and Internet, it appears that the UAE falls somewhat short in metrics relating to the first three pillars. Figure 2 allows us to evaluate the KIE in relation to GDP, a measure of economic growth (Feldman, 2004), revealing a "strong correlation between a country's overall knowledge economy readiness index and its level of development as measured by the country's GDP per capita"(Aubert and Reiffers, 2003). The UAE sits outside the GDP vs. KEI curve. Therefore, it appears that despite substantial economic growth, enabled by the availability of natural resources, the potential for the economic development and related knowledge economy development is currently not being fully exploited, potentially creating the basis for a widening gap in development capabilities in parallel to a widening knowledge gap (Aubert, 2003). These issues call for a greater and more active role of Government in guiding transforming economies such as the UAE – and in particular Abu Dhabi, and Saudi Arabia, in order to maximise in a timely fashion the advantages that such economies currently

possess whilst reducing the imbalances caused by a non diversified economy (Gallarotti, 2013).

## Foreign Direct Investment (FDI) and absorptive capacity of an economy

Foreign Direct Investment, or FDI, is, "an investment made to acquire a lasting management interest (normally 10% of voting stock) in a business enterprise operating in a country other than that of the investor defined according to residency"(World Bank, 1996, in Moses (2011)). FDI is in general – albeit not unanimously, as shown for example by analysis in (Durham, 2004), associated with positive economic development and indirect (spillover) effects on national economies – achieved through a variety of means such as imitation, training, introduction of new technologies and processes and increased collaboration between incumbent and indigenous firms (Branstetter, 2006). However, in regions such as Middle East and North Africa (MENA), factors such as: political risk; less developed investment laws and unreliable and cumbersome legal and regulatory frameworks are some of the key elements responsible for relatively low levels of traditional inward FDI investments, with however an uneven performance profile across the panel due to the dependence of FDI on variables such as market and economy size (benefits of FDI from the expansion of market size were found to increase, but at a decreasing rate (Mohamed and Sidiropoulos, 2010)) and richness in natural resources – which brings again to the limelight the still controversial conundrum embodied by the "Oil Curse"(Bleischwitz, 2010; Gylfason, 2009) albeit seemingly showing contribution to increased intraregional FDI activities (SCHWAB, 2012). Considering the 'absorptive capacity' of an economy can help decrease the uncertainty with which conclusions can be drawn upon the effects of FDI-only on the performance of an economy and its development. The term is primarily utilised within the context of a firm, and defines the firm's ability to absorb, internalise and exploit external knowledge (Cohen and Levinthal, 1990); more specifically, it is "the appropriate supply of human capital and technological capability to be able to generate new technologies and consequently use production resources efficiently", in turn leading to "productivity growth for firms as well as countries"(Narula, 2004) and competitiveness (Daghfous, 2004).

When considering the average Arab country and including the effects of absorptive capacity, it has been shown that, at present, the effects of FDI within the wide dynamics of economies is still not completely understood; specifically, increasing FDI was found to be no more likely to benefit an economy's growth than other types of investments (Krogstrup and Matar, 2005). When considering specific major resource-rich Arab countries, such as Saudi Arabia (Ramady and Saee, 2007) which presents a substantial market and sizeable economy, as well as natural resources, we see that it is still currently failing to attract FDI (after a substantial influx phase in the early 1980s), for reasons which seem to be primarily related to bureaucratic hurdles and protectionist measures, as well as to cultural differences in enterprising. The dynamics at play in these latter cases show a stronger volatility of FDI compared to more diversified Arab economies (Krogstrup and Matar, 2005). It is therefore apparent from the above that new and complimentary intervention strategies, aimed at resource-rich countries and especially the GCC conglomerate should be investigated, as a means to try to circumvent the constraints which the interrelationships between FDI, absorptive capacity and growth are subjected to.

## Government as an investor in support of growth and innovation

In order to achieve real sustainable economic development beyond economic growth, underlying evolutions are therefore needed at a country's level, under the guidance of government, enabling a range of measures, such as new forms of industry that create higher value added activities (Feldman, 2004). One of the important steps for government is to broaden the enterprise base. Imbalances exist in resource rich economies like Abu Dhabi and Saudi Arabia, whereby, largely as a result of the dominance of the oil sector, large enterprises – mainly in the Oil and gas sector, dominate the share of industry's contribution to GDP. Therefore, room for improvement in the development of the SME sector and their productivity exists. Compared to the GCC region, in the EU27 economies, for example, SMEs account for a larger proportion of Gross Value Added (GVA) in 2012 – 58.1% than large businesses (ECORYS, 2012). Developing the SME sector will therefore bring these NRREs in line with their benchmark countries, reduce the economic risks and help diversify the economies, encourage innovation and help create jobs.

Investors use their networks to seek out high growth potential opportunities. Very few funds—primarily private equity, address seed stage opportunities as they are high risk, lack any proven technology and also due to the uncertainty of their acceptance in the market place. Venture Capitalist firms (VCs) and other forms of funding often. tend to concentrate their activities within regions that present high density of knowledge ventures, albeit early discovery and guidance of these very high potential businesses is crucial for countries ambitious on transforming into high tech knowledge economies. This calls for NRREs' governments to develop innovative models within robust innovation policies to approach the problem of accelerated knowledge business creation in an holistic way.

Governments are the main financial powerhouse in these regions and have the necessary funding that is required to stimulate and transform the internal economy. They have increasingly been active in developing and maintaining stable regulatory and legislative frameworks, necessary for long term stability of the nations (BIS, 2010), developing infrastructures (physical, academic, network and support) and boosting education and skills. However, it is imperative that, together with the support and nurturing of both public and private sector, from a financial, innovation, education, institutional and infrastructure points of view (OECD, 2007), they also capitalise on their current financial strengths and embrace "investor -driven innovation" (Bart Clarysee, 2012) as a mechanism part of their toolkit to accelerate the knowledge economy development in their nations. Figure 3 shows some of the roles Governments can have in fostering Innovation, whereas Figure 4 illustrates the national innovation ecosystem

Unfortunately in many of the Middle Eastern economies there is inadequate spending on activities such as research and development (R&D) – see Figure 5. According to the Arab knowledge report 2010 -2011 these countries spend around 0.7% of GDP on R&D activities (Nations, 2010), whereas in OECD countries this average rises to 2.3% (OECD, 2007). Moreover most of the R&D funding in the Middle East comes from the Government whereas in developed economies the private sector contributes around 60 % of total R&D Spending. This problem is exacerbated further by the tendency of cash rich nations to import rather than manufacture, which means there is little impetus for industries to conduct their own R&D. Furthermore, as national sources of R&D are weak, any needs which a particular in-

dustry does have are brought in from leading global R&D providers meaning that local universities and institutions remain weak (Nations, 2010).

As one of the mechanisms for the enactment of FDI at a more strategic level, Sovereign Wealth Funds (SWFs) have in recent times arisen to increased prominence (NOTES, 2007), doubling flows from $10bn in 2011 to $20bn in 2012 (and with a cumulative total standing at $127bn) and have so far been comprising of primarily cross border M&As within the services (70%) sector (UNCTAD, 2013) although their potential to promote economic development, and especially the knowledge economy, is still greatly underutilised by and within NRREs and therefore represents an ideal candidate to channel current natural resources-derived wealth in to knowledge intensive activities.

## The Emirate of Abu Dhabi

The Emirate of Abu Dhabi, located in the Arabian Gulf is the largest and richest of the seven Emirates that comprise the United Arab Emirates, occupying 86% of the UAE's total area (at 26,000 square miles, it is slightly smaller than Ireland) and contributing 80% of the Emirates' total federal budget (Sharpley, 2002). The Emirate of Abu Dhabi has over the past decades experienced rising economic growth and prosperity, fuelled by large revenues from its oil sales (IKED, 2010). Abu Dhabi today has one of the largest GDP per capita in the world and the world's 6th largest oil reserves that are estimated to last another 150 years (Partners, 2010). In 2008 the Government of Abu Dhabi engaged in a substantial effort to create a long term vision, whose implementation has been initiated and publicised through the Abu Dhabi Vision 2030 strategy document (Dhabi, 2008). The document sets the Emirate's strategic roadmap to foster innovation, and its long term aspirations to: transform itself into a Sustainable Knowledge-Based Economy; grant increased power to women and encourage more active participation in the workplace and at all levels of society; allow far greater private sector participation in the buoyant economy and active engagement of Emirati's nationals in the workforce. Abu Dhabi wants to transform itself into an innovation hub for knowledge, science and technology and to benefit from a diversified knowledge-based economy, where various sectors contribute to the total GDP with reduced reliance on the Oil and Gas Sector. down from 70% (2009) to 35% (2030) This is to be achieved through the expansion in to non -oil revenue sources, such as renewables (Reiche, 2010), whilst tackling key development areas, such as infrastructure and real estate (Davidson, 2009; Ponzini, 2011); tourism (Sharpley, 2002); and finance (Alfaro et al., 2006; Beck and Fidora, 2008). These developments are being pursued through interventions such as intensified investment activities (Partners, 2010); improved cultural and entertainment activities, drawing on from Qatar's recent focus on the development of cultural establishment, such as museums (Adam and Burns, 2011), improved education and research systems (Muysken and Nour, 2006). In addition, success in a knowledge economy also requires a strong business environment to facilitate growth and entrepreneurship. Competition, openness to trade and Foreign Direct Investment (FDI) are important to transform knowledge and skills into growth and competitiveness.

Abu Dhabi will emerge from the vision as a more cultured society retaining its identity and benefiting from a strong and diversified economy.

## A new paradigm: Open Reciprocal Companion Direct Investment (CDI)

*Definitions*

The authors define Companion Direct Investment (CDI) as an innovation engine exhibiting reciprocal, multi-way and multi-directional monetary and knowledge "transactions". CDI possesses the following properties:
1. A financial transaction is made from a Host Country (Financier) and channelled as an equity investment in to both an established, knowledge intensive Micro-company - from a knowledge intensive region, and a prospective startup enterprise located in said host Country;
2. Initial knowledge transfer and – potentially, intellectual property (IP) rights "transactions" are made by the knowledge intensive micro-company on to the newly established, knowledge -driven startup enterprise in the Host Country to initialise its enterprise innovation engine. A description of CDI in terms of SWOT analysis and a diagrammatic view of are shown in Figure 6and Figure 7, respectively.

Since, as we have shown in the previous sections, transforming NRREs have in recent times experienced a substantial growth, as well as volatility, in their wealth and monetary reserves, the need for a long term strategic approach to their economies' development has inspired a range of initiatives and policy interventions to establish the foundations for the development of knowledge based economies. The availability, within Governments' investment arms, of cash reserves has been traditionally utilized, with various successes, in diversified investment strategies, with dynamics such as moving from a "sovereign savings fund" approach to create fully fledged "government investment firms" as in the case of Abu Dhabi's Mubadala Development Company (Abdelal, 2009). Such investment vehicles have operated often sizable equity investments in large foreign multi-national corporations and in high value added brands (Beck and Fidora, 2008) - as well as classic FDI outflow investments involving multinational, international and global corporations. So far, however, benefits to the development of a robust and sustainable indigenous knowledge economy have been limited, as we have shown in the previous section.

Within a CDI scenario, equity investments are made in order to establish a new entity - a startup enterprise in the Host region. This newly established enterprise is set up as a knowledge-driven Joint Venture company co-owned by the Financier and a (foreign) knowledge based micro-company / SME based in a Knowledge based economy. In addition, and according to Points 1 and 2, an investment is made by the Financier in to the same (foreign) knowledge based micro company/SME.

The establishment of a Joint Venture, knowledge-based Company within the Host Country primarily enables two factors: knowledge infusion between the foreign enterprise and the newly established enterprise; access to Intellectual Property Rights already developed within the parent micro-company. The former dynamics enables the company to, at least in part, forego the lengthy process of having to develop an initial knowledge base, know-how, initial strategic business directions, and initial required skills identification and exploitation within the new business, whilst enabling a predominantly indigenous workforce to drive the enterprise and its core activities. The latter dynamics enables the development of technology and new intellectual property within the newly established enterprise, thanks to the R&D activities which are core to any knowledge based and knowledge intensive business, to initially

serve the Host country Market and its region, and with the potential to have a wider reach. This translates in to the creation of substantial value within the newly established business. The strong links associated with the parent company, the Host Country / Financier together with their respective networks at the same time ensure that strategic development will take in to consideration the global markets, optimizing the local and regional commercial - as well as economic, potential, whilst serving as part of the country's strategic toolkit to accelerate its knowledge economy development.

## Principles of Operation

Having noted the benefit of FDI and economic growth we look at how CDI works, together with the many external benefits that it can create upon the host country's economy and the implications it has on the policy development of the Host nation.

The CDI innovation engine starts with the identification of a knowledge-rich enterprise. Such enterprises could be located anywhere in the world, however we recognise the fact that there would be an increased likelihood of them to originate in knowledge intensive (or knowledge based) regions. Knowledge Intensive micro and small-to-medium Enterprises (KIEs) and knowledge-based businesses are in general established to: develop technologies or knowledge based services utilizing intellectual property which the company would have access to—typically, said IPR would have been generated by, and reside within, said company; and to satisfy identified or emerging market needs (in agreement with a dualistic "science-push/demand-pull" absorptive capacity two-dimensional paradigm (Murovec & Prodan, 2009). More generally, they are "focused on knowledge creation, acquisition, learning, use, sharing, integration, exploitation and protection in order to achieve economic and social performance" (Dorinela, 2011).The nature and core technologies of the knowledge businesses considered for CDI offer the potential to be utilized as a platform to serve a global market, as well as to be tailored to suit different niche markets and different applications, in addition to enabling the traditional expansion of the business in other areas/geographical regions. In order to develop IP and its related technology, a substantial amount of R&D is normally conducted, especially during the company's early, high risk stages of startup, proof of concept (POC) and early prototype/technology demonstrator. This enterprise would therefore have overcome the early, high mortality rate phase between research and successful innovation - the so-called "Valley of Death" (Gulbrandsen, 2009; Hudson & Khazragui, 2013) and would likely have developed a substantial knowledge base and technology, leading to greatly reduced risks (for potential investors) associated with an equity investment, compared to a company possessing an untested/unproven technology (Murphy and Edwards, 2003). However, whilst a proven core technology can intuitively facilitate investments as well as a diversification and expansion strategy, the process of raising funds to pursue said aspirations may still present substantial challenges, since, in contrast with the seemingly wide availability of resourceful Funds and investment bodies, their remit and scope may not enjoy the necessary flexibility to pursue a optimal diversification and/or expansion in to markets—such as, for example, the GCC area, which may present higher than usual barriers to entry for micro-companies (especially market size, bureaucracy and other institutional and culture-related variables) (Mohamed and Sidiropoulos, 2010).

In order to achieve the goals of expansion and business diversification, and therefore progressing through its value roadmap, this enterprise would therefore greatly benefit from venture investment as well as from the establishment of a sister operation in transforming regions keen on developing a Knowledge Economy, such as the GCC. The Host nation "financier",

whether it be the Government, an SWF or another entity as the investor, would, according to the definition of CDI, acquire an equity stake in the Knowledge rich enterprise which will fund the next phase of the business development. The magnitude of this equity investment would typically position the Financier as a minority shareholder investor in the micro-company. This first investment event can be classed as a classic FDI outlow from our nation of interest's perspective. Conversely, a parallel investment enabling the creation of a knowledge driven business within the Host nation will place the Financier as a co-owner of the new business (together with the Micro-company), typically holding a majority stake in this newly formed business.

The newly established enterprise would be a full-fledged company, incorporated in the Host nation and compliant to the host nation's corporate regulations and company laws, however it will also possess a structure and governance to enable it to comply to standards and related regulations in international trade.

The structure of the newly established enterprise would comprise of management, operational, research and development, sales and marketing, and manufacturing functions. Governance would have representation from the parent business as well as the Financier. The workforce and leadership would be—in the fullness of time, predominantly constituted by local skilled workers, managers and researchers. As we can see in the two diagrams shown in Appendix 2, in contrast to an FDI scenario, the newly established company would undertake significant research and development in the Host Country as well as manufacture, assemble and conduct product sales within its host nation. In parallel with the planned launch of a first product by the new enterprise, a presence within the wider region will be established, in order to service the neighbouring nations. However, in contrast with the traditional FDI approach, in the case of CDI the decreased burden dictated by the interface with the local and regional governments are greatly reduced, due to the active involvement of the Host nation's indigenous investment and leadership.

The inner structure, as well as the dynamic behaviour of the new enterprise therefore differ profoundly from the archetypical product of a traditional FDI inflow process, as well as from the product of a Government-backed inward investment. This translates in a different dynamic at play, as well as a different economic and business performance of a CDI compared to a traditional FDI approach, as exemplified in the following section.

## Case study: application of the CDI model to the Emirate of Abu Dhabi

For our case study we evaluated an existing (anonymised) knowledge based medical device company based in Wales, UK, showing strong signs of global leadership potential within their technological and application area. For the purpose of this example, we call this company W. Company W, currently conducting pre-clinical trials of their device, has developed a high-technology medical product and has undergone extensive R&D as well as prolonged laboratory testing. Company W was able so far to raise meaningful Series A and B equity investment, and has received a number of national R&D government grants. It is now approaching the need for significant injection of capital (in the range of £5m - £15m) to fund the next phase of its development, to take their device to first-in-human trials. Meanwhile, the Government of Abu Dhabi, striving to pursue an aggressive strategy to boost the knowledge economy of the Emirate, would utilise its sovereign wealth fund (the 'Financier') to set up, establish and fund a Joint Venture company (JVC) with Company W, in Abu Dhabi – Company AD, as well as investing in Company W in Wales. In order to clearly illustrate the behaviour, performance and advantages of CDI compared to FDI we have decided to focus on a

simplified model. This Model assumes that the economy under investigation (Abu Dhabi) is constituted of a single company, i.e., Company AD. The parameters utilised to conduct the analysis are reported in Appendix 1. Calculations of the Real GDP were conducted utilising the standard expenditure method, in accordance to guidelines published by, amongst others, US Department of Commerce's Bureau of Economic Analysis (McCulla and Smith, 2007): $GDP\ (AD) = C + I + G + (X - M)$. Where $C$ is private consumption, $I$ is gross investment, $G$ is government spending and $(X-M)$ is the difference between exports and imports.

Structure of CDI business set up in Abu Dhabi and related requirements for the different business operations, compared to a traditional FDI setting are outlined in Figure 8. Figure 9 and Figure 10 show some of the results of the analysis, in terms of: a) sales generated; b) government's revenue from taxation; and c) skilled workforce employed. From Figure 9 a), we note that sales volumes are anticipated to grow at a faster rate than in a traditional FDI setting as the company benefits from an earlier start to its operations in the country and a more enhanced access to wider markets, in part due to a more direct access to levers of influence within the administrative and bureaucratic local machinery. Furthermore, Figure 9 b) shows increased revenues for the host Government/Country in the form of taxation to be received, due to the aforementioned increased employment, as well as the increased retention of capital within the region, owed to the predominantly local workforce, which leads to the redeployment of money within the local economy, assuming a constant level of savings. Finally, from Figure 9 c), adopting a CDI innovation engine leads to increased employment compared to adopting a standard FDI approach. This is a direct effect of the presence of a robust business core, together with R&D, Manufacturing and Clinical activities, in addition to Sales and Marketing, occurring through the adoption of a CDI approach, compared to FDI, whereby the business would be focused predominantly on sales activities, with a certain level of tech and clinical support.

Figure 10 shows the calculated Real GDP for the Country based upon a "single company" economy, thus considering Company AD as the only industry and source of employment (Feldman, 2004). We note that GDP levels are much higher in the CDI scenario than in an FDI equivalent. Again, the observed behaviour can be readily attributed to factors such as: extra number of people being employed—leading to greater taxation and consumption; increased number of sales of the device due to factors such as an earlier start to operations and preferential opportunities in the wider region which could occur as the government or financier would be a key investor in the Sister/ Core Company and present opportunities to participate in other ventures and to hold exclusivity in the region.

## Benefits of CDI and Policy implications to the Host Nation

As hypothesised in our earlier discussions in this paper both the company and the Resource Rich region can greatly benefit from the effective collaborative approach offered by CDI.
For the purposes of this analysis, we focus solely on the benefits accruing to the host Nation. An analysis of the benefits of the CDI model at firm as well as individual levels, as well as an analysis of the economic development dynamics involving the host nation and the wider region and their relationships and dynamics within their networks will be the subject of further research and publications.

Resource-rich economies are able to seamlessly integrate a CDI innovation engine within their long-term planned development strategy and vision, since CDI can be considered in essence a "plug and play" additional engine to boost a country's knowledge economy and development. In the CDI model, investment in to the host nation is constituted by skills,

knowhow and knowledge capital rather than financial capital. Furthermore, whereas traditional FDI would originate an operation geared towards sales—and, sometimes, assembly activities, whilst retaining R&D functions at the parent company (its headquarters), a CD Investment originates a research-intensive entity which will, in time, be able to advance and develop new technology. Additionally, in contrast to traditional Government interventions to stimulate relocation of MNEs in to a developing region, the Host nation, through its Financial arm and local leadership and workforce, takes an active commercial interest and drive on the newly created business.

In its role as an engine, CDI can readily integrate within existing innovation policies and immediately benefit the performance of government interventions and policies such as: educational reforms and increased focus on Higher Education and the R&D agenda, since it can absorb new highly skilled graduates who may be diverted on to other types of employment; entrepreneurship policies, since CDI has the potential to stimulate the creation of knowledge entrepreneurs within the nation; financial and investment policies to improve internationalisation of the country's economy and its diversification, due to the international nature of CDI; investment policies, since it stimulates and favours net and active investment in knowledge and skills, whilst acting as an accelerator for the development of further high level skills within the local population.

CDI as a mechanism has therefore enormous policy implications for a Resource rich economy and we now explore how this synergistic relationship between a Knowledge Intensive firm and a Transforming developing Nation sits harmoniously with current Government policies of Oil Rich Nations in the Middle East. A key component of the CDI model ensures that the objectives of: increasing investments in to potentially high-return equity in diversified investments; enhanced and complementing knowledge transformative activity of the nation, in line with Government policy and aspirations of the Host Nation, are met. It is clear from The Abu Dhabi Government with its Vision 2030 (2008a), The Saudi Arabian Government through its vision 2020 (Authority, 2009) and the state of Qatar with its long term ambitious plans via the Qatar 2030 Vision (2008b) all aspire to transform and diversify their Resource Rich economies into Sustainable Knowledge Based Societies. Many of their respective policy strands have begun to be implemented, such as the establishment of world class educational facilities in Qatar Science and Technology Park, in order to bolster Knowledge and skills of the local citizens. Abu Dhabi too has engaged with international Universities to bring campuses in its region. Moreover Saudi Arabia's current engagement in an ambitious project to create 'Knowledge Mega Cities', which are to be beacons of Innovation and learning activity, demonstrate the commitment of these nations to diversify their respective economies. In keeping with government's objectives of "Emiratisation", or nationalisation of its workforce (Mashood et al., 2009), the newly formed Company AD would endeavour to recruit locals, and develop the skills of the local workforce. It would provide a platform for knowledge acquisition and transfer, and also the opportunity for talented individuals to pursue opportunities such as industrial PhDs and develop the human capital of the local population. Again this is in keeping with current policy to develop the skills of the citizens. The right choice of business idea is critical to the region too and, owing to the aforementioned investor-driven innovation principles, investment in certain innovative enterprises could in turn also stimulate the advancement or development of new policies: as businesses could likely develop products and services to address important needs of society, benefits deriving from investing on said ventures could therefore have benefits that will trickle into many other areas. For instance, if the company in question is focused on the healthcare - life sciences sector, and is developing a product with great potential and benefit to tackle a medical need, greater benefits will spur as

a result, not only to the economy of, in this case Abu Dhabi but also to society as well. In addition, this level of medical innovation can become a magnet for other associated companies to develop research creating a cluster of innovative high tech life sciences companies and developing a knowledge economy network. This too is complementary to current Government Policy. In Qatar for example Business incubation is being facilitated for foreign technological firms to embed innovation.("qstp," 2013), and interventions such as R&D tax credits are being explored (Feldman, 2004).

This in turn can provide impetus for the further enhancement of healthcare provision in the region and help sectors such as health tourism overcome the limitations which the traditional tourism is currently facing in Abu Dhabi (Sharpley, 2002). The creation of a network of skilled workers and exchange of ideas and knowledge can allow for the development of many high value-added products and help facilitate the Country's move towards economic diversification at a higher pace. The integration of a CDI accelerator model enjoying the general properties described in the previous section would therefore sit harmoniously within government's current and planned future investment and development strategy and interventions, whilst enabling further cross fertilization of potentially interlinked business development areas and an increased pipeline of opportunities for collaboration, networking and general business relations in loco between entities attracted through the traditional FDI mechanisms and the proposed CDI-enabled home-grown, fast-paced enterprises, as well as with indigenous, pre-existing enterprise.

## Conclusions

In this paper, we have presented the novel concept of Companion Direct Investment as an engine to help boost the economic development potential of transforming resource-rich economies, such as the GCC. We have utilised the United Arab Emirates, and specifically the Emirate of Abu Dhabi, and a real life high potential micro-company based in a knowledge intensive region as the actors to exemplify the high-level operation of the model, and have shown its performance potential compared to a traditional FDI model. Resource rich economies of the Gulf region have made significant investments in human capital over the last several years, but have yet to reap the full innovation benefits from these actions. Weaknesses in knowledge and technology output such as lack of patents, have impacted their performance. Qatar, Saudi Arabia and Kuwait rated below the trend line and were among a host of resource-rich, high-income underperformers when comparing Global Innovation Index performance against GDP per Capita (Dutta, 2012). Prospects of growth are above the average for the UAE, when compared to European countries, standing at 4% / year in 2011 to 2020; however, the rate is forecasted to decrease thereafter, as the working age population slows down. The rate of UAE's GDP growth will remain dependant on oil production, however increasing the amount of foreign investment through its sovereign wealth funds can provide a cushion against downturn and volatile oil prices, through a diversification of the current oil-based economy. A successful diversification can help develop a sustainable economy, the goal of every nation in the world today and an especially pressing matter if NRREs can evolve in to long term healthy economies. In turn, a sustainable economy further enhances a nation's standards of living by creating wealth and jobs, encouraging the development of new technologies and services, helping to create a stable political climate.

Our model provides a unique, flexible and innovative approach which fits in well with NRRE governments' objectives and policies and the countries' respective long-term strategic visions and aspirations. In addition to economic growth via increased GDP, CDI shows three

key benefits for a resource-rich nation: increased skilled employment; increased Government revenues; and projections of accelerated sales for the company's products pipeline, which in turn translate in a more dynamic and diversified economy.

In order for CDI to be successful, however, a concerted action is needed within government and policy makers, who have to consider economic development in a holistic way, by taking in to account the relationships between economic, educational, financial, cultural and industrial factors. A successful implementation of the Companion Direct Investment engine has the potential to originate a balanced, sustainable economy where business and individuals can take advantage of the opportunities presented, whilst ensuring that governments takes an active role in guiding the countries' economic development by being engine, driver of innovation and entrepreneurship, and guardian of the well being of its citizens.

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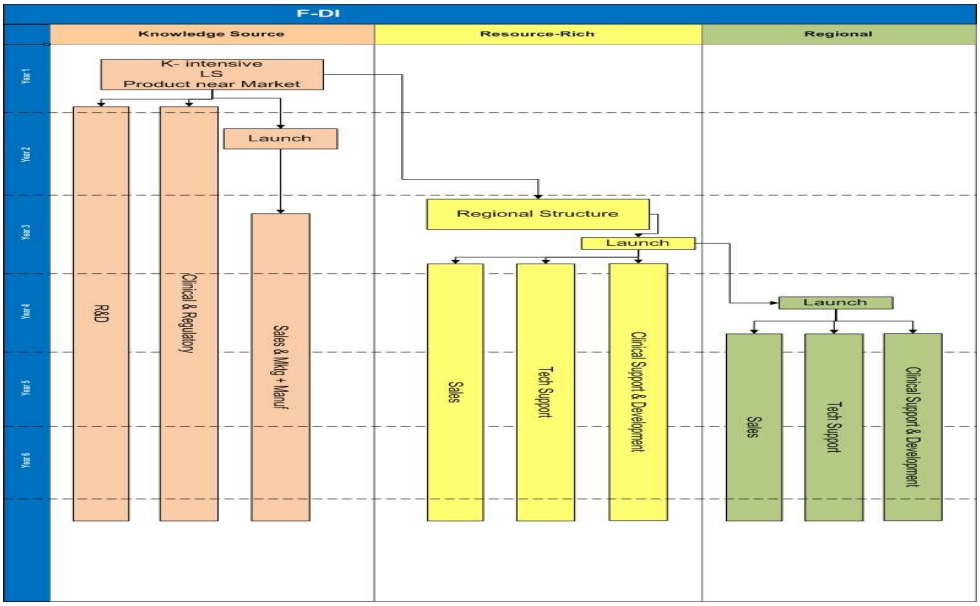
**Appendix 1**

Case Study: Company X (medical device Co) – start up operation in Abu Dhabi. Notable Figures used for calculations.

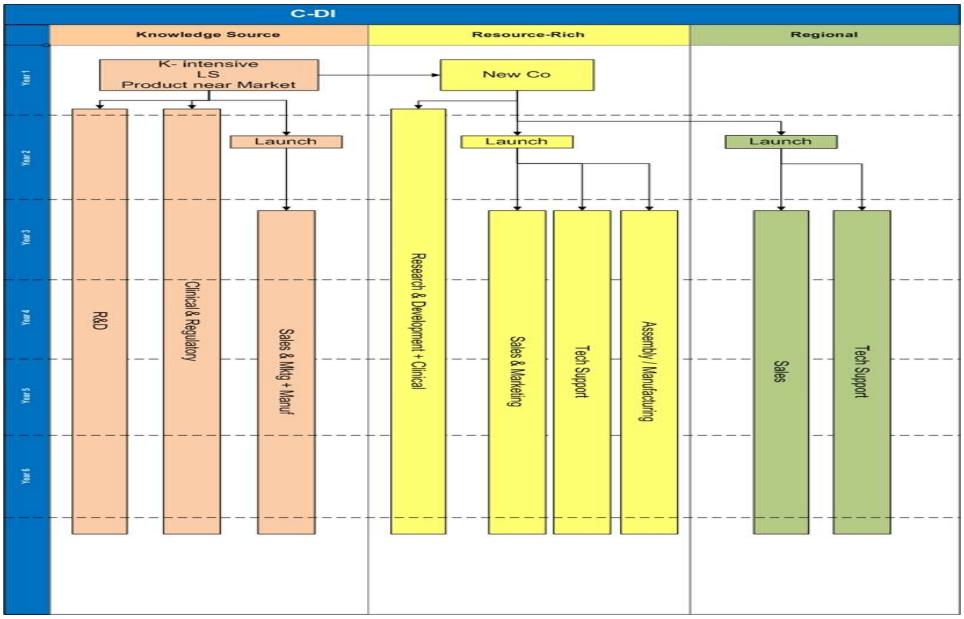
| | |
|---|---|
| Cost of Medical Device | £30,000 |
| Tax RATE | 20% |
| National Insurance tax | 22% |
| Cost of Goods | At 30% |
| Initial Investment in CDI region by Host Financier | £5,000,000 |
| Business Structure | See charts below |
| Total Number of People Employed CDI | 17 |
| Total Number of People Employed FDI | 7 |
| Volume of Sales In CDI scenario | 290 units between year 2 -5 ( operations begin year 2) |
| Volume of Sales In FDI scenario | 120 units between year 3 -5 ( operation begins year 3) |

**Appendix 2**

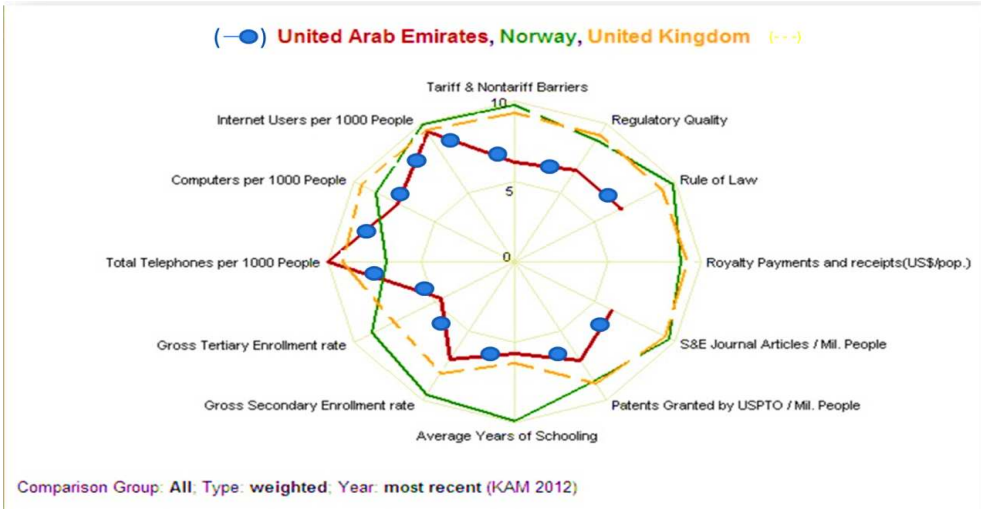
STRUCTURE OF SETTING UP COMPANY X IN ABU DHABI USING FDI AND CDI APPROACH



*Appendix 3*




*Appendices 4 & 5*



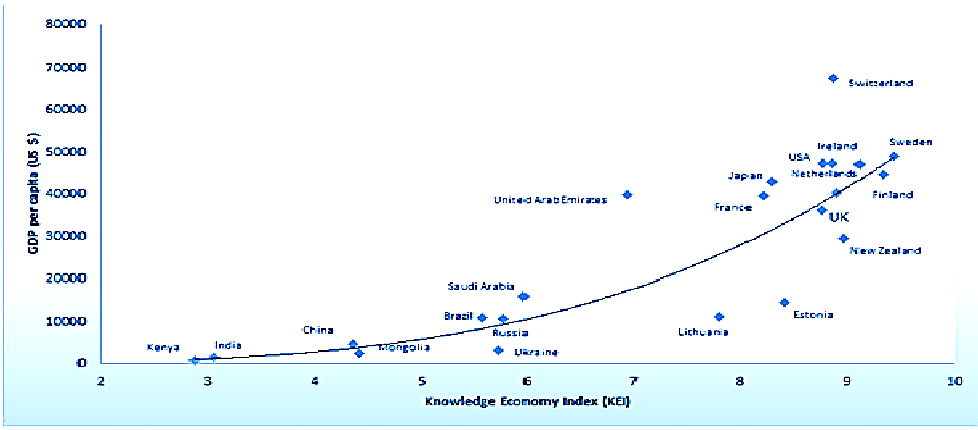
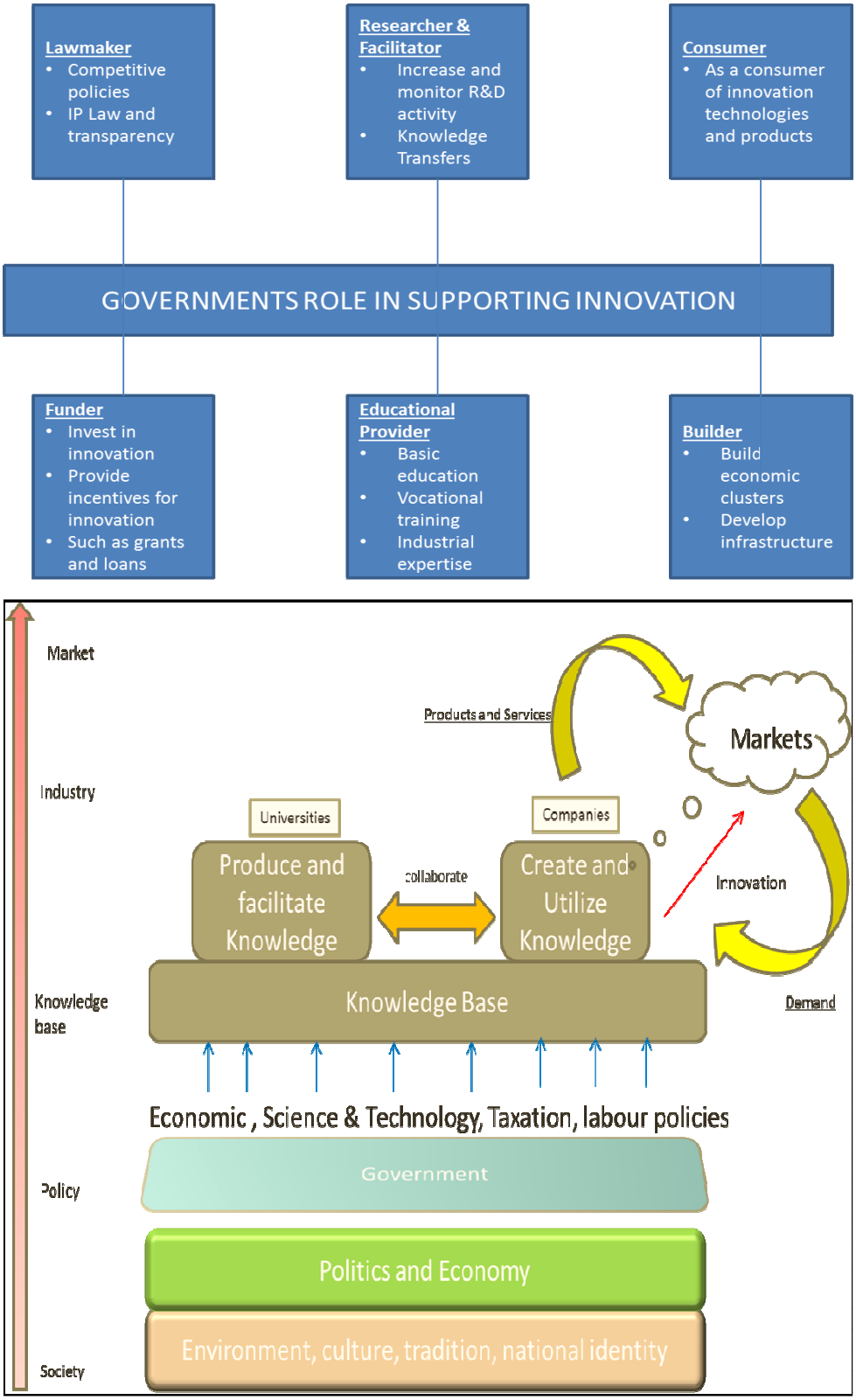



*Figure 3: The role of Government to support Innovation activities within the Country*



*Appendix 6*

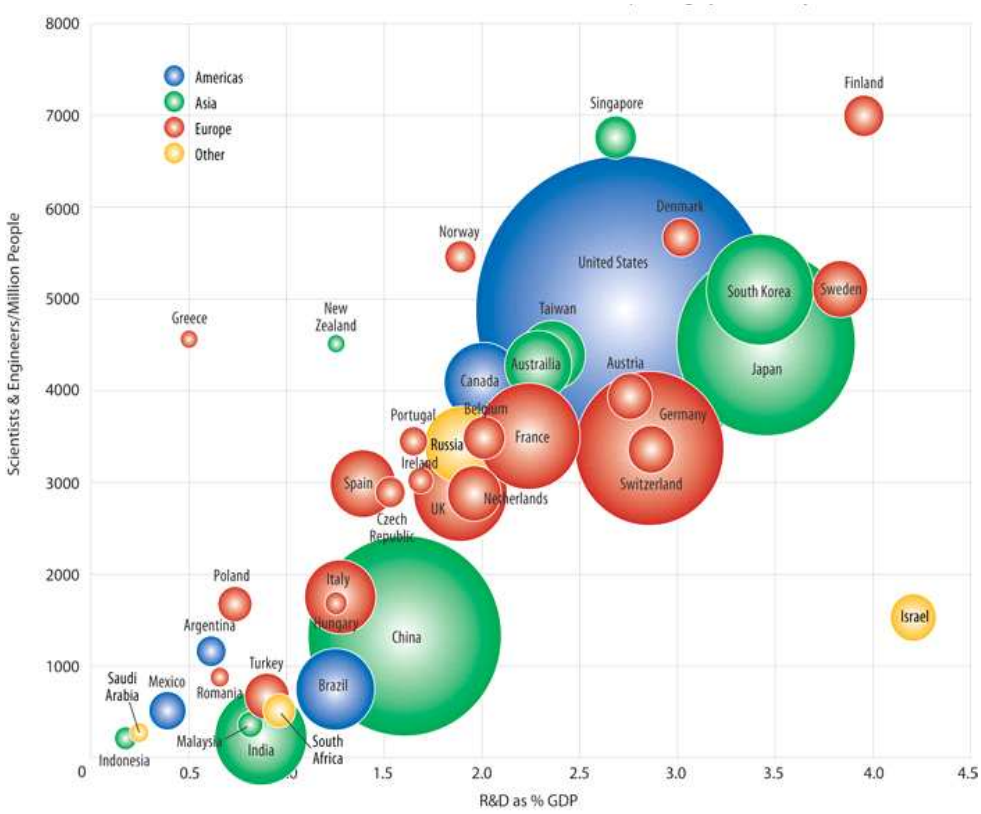



*Figure 7: Proposed CDI model*

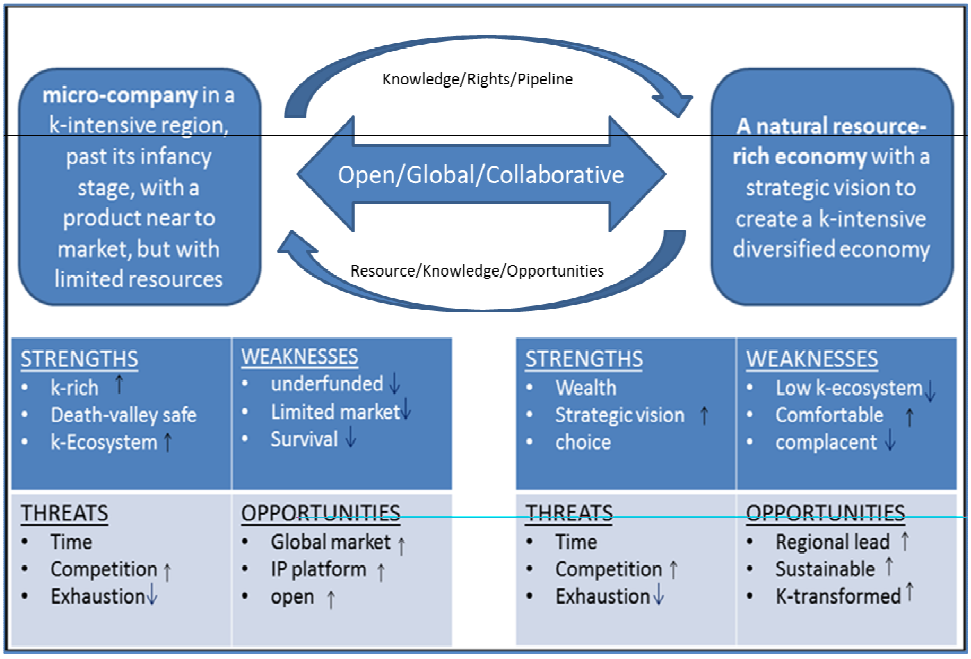


*Figure 8: CDI and FDI options for medical device 'start up' company setting up abroad*

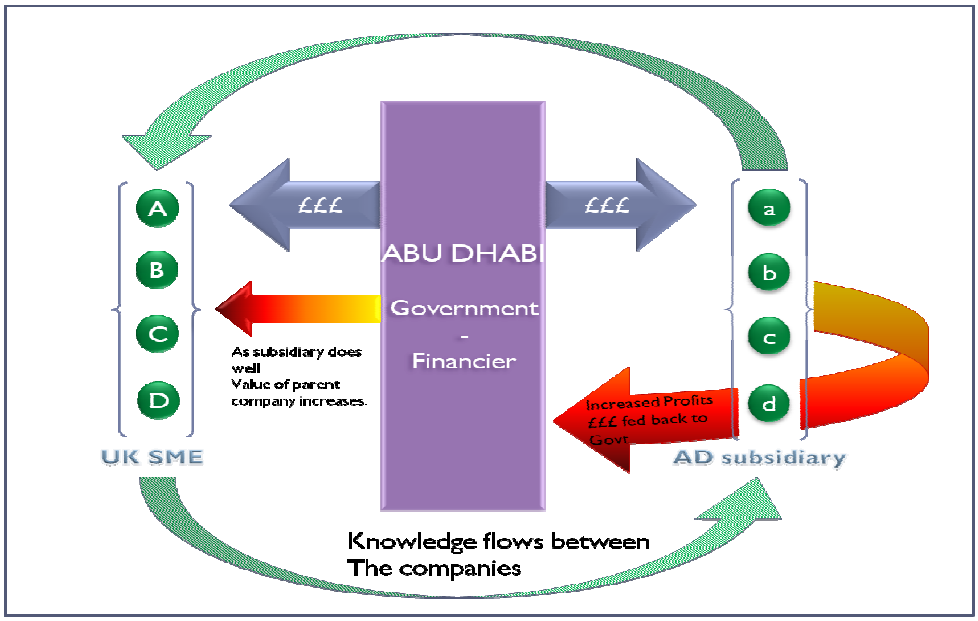
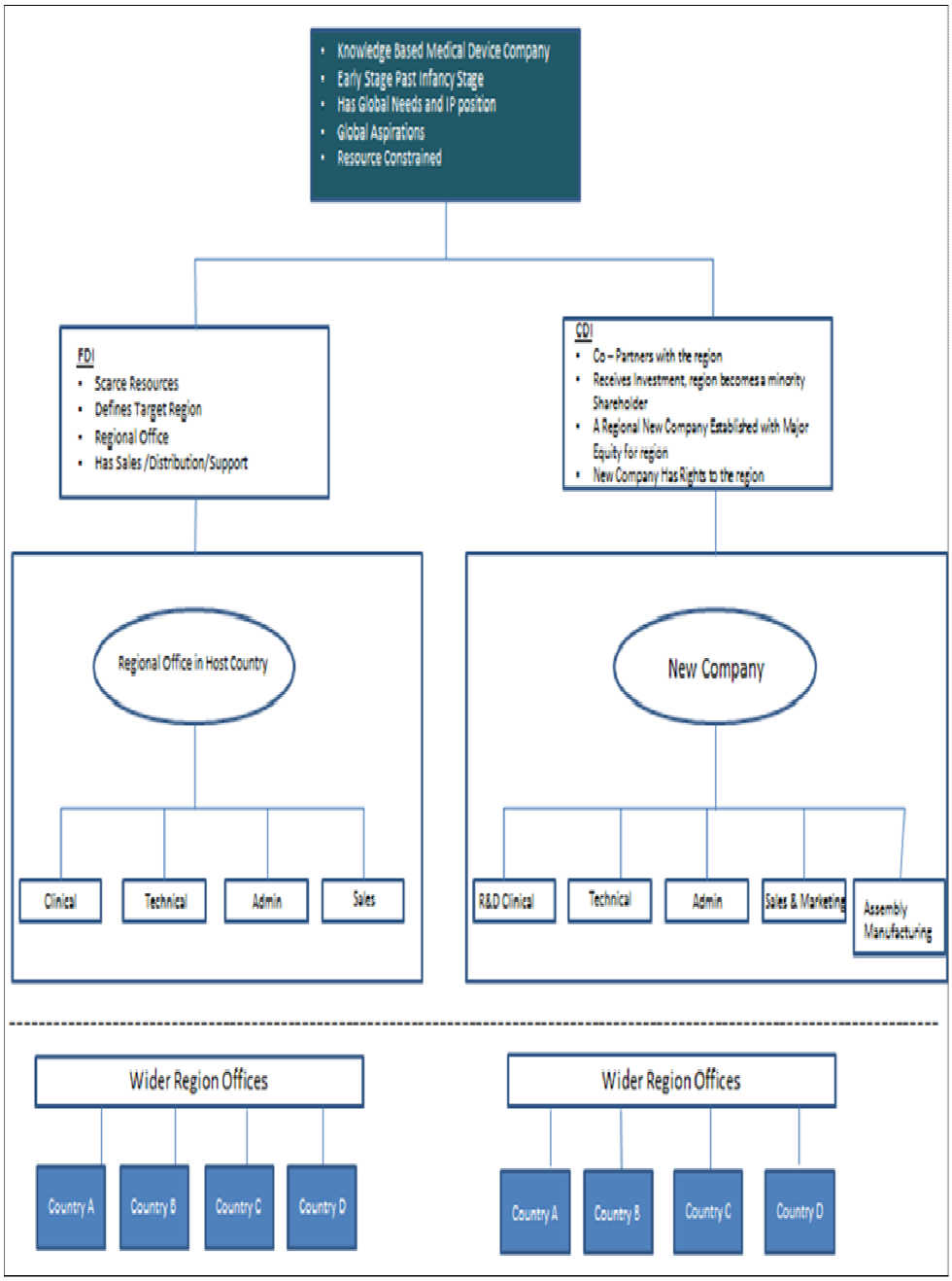
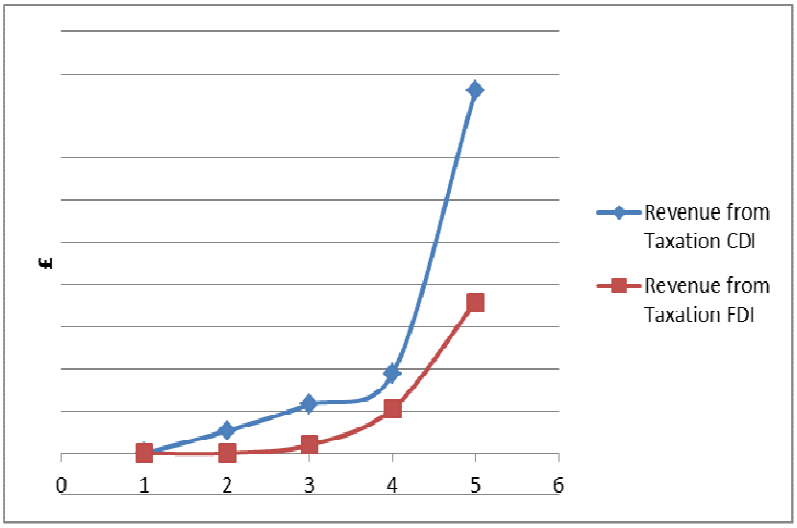


*Figure 9: Comparisons of CDI and FDI for a start-up medical device company in Abu Dhabi*

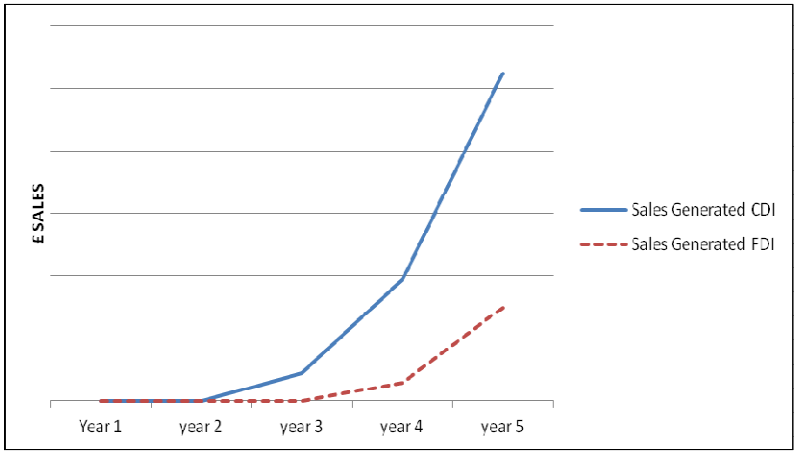


*Appendices 7-9*

A




B




C