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Investing in innovation to enable global competitiveness: The case of Portugal

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ABSTRACT

The concept of leveraged innovation to create wealth within regions, countries and economies is not a new concept. Competitiveness of regions in the increasingly global economy now requires not only that innovation be present within a regional economy, but also that mechanisms exist to effectively transfer those developed innovations from the research laboratory to the marketplace. It is surmised that increased innovation, and the transfer of this innovation, can lead to increased prosperity of regions (Porter). As such, many developing countries around the world are looking at investments in innovation as a means to spur regional economic development and wealth creation while preserving national competitiveness. That said, innovation investment is by no means an exact science. Historically, typical "innovation investments" have been focused on "tangible" capital infrastructure projects such as the establishment of incubators and science parks. While many regions point to the existence of such tangible innovation assets as proof of investment in innovation, it has been discovered that in some cases, an investment in the capacity building of human networks to engage in technology transfer and commercialization related activities can act as a stronger facilitator for the transformation of economies and produce a larger return on investment in innovation for the country. Given not only Portugal's, but other regions throughout the EU-Zone, recent financial and economic woes, it bears examination on whether investing in the innovation and technology transfer knowledge and "know how" of key human networks within a struggling economy is a worthwhile investment for financially struggling countries during the current times of fiscal crisis.

1. Conceptual/theoretical background

1.1. Innovation as economic investment option for countries

As mentioned previously, the innovation and technology transfer fields are often thought of as "add-on" or "soft" areas of competency in academic circles. Many colleges and institutions rigorously argue against focused innovation initiatives, especially those focused on the so called commercialization of technology from research institutions, claiming that such activities tend to dilute the scientific base of pure research by focusing it on economic return. Given academe's changing but historical reluctance to participate in commercialization activities, it is often government and policy makers who must drive and invest in commercialization and innovation activities. In order to analyze the need for investment in innovation for a country, especially during economic crisis, it is useful to delve into previous successful innovation investment models globally and then develop further the current investment in Portugal related to the EU context.

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1.2. Economic impact of innovation investment: the Bayh–Dole Act

One of the first active economically driven innovation policies adopted globally by a country was the Bayh–Dole Act of 1980 in the United States which was viewed as the catalyst for focusing university and government research and resulting innovations to economic results or outcomes [1]. As with any policy driven change, only history will tell the effectiveness of whether a measure has achieved its goal. After the enactment of the Bayh–Dole Act, revenues related to innovation rose markedly over a period of 15 years after the Act's adoption as shown in Fig. 1 [2].

While the increase in revenues among select schools is impressive in number, even when accounting for inflationary variables, this relationship of the Bayh–Dole Act (BDA) to investment in innovation is not clear simply from an increase in revenue numbers for a select number of institutions. However, when long term economic impact is considered, it becomes increasingly apparent that a focus on innovation can have far reaching economic impacts. According to the Association of University Technology Managers (AUTM);

> "Before 1980, fewer than 250 patents were issued to U.S. universities each year and discoveries were seldom commercialized for the public's benefit. In contrast, in FY 2002, AUTM members reported that 5,327 new license agreements were signed. Between FY 1991 and FY 2004, annual invention disclosures increased more than 290 percent (to 18,178), new patents filed increased nearly 450 percent (to 11,089) and new licenses and options executed increased about 510 percent (to 5,329) [3]."

While percentages and numbers are interesting of course, economic impact is usually less easy to quantify. In the context of innovation, it is believed that in 1999 for the US, licenses made possible by the BDA generated over $40.9 billion in economic activity and supported 270,900 jobs [4].

1.3. Translation of innovation investment to other countries

While the BDA is considered an example for commercially focused innovation policy which guides the allocation of resources within the United States Ecosystem, many will argue that this model, for various reasons, does not translate in applicability or practice to other ecosystems. While many factors can affect the development innovation investment, at a policy level, many are looking to examples like the BDA to guide country direction in developing the return on investment (ROI) necessary to justify research spending in times of economic crisis. Siepmann argues that many countries have followed suit in adopting BDA like practices within their regions varying global effect [5]. Most examples cited by Siepmann who has adopted BDA like policies from 1977 to 2000 (specifically France, the UK, Sweden and Italy) show some level of increase in commercial results on innovation according to ongoing economic data from EU and government sponsored reports from various sources. As such, it seems reasonable to suggest that for developing economies and countries, even those under a state of economic crisis, innovation policies and investment are warranted, especially in increasing the capacity to engage in active innovation commercialization on the part of country resources.

1.4. EU innovation investment country comparison: Ireland

Dubbed the "Celtic Tiger," Ireland presents many historical and upfront similarities to Portugal in terms of economy and R&D percentages. With a population approaching 7 million persons [6] and roughly similar R&D policies, Ireland as an economic ecosystem presents some natural comparison with Portugal, especially in light of recent financial and economic woes.

	FY1970	FY1975	FY1980	FY1985	FY1990	FY1995
UC						
Gross income (1992 dollars: 000s)	1140.4	1470.7	2113.9	3914.3	13,240.4	58,556.0
Gross income from top 5 earners (1992 dollars: 000s)	899.9	1074.8	1083.0	1855.0	7229.8	38,665.6
share of gross income from top 5 earners (%)	79	73	51	47	55	66
share of income of top 5 earners associated with biomedical inventions (%)	34	19	54	40	91	100
share of income of top 5 earners associated with agricultural inventions (%)	57	70	46	60	09	0
Stanford		FY76				
Gross income (1992 dollars: 000s)	180.4	842.6	1084.4	4890.9	14,757.5	35,833.1
Gross income from top 5 earners (1992 dollars: 000s)		579.3	937.7	3360.9	11,202.7	30,285.4
share of gross income from top 5 earners (%)		69	86	69	76	85
share of income of top 5 earners associated with biomedical inventions (%)		87	40	64	84	97
Columbia						
Gross income (1992 dollars: 000s)				542.0	6903.5	31,790.3
Gross income from top 5 earners (1992 dollars: 000s)				535.6	6366.7	29,935.8
share of gross income from top 5 earners (%)				99	92	94
share of income of top 5 earners associated with biomedical inventions (%)				81	87	91

Fig. 1. Select US institution licensing revenue pre and post Bayh-Dole act.