

Influential Article Review -The Relation Between Economic Development and Patents in the Context of Innovation

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This paper examines economics. We present insights from a highly influential paper. Here are the highlights from this paper: This study analyzes the role of economic indicators in country-level innovation, represented by patents in the technology sector. Innovation indicators include the ratio of patents owned by foreign residents and the number of patent applications in each industry in the technology sector. Economic indicators include GDP, gross national income, labor cost, R&D expenditure, real minimum wage, tax revenue, and education enrollment. The data for OECD countries collected from stats.oecd.org for 2000 to 2010 is analyzed using Cognos. Results show that countries with low GDP rely on foreign collaboration for innovation; education enrollment stimulates innovation; among the sectors, government and higher education have higher R&D expenditures than private and non-profit sectors. A significant contribution of our research lies in the dimension of internationalization and ownership of technology innovation. We suggest viable solutions for countries facing tax revenue losses arising from mobility of patents. For our overseas readers, we then present the insights from this paper in Spanish, French, Portuguese, and German.

Keywords: : Economic development, Patent, Industry, OECD, Education enrollment, Cognos, Business intelligence, Innovation

SUMMARY

- Distribution of patent applications under PCT by country for 2010. As seen in Fig. 1, countries such as the USA, Japan, Germany, Korea, and France have a high number of patent applications under PCT indicating a significant level of innovation.
- Distribution of the number of patent applications by industry for 2010. Figure 2 displays the sector/industry ranking by number of patent applications. The lower-ranked industries in green. Industries—including textiles, paper, and fixed constructions—show a low number of patent applications compared to industries such as electricity and physics.
- R&D expenditure per capita for 2010. Figure 3 shows that, for 2010, Finland ranks first with the highest R&D expenditure per capita, followed by Sweden, Denmark, and Austria. The large R&D expenditure in Finland can be attributed in part to its headquartering Nokia, the multinational ICT company that pioneers innovative technology. These findings are consistent with Bloomberg's

2015 global innovation ranking of countries based on R&D expenditure . Sweden and Finland also were among the top five innovative countries in Bloomberg’s ranking. On the other hand, Germany, which is sixth in our ranking, does not figure among the top six in Bloomberg’s 2015 ranking.

- Real minimum wage and PCT patent applications. Figure 5 lists the countries in descending order of real minimum wages . The values of PCT patent applications per 10,000 inhabitants that are above 1.0 are highlighted. The countries of Netherlands, Belgium, and Ireland have the highest real minimum wages.
- To identify any significant patterns, we analyzed labor costs by industry for all European countries in our sample .
- Labor cost by industry for countries in Europe. Figure 7 shows that of all the industries construction has a significant contribution to the increase in labor cost over time. From our earlier analysis on the number of patent applications by industry , construction showed a less-than-average number of patent applications per 10,000 inhabitants. It appears that there is a negative association between labor cost and number of patent applications. The higher the labor cost, the lower the number of patent applications, suggesting that countries should contain the cost of labor in order to stimulate innovation and growth.
- Because education is an important indicator for any economy, we chose to investigate whether education plays a role in country level innovation.
- High education enrollment does not necessarily indicate high innovation. Even though education, learning, and knowledge are integral for creative thinking and innovation, transforming creative ideas into innovation is contingent upon environmental components as well as the way in which education is fostered .
- We analyzed the proportion of patents owned by foreign versus domestic residents for countries in Europe for the year 2005 .
- Figure 12 shows that countries with a low average of economic indicators have a high percentage of patents owned by foreign residents. These countries rely on foreign collaboration to strengthen their resources and facilities for innovations.
- We had analyzed overall R&D expenditure per capita for all the countries.

HIGHLY INFLUENTIAL ARTICLE

We used the following article as a basis of our evaluation:

Raghupathi, V., & Raghupathi, W. (2017). Innovation at country-level: Association between economic development and patents. *Journal of Innovation and Entrepreneurship*, 6(1), 1–20.

This is the link to the publisher’s website:

<https://innovation-entrepreneurship.springeropen.com/articles/10.1186/s13731-017-0065-0>

INTRODUCTION

Today, the world’s societies face severe economic and social challenges. The economic downturn of 2008–2009 has led to reduced growth, rising unemployment, and soaring public debt. To recover, countries need to find new and sustainable sources of growth. Innovation—the introduction of a new or significantly improved product, process, or method—holds the key to boosting economic growth and productivity. Innovation has much broader implications than Research & Development and is influenced by a wider range of factors. Innovation can help accelerate economic recovery and put countries on a path to sustainable and greener growth. Innovation allows a country to discover opportunities that exist or are likely to emerge in time, to focus on existing business processes and practices that improve efficiency, to find potential customers, to minimize wastage, and to increase profits.

Innovation is a key driver of technology development and economic growth. It provides a means of satisfying the demands of the current market and the potential needs of future markets. Innovation is achieved through more effective products, processes, services, or technologies that are readily available to the current market. There is an increased awareness and recognition among national policy makers about innovation as a key factor in economic growth. Many OECD (Organization for Economic Cooperation and Development)-member countries have enforced strategies and policies to enhance innovation and economic development.

Innovation has different implications for different economies such as developing, emerging, and developed. It is important that we develop tools to measure innovation across diverse economies. Various financial, industrial, economic, and social indicators are associated with trends in innovation.

Innovation is a crucial factor in national progress. The application of advanced technology along with entrepreneurship and innovation approaches in creation of goods and services results in translation of scientific and technological advances into productive economic activity. This contributes to economic growth when aided by environmental and regulatory structures. Policy makers look to regulatory framework as an instrument to promote innovation (Blind et al. 2004). The bridge between administrative or institutional regulations and innovation is through intellectual property rights (such as patents and copyrights). Policy makers can calibrate the strength of patent protection rights to have an influence on the country's innovation. As it stands now, research on innovation is fragmented. A general framework of analysis and greater coordination of research efforts will serve to offer a holistic view of the phenomenon, starting from its inputs to its economic and social impact. Innovation has become a multidimensional concept; it is not just about producing new products. It is also about services, technical standards, business models, and processes.

What are the key economic factors that determine the success of innovation at a country level? This study addresses the question by exploring the association between economic indicators and innovation (represented by patents) for OECD countries for the years 2000 to 2010. Though other studies have looked at economic growth and innovation, the uniqueness of our study lies in utilizing a large data set that spans a longitudinal period and in deploying a sophisticated analytic tool such as Cognos, in drilling down and identifying patterns and relationships in the data.

The remainder of this paper is organized as follows: Section "Research background" provides research background; Section "Methods" describes research methodology; Section "Results and discussion" contains the results and discussion of data analyses; Section "Scope and limitations" outlines the scope and limitations of the research; and Section "Conclusions" offers conclusions along with contributions and implications.

CONCLUSION

Despite its limitations, our study makes several important contributions to literature on innovation and economic growth at a national level. Whereas most studies on innovation focus on firm-level or enterprise-level innovation, our study analyzes country-level innovation. In addition, it incorporates a comprehensive and large data set from OECD that allows for longitudinal analyses.

We also contribute in terms of the methodology of analytics used in the research. This emerging technique offers potential in various domains including innovation. We demonstrate how data-driven analytics can help make informed decisions on innovation and economic growth. The research adds to the empirical studies literature on innovation that deploy an analytic approach.

By identifying a portfolio of economic factors that influence innovation, we offer insights policy makers may call upon to design effective policies targeted toward promoting and encouraging innovation. Our analysis of industries with the most potential for innovation offers benchmarks for effective resource allocation or incentive assignment in fecund industries. Incentives can take the form of subsidies, tax breaks, grants, or business incubation services that facilitate innovation. In addition, our results offer benchmarks for efficient resource allocation among industries.

The relationship between R&D expenditure and innovative efforts of a country has been emphasized by endogenous growth models (Romer 1994; Zachariadis 2003). In this regard, we show that while R&D is an important indicator for innovation, only some OECD countries innovate by increasing their investment in R&D. Others promote their innovation through technology spillovers from other OECD countries (Acemoglu and Linn 2004; Wang 2010). These countries utilize the know-how that is generated by other countries (Guloglu and Tekin 2012). This finding does not mean that R&D is not important for long-term growth. Instead, it implies that the measure of R&D cannot be interpreted as a complete measure of innovation: other factors must be considered (Aghion and Howitt 1998).

On a socio-economic level, our findings on the association between the standard of living (real minimum wages, labor cost) and innovation suggests that to improve innovation and economic growth, countries need to focus on improving the standard of living in terms of high minimum wages, low labor cost, and better work conditions.

A notable contribution of our research lies in the dimension of internationalization and ownership of technology innovation (patents). We show that countries with high foreign ownership of patents have low tax revenues as a percentage of GDP. An exploration of the concept of income from intellectual property (IP) is helpful in interpreting this association further. In general, income from IP is mobile because it has no associated trade costs (Griffith et al. 2014). Thus, patent ownership may be found in locations other than the country in which they were created. Multinational companies, a big source for patents, typically exploit this mobility by locating their intellectual property in low-tax countries (referred to as tax havens) thereby decreasing their tax burden (Lipsey 2010). It's no wonder that countries that see a high proportion of patents owned by foreign residents have grown increasingly concerned about the tax revenue losses arising from such relocation schemes. To address this, some countries have introduced patent boxes to reduce the tax rate on income derived from patents. Belgium, for example, introduced a patent box in 2007, reducing the tax rate from 34 to 6.8%. The Netherlands reduced the tax rate from 31.5 to 10%. In 2008, Luxembourg reduced the rate from 30.4 to 5.9%; and in 2013, the UK introduced a patent box at the rate of 10% reducing the tax rate from 30 to 24% (Griffith et al. 2014). We suggest that countries should address the ownership of patents and encourage more ownership by local residents and less by foreign residents, in order to increase innovation and boost tax revenues that result in economic growth.

In terms of education in influencing innovation, we highlight the importance of having an integrated curriculum that offers students the liberal arts skills (analytical, evaluative, critical and creative thinking, and written and oral communication) as well as quantitative and technical skills needed for the workplace. Most employers want employees to have the ability to learn and synthesize new ideas, be reflective and articulate, and have excellent organization and time-management skills. We reinforce the need for governmental policies to focus on enhancing the quality of education to facilitate the knowledge transfer needed for country-level innovation. Proposing a regulatory framework to promote innovation is a challenging task because, in addition to economic growth, this framework has to address social and environmental goals. More theoretical and empirical research is needed. Another important direction for future work is analysis of the impact of other forms of intellectual property-copyrights and trademarks in addition to patents- on economic growth and innovation.

APPENDIX

FIGURE 1
DISTRIBUTION OF PATENT APPLICATIONS UNDER PCT BY COUNTRY FOR 2010

Year: 2010
Patent Application under PCT: Descending order

Country	Year	Patent Application under PCT
United States	2010	87318.77
Japan	2010	63981.51
Germany	2010	34561.64
Korea	2010	18165.47
France	2010	14709.46
United Kingdom	2010	9059.07
Switzerland	2010	7806.77
Netherlands	2010	7703.20
Sweden	2010	6561.50
Italy	2010	5201.50
Canada	2010	4685.40
Finland	2010	4098.47
Spain	2010	3407.65
Australia	2010	3357.23
Israel	2010	2865.85
Austria	2010	2290.33
Denmark	2010	2224.83
Belgium	2010	2090.90
Norway	2010	1418.00
Ireland	2010	967.36

FIGURE 2

DISTRIBUTION OF THE NUMBER OF PATENT APPLICATIONS BY INDUSTRY FOR 2010

[Year: 2010 AND NOT Patent by Technology: Total Patents](#)
[Patent Application under PCT: Descending order](#)

Patent by Technology	Year	Patent Application under PCT
<u>Electricity</u>	2010	31500.51
<u>Physics</u>	2010	26506.75
<u>Human Necessities</u>	2010	26406.39
<u>Chemistry; Metallurgy</u>	2010	20153.22
<u>Performing Operations; Transporting</u>	2010	20125.11
<u>Mechanical Engineering; Lighting; Heating; Weapons; Blasting</u>	2010	13132.01
<u>Fixed Constructions</u>	2010	4237.75
<u>Textiles; Paper</u>	2010	1459.54
Summary		143521.29

FIGURE 3
R&D EXPENDITURE PER CAPITA FOR 2010

Continent: Europe AND Year: 2010

GDP per capita (US\$) * Expenditure/GDP: Descending order

Continent	Year	Country	GDP per capita (US\$)	Expenditure/GDP	GDP per capita (US\$) * Expenditure/GDP
Europe	2010	Finland	181,535	0.0781	14177.88
Europe	2010	Sweden	196,727.95	0.0678	13338.16
Europe	2010	Denmark	200,949.4	0.0614	12338.29
Europe	2010	Austria	200,324.2	0.0558	11178.09
Europe	2010	Luxembourg	345,077.4	0.0296	10214.29
Europe	2010	Germany	149,720.36	0.056	8384.34
Europe	2010	Norway	229,037.8	0.0336	7695.67
Europe	2010	France	171,281.35	0.0447	7656.28
Europe	2010	Belgium	188,639.2	0.0401	7564.43
Europe	2010	United Kingdom	178,434	0.036	6423.62
Europe	2010	Netherlands	168,782.28	0.0371	6261.82
Europe	2010	Slovenia	134,705	0.0418	5630.67
Europe	2010	Ireland	161,912.52	0.0341	5521.22
Europe	2010	Spain	159,519	0.0278	4434.63
Europe	2010	Portugal	127,221.45	0.0317	4032.92
Europe	2010	Italy	159,555.5	0.0252	4020.80
Europe	2010	Czech Republic	126,289.2	0.031	3914.97
Europe	2010	Estonia	101,966.45	0.0326	3324.11
Europe	2010	Hungary	82,222.44	0.0232	1907.56
Europe	2010	Slovak Republic	116,318.2	0.0126	1465.61

FIGURE 4

TAX REVENUE AS A PERCENTAGE OF GDP AND PATENTS OWNED BY FOREIGN RESIDENTS

Year: 2005

Tax revenue as percentage of GDP: Descending order

Country	Year	Ratio of patents owned Foreign residents	Tax revenue as percentage of GDP	(Ratio of patents owned Foreign residents) / Tax revenue as percentage of GDP
Denmark	2005	10.0162	254.15	0.039
Sweden	2005	5.5053	244.35	0.023
Belgium	2005	19.3308	222.35	0.087
France	2005	9.2681	220.5	0.042
Finland	2005	3.4884	219.55	0.016
Norway	2005	18.0851	216	0.084
Austria	2005	3.6293	210.55	0.017
Iceland	2005	8.8889	203.45	0.044
Italy	2005	7.4958	202.95	0.037
Slovenia	2005	2.0202	193.1	0.010
Netherlands	2005	6.7639	192.1	0.035
Luxembourg	2005	23.1884	187.9	0.123
Hungary	2005	8.5107	186.55	0.046
New Zealand	2005	16.1138	181.75	0.089
Czech Republic	2005	10.9678	180.5	0.061
Spain	2005	8.2052	180.2	0.046
Israel	2005	23.9719	178.4	0.134
United Kingdom	2005	19.1934	177.15	0.108
Germany	2005	5.7659	175.15	0.033
Poland	2005	13.986	165	0.085

FIGURE 5

REAL MINIMUM WAGE AND PCT PATENT APPLICATIONS

Real Min Wage: Descending order

Year	Country	Real Min Wage	PCT patents applications per 10,000 inhabitants
2008	Netherlands	27,374.46	2.17
2008	Belgium	26,510.56	1.02
2008	Ireland	25,857.88	0.97
2008	France	24,350.08	1.11
2008	United Kingdom	23,999.89	0.98
2008	Canada	17,273.34	0.78
2008	Japan	13,633.05	1.99
2008	United States	13,582.12	1.43
2008	Spain	13,174.55	0.36
2008	Greece	13,099.21	0.1
2008	Slovenia	10,767.05	0.7
2008	Korea	10,351.71	1.46
2008	Portugal	9,442.18	0.13
2008	Poland	6,443.7	0.05
2008	Czech Republic	6,025.01	0.2
2008	Hungary	5,815.24	0.22
2008	Estonia	5,484.9	0.34
2008	Slovak Republic	5,066.27	0.06
2008	Chile	3,763.74	0.03
2008	Mexico	1,409.54	0.02
Summary		263,424.48	14.12

FIGURE 6
DISTRIBUTION OF LABOR COST BY INDUSTRY FOR COUNTRIES IN EUROPE

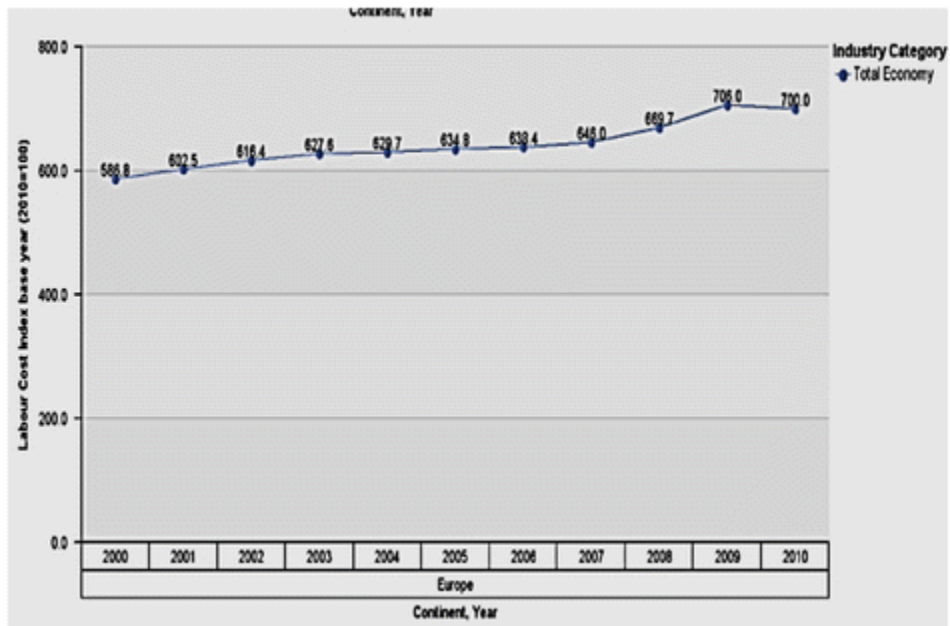


FIGURE 7
LABOR COST BY INDUSTRY FOR COUNTRIES IN EUROPE

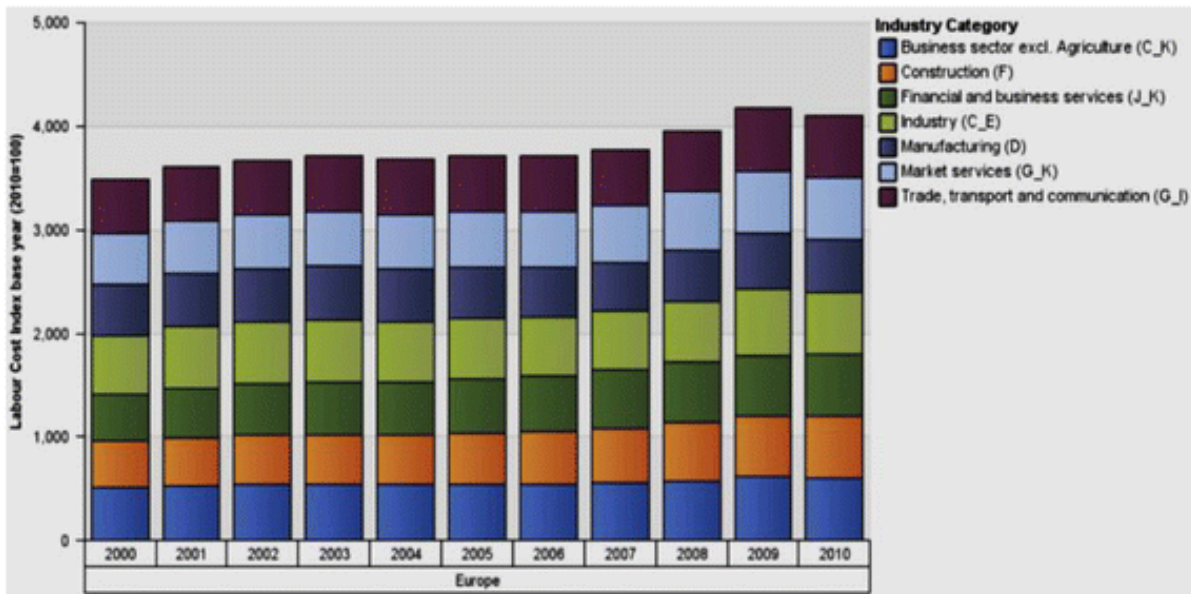


FIGURE 8
RATIO OF EDUCATION ENROLLMENT TO TOTAL POPULATION

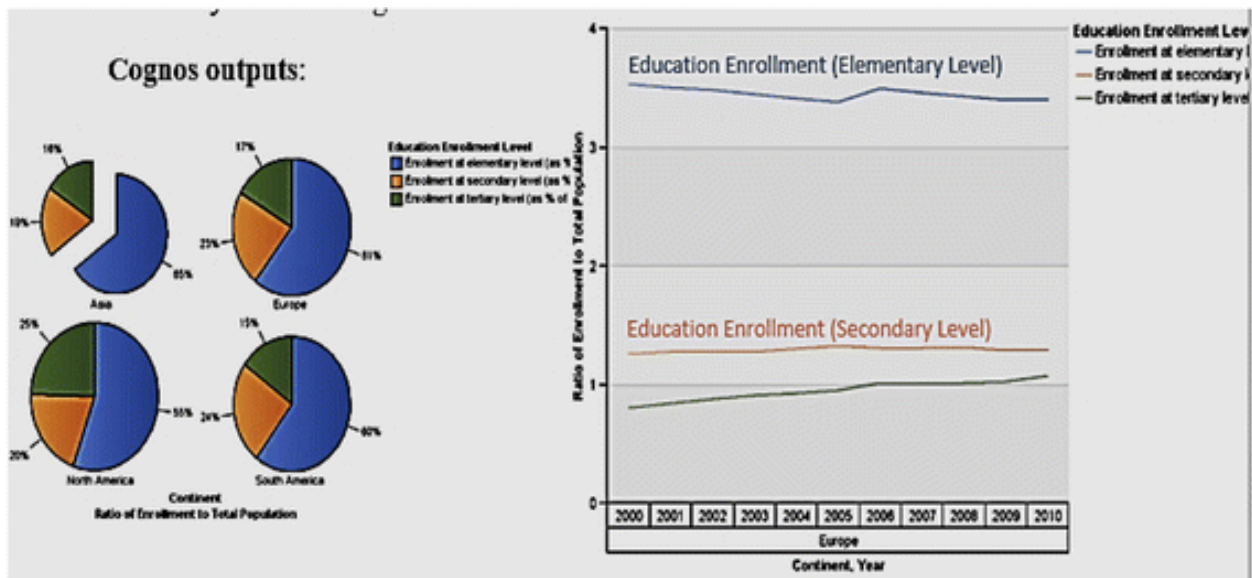


FIGURE 9
RATIO OF EDUCATION ENROLLMENT AND NUMBER OF PATENT APPLICATIONS
UNDER PCT

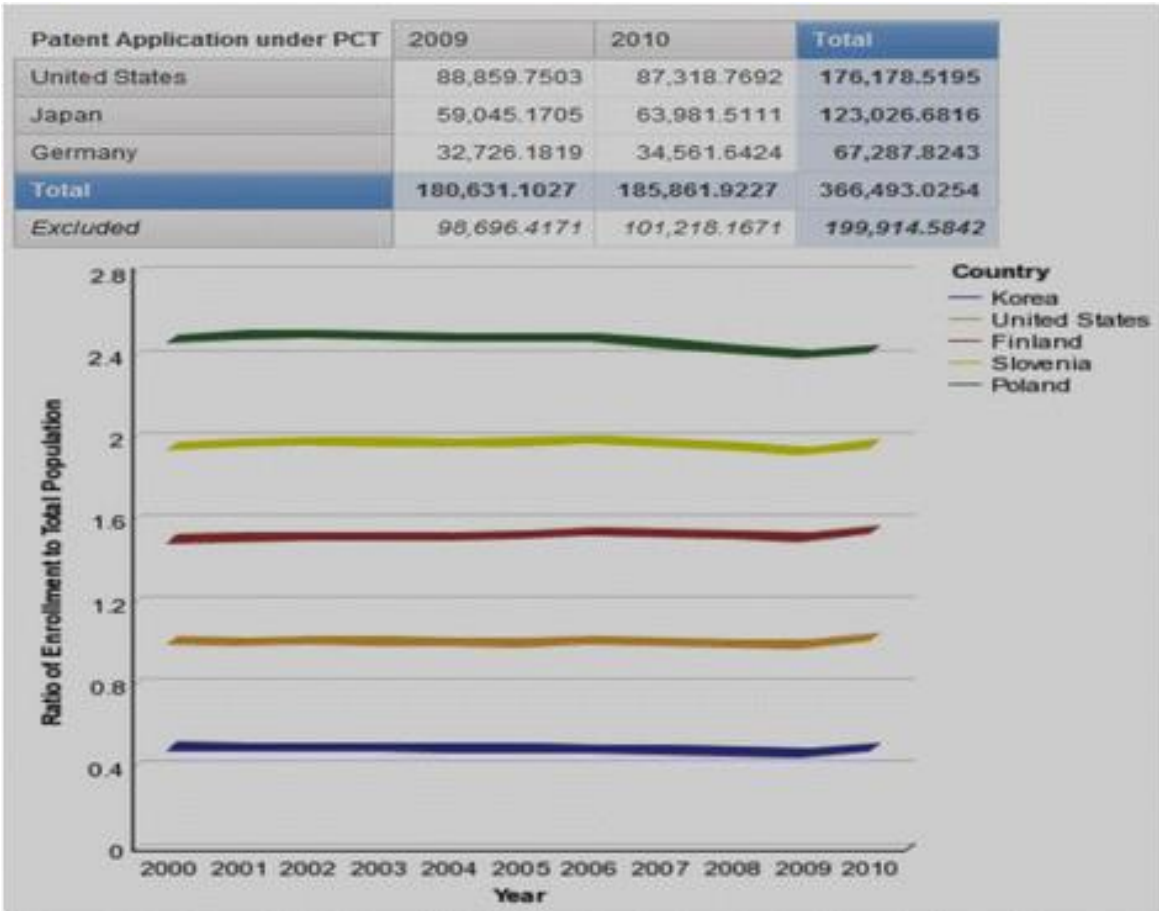


FIGURE 10
EDUCATION ENROLLMENT AT TERTIARY LEVEL AND PCT PATENT APPLICATIONS
PER 10,000 INHABITANTS

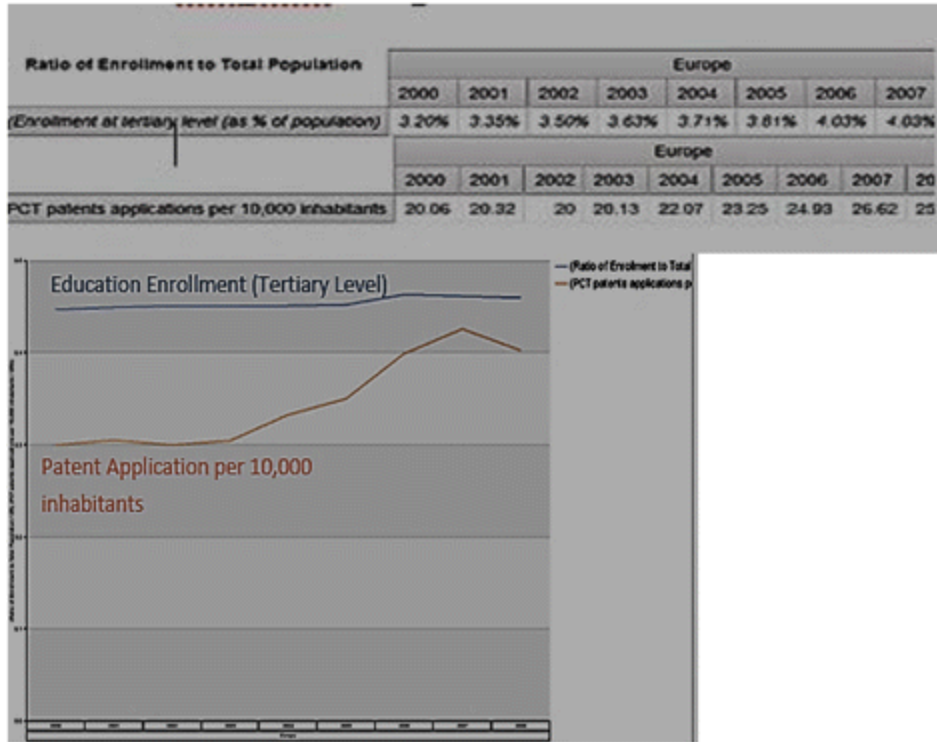


FIGURE 11
COMPARISON OF PATENTS OWNED BY FOREIGN RESIDENTS VS. DOMESTIC RESIDENTS IN EUROPE FOR 2005

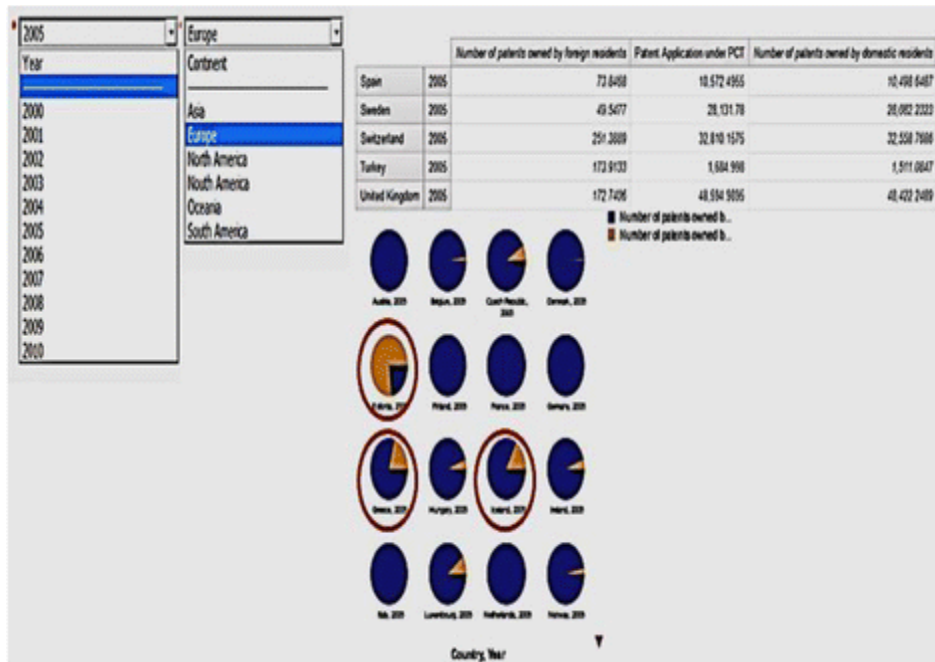


FIGURE 12
ECONOMIC INDICATORS AND PATENTS OWNED BY FOREIGN RESIDENTS

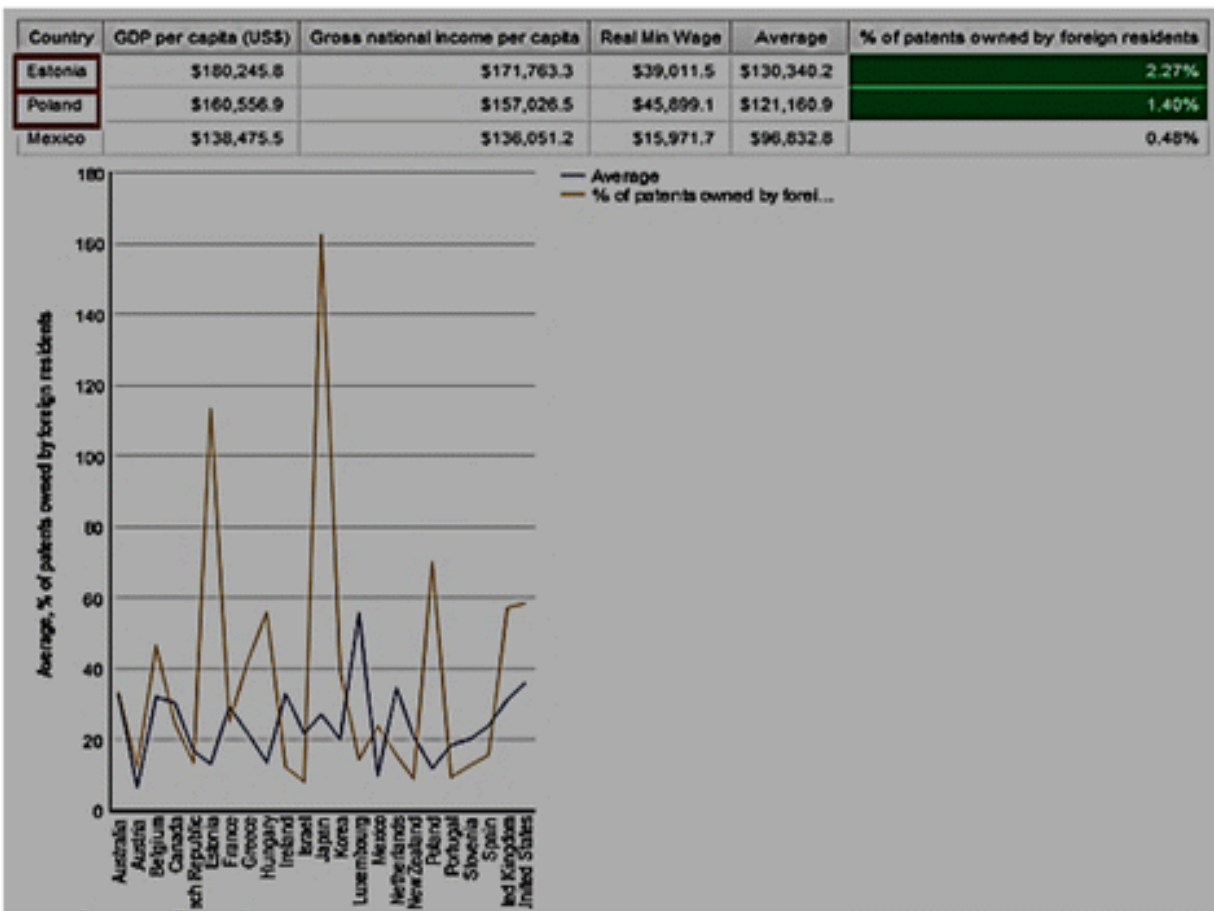


FIGURE 13
PATENTS UNDER PCT BY INDUSTRY FOR COUNTRIES WITH HIGH PERCENTAGE OF
PATENTS OWNED BY FOREIGN RESIDENTS

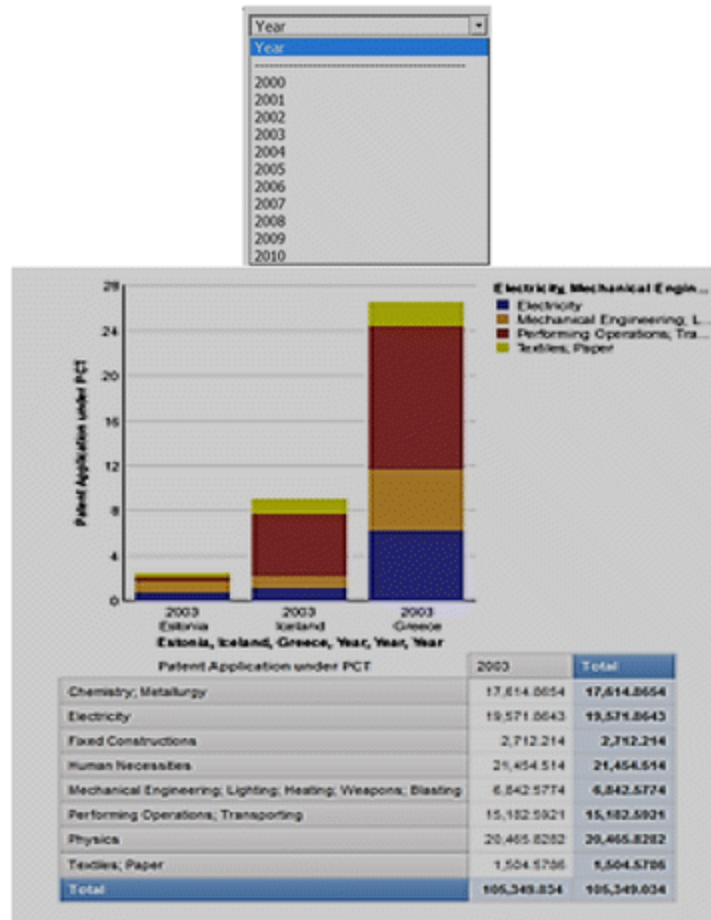
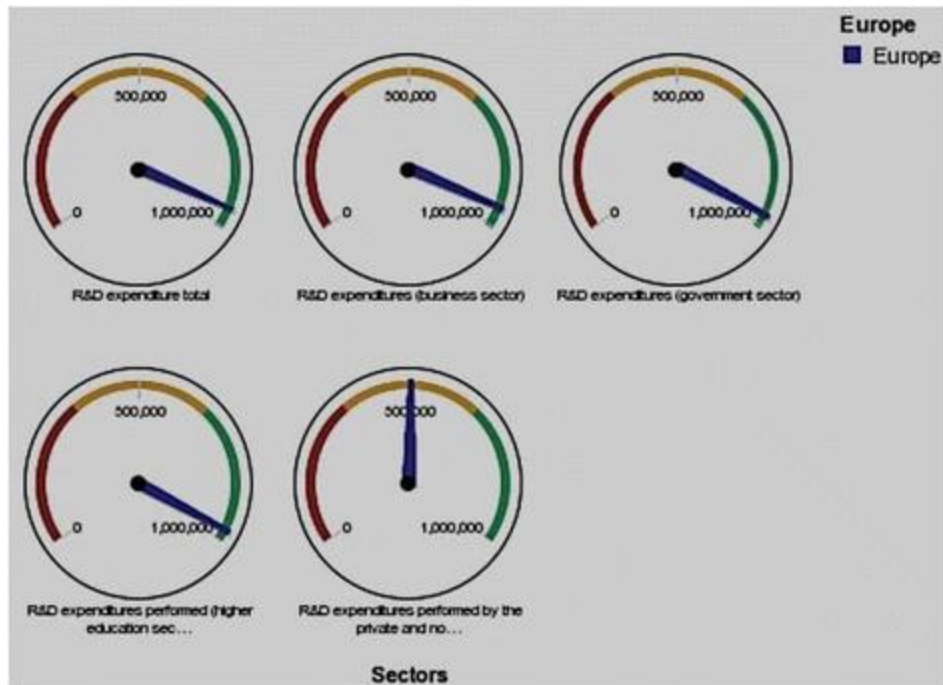


FIGURE 14
NUMBER OF PATENT APPLICATIONS AND R&D EXPENDITURE BY SECTOR



**TABLE 1
RESEARCH METHODOLOGY**

<p>Data collection and variable selection Data source: http://stats.oecd.org/ Indicators: innovation, economic development</p>
<p>ETL Extract: data extracted from OECD database in csv format; Transform: data transformed and prepared for loading with framework manager; Load: prepared data loaded into IBM's DB2 database and IBM's Cognos-8</p>
<p>Analytics platform/tools selection DBMS: IBM DB2 Analytics: IBM Cognos Analysis: Cognos Analysis and Report Studio</p>
<p>Analytics implementation Analysis and reports implementation using Cognos</p>

**TABLE 2
VARIABLES IN THE RESEARCH**

Economic indicators	Description
Gross domestic product (GDP) per capita (\$)	US \$ current PPP, current prices
Gross national income (GNI) per capita (\$)	US \$ current PPP, current prices
Labor cost index (base year 2010=100)	Measures changes in average hourly labor cost, taking into account not only price changes but also changes in the composition and the characteristics of the labor input; Calculated by dividing the labor costs by the number of hours worked. Labor costs are made up of costs for wages and salaries, plus non-wage costs such as employer's social contributions. These do not include vocational training costs or other expenditures such as recruitment costs, and spending on working clothes.
Research & development (R&D) expenditure (\$)	Money spent on creative work undertaken on a systematic basis to increase the stock of knowledge and the use of this knowledge to devise new applications in the sector
Real minimum wage (\$)	Statutory minimum wages converted into a common hourly and annual pay period (in US\$) for the OECD countries for which they are available.
Tax revenue as percentage of GDP (%)	Tax Revenue expressed as a percentage of GDP
Ratio of education enrollment to total population (enrollment in 3 levels of primary, secondary, tertiary)	Ratio of enrollment in primary, secondary, and tertiary education levels expressed with the total population
Innovation indicators	Description
PCT (Patent cooperation treaty) patent applications per 10,000 inhabitants	Number of patent applications in PCT per 10,000 inhabitants (reference date is application date)
Patents owned by foreign residents	Patents owned by foreign countries (drill down to 8 countries including EU)
Patent applications under PCT by technology sector	Number of patent applications by technology for different sectors (sectors include chemistry/metallurgy; electricity; human necessities; fixed construction; mechanical engineering, lighting, heating; performing operations/transportation; physics; textiles/paper)

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TRANSLATED VERSION: SPANISH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUCIDA: ESPAÑOL

A continuación se muestra una traducción aproximada de las ideas presentadas anteriormente. Esto se hizo para dar una comprensión general de las ideas presentadas en el documento. Por favor, disculpe cualquier error gramatical y no responsabilite a los autores originales de estos errores.

INTRODUCCIÓN

Hoy en día, las sociedades del mundo se enfrentan a graves desafíos económicos y sociales. La recesión económica de 2008-2009 ha llevado a una reducción del crecimiento, un aumento del desempleo y una creciente deuda pública. Para recuperarse, los países necesitan encontrar nuevas fuentes de crecimiento sostenibles. La innovación —la introducción de un producto, proceso o método nuevo o significativamente mejorado— es la clave para impulsar el crecimiento económico y la productividad. La innovación tiene implicaciones mucho más amplias que la investigación y el desarrollo y está influenciada por una gama más amplia de factores. La innovación puede ayudar a acelerar la recuperación económica y poner a los países en un camino hacia un crecimiento sostenible y más verde. La innovación permite a un país descubrir oportunidades que existen o es probable que surjan a tiempo, centrarse en los procesos y prácticas comerciales existentes que mejoran la eficiencia, encontrar clientes potenciales, minimizar el desperdicio y aumentar los beneficios.

La innovación es un motor clave del desarrollo tecnológico y del crecimiento económico. Proporciona un medio para satisfacer las demandas del mercado actual y las necesidades potenciales de los mercados futuros. La innovación se logra a través de productos, procesos, servicios o tecnologías más eficaces que están fácilmente disponibles para el mercado actual. Los responsables políticos nacionales tienen una mayor concienciación y reconocimiento sobre la innovación como factor clave en el crecimiento económico. Muchos países miembros de la OCDE (Organización para la Cooperación y el Desarrollo Económicos) han aplicado estrategias y políticas para mejorar la innovación y el desarrollo económico.

La innovación tiene diferentes implicaciones para las diferentes economías, como el desarrollo, la emergente y la desarrollada. Es importante que desarrollemos herramientas para medir la innovación en diversas economías. Varios indicadores financieros, industriales, económicos y sociales están asociados con las tendencias de la innovación.

La innovación es un factor crucial en el progreso nacional. La aplicación de tecnología avanzada junto con enfoques de emprendimiento e innovación en la creación de bienes y servicios da como resultado la traducción de los avances científicos y tecnológicos en la actividad económica productiva. Esto contribuye al crecimiento económico cuando se ve ayudado por estructuras ambientales y regulatorias. Los responsables políticos consideran que el marco reglamentario es un instrumento para promover la innovación (Blind et al. 2004). El puente entre los reglamentos administrativos o institucionales y la innovación es a través de los derechos de propiedad intelectual (como las patentes y los derechos de autor). Los responsables políticos pueden calibrar la solidez de los derechos de protección de patentes para influir en la innovación del país. Tal como está ahora, la investigación sobre la innovación está fragmentada. Un marco general de análisis y una mayor coordinación de los esfuerzos de investigación servirán para ofrecer una visión holística del fenómeno, desde sus insumos hasta su impacto económico y social. La innovación se ha convertido en un concepto multidimensional; no se trata sólo de producir nuevos productos. También se trata de servicios, estándares técnicos, modelos de negocio y procesos.

¿Cuáles son los factores económicos clave que determinan el éxito de la innovación a nivel de país? Este estudio aborda la cuestión explorando la asociación entre los indicadores económicos y la innovación (representada por patentes) para los países de la OCDE para los años 2000 a 2010. Aunque otros estudios han analizado el crecimiento económico y la innovación, la singularidad de nuestro estudio radica en utilizar un gran conjunto de datos que abarca un período longitudinal y en la implementación de una sofisticada herramienta analítica como Cognos, en la profundización e identificación de patrones y relaciones en los datos.

El resto de este documento se organiza de la siguiente manera: La sección "Fondo de investigación" proporciona antecedentes de investigación; La sección "Métodos" describe la metodología de investigación; La sección "Resultados y discusión" contiene los resultados y la discusión de los análisis de datos; La sección "Alcance y limitaciones" describe el alcance y las limitaciones de la investigación; y la sección "Conclusiones" ofrece conclusiones junto con contribuciones e implicaciones.

CONCLUSIÓN

A pesar de sus limitaciones, nuestro estudio hace varias contribuciones importantes a la literatura sobre innovación y crecimiento económico a nivel nacional. Mientras que la mayoría de los estudios sobre innovación se centran en la innovación a nivel de empresa o de empresa, nuestro estudio analiza la innovación a nivel de país. Además, incorpora un conjunto de datos completo y grande de la OCDE que permite análisis longitudinales.

También contribuimos en términos de la metodología de análisis utilizada en la investigación. Esta técnica emergente ofrece potencial en varios ámbitos, incluida la innovación. Demostramos cómo el análisis basado en datos puede ayudar a tomar decisiones informadas sobre innovación y crecimiento económico. La investigación se suma a los estudios empíricos literatura sobre innovación que despliegan un enfoque analítico.

Al identificar una cartera de factores económicos que influyen en la innovación, ofrecemos ideas que los responsables políticos pueden recurrir a diseñar políticas eficaces orientadas a promover y fomentar la

innovación. Nuestro análisis de industrias con más potencial para la innovación ofrece puntos de referencia para la asignación efectiva de recursos o la asignación de incentivos en industrias fecundas. Los incentivos pueden adoptar la forma de subsidios, exenciones fiscales, subvenciones o servicios de incubación empresarial que faciliten la innovación. Además, nuestros resultados ofrecen puntos de referencia para una asignación eficiente de recursos entre las industrias.

La relación entre el gasto en I+D y los esfuerzos innovadores de un país ha sido subrayada por los modelos de crecimiento endógeno (Romer 1994; Zachariadis 2003). A este respecto, demostramos que, si bien la I+D es un indicador importante para la innovación, sólo algunos países de la OCDE innovan aumentando su inversión en I+D. Otros promueven su innovación a través de los efectos de contagio tecnológicos procedentes de otros países de la OCDE (Acemoglu y Linn 2004; Wang 2010). Estos países utilizan el know-how que generan otros países (Guloglu y Tekin 2012). Esta constatación no significa que la I+D no sea importante para el crecimiento a largo plazo. En cambio, implica que la medida de la I+D no puede interpretarse como una medida completa de la innovación: deben tenerse en cuenta otros factores (Aghion y Howitt 1998).

A nivel socioeconómico, nuestros hallazgos sobre la asociación entre el nivel de vida (salarios mínimos reales, costo laboral) y la innovación sugieren que para mejorar la innovación y el crecimiento económico, los países deben centrarse en mejorar el nivel de vida en términos de salarios mínimos altos, bajo costo de trabajo y mejores condiciones de trabajo.

Una contribución notable de nuestra investigación radica en la dimensión de la internacionalización y la propiedad de la innovación tecnológica (patentes). Mostramos que los países con alta propiedad extranjera de patentes tienen bajos ingresos fiscales como porcentaje del PIB. Una exploración del concepto de ingresos procedentes de la propiedad intelectual (P.I.) es útil para seguir interpretando esta asociación. En general, los ingresos procedentes de la P.I. son móviles porque no tienen costos comerciales asociados (Griffith et al. 2014). Por lo tanto, la propiedad de la patente puede encontrarse en lugares distintos del país en el que se crearon. Las empresas multinacionales, una gran fuente de patentes, suelen explotar esta movilidad al ubicar su propiedad intelectual en países con impuestos bajos (denominados paraísos fiscales), disminuyendo así su carga fiscal (Lipsey 2010). No es de extrañar que los países que ven una alta proporción de patentes propiedad de residentes extranjeros se hayan preocupado cada vez más por las pérdidas fiscales derivadas de esos sistemas de reubicación. Para hacer frente a esta esta página, algunos países han introducido cajas de patente para reducir el tipo impositivo sobre los ingresos derivados de las patentes. Bélgica, por ejemplo, introdujo una caja de patentes en 2007, reduciendo el tipo impositivo del 34 al 6,8 por ciento. Los Países Bajos redujeron el tipo impositivo del 31,5 al 10 por ciento. En 2008, Luxemburgo redujo el tipo del 30,4 al 5,9 por ciento; y en 2013, el Reino Unido introdujo una caja de patentes a un tipo del 10% reduciendo el tipo impositivo del 30 al 24% (Griffith et al. 2014). Sugerimos que los países aborden la propiedad de patentes y fomenten una mayor participación de los residentes locales y menos por parte de los residentes extranjeros, a fin de aumentar la innovación e impulsar los ingresos fiscales que dan lugar al crecimiento económico.

En términos de educación para influir en la innovación, destacamos la importancia de tener un plan de estudios integrado que ofrezca a los estudiantes las habilidades artísticas liberales (analíticas, evaluativas, críticas y creativas, y la comunicación escrita y oral), así como las habilidades cuantitativas y técnicas necesarias para el lugar de trabajo. La mayoría de los empleadores quieren que los empleados tengan la capacidad de aprender y sintetizar nuevas ideas, ser reflexivos y articulados, y tener excelentes habilidades de organización y gestión del tiempo. Reforzamos la necesidad de que las políticas gubernamentales se centren en mejorar la calidad de la educación para facilitar la transferencia de conocimientos necesaria para la innovación a nivel de país. Proponer un marco reglamentario para promover la innovación es una tarea difícil porque, además del crecimiento económico, este marco tiene que abordar los objetivos sociales y medioambientales. Se necesita una investigación más teórica y empírica. Otra dirección importante para la labor futura es el análisis del impacto de otras formas de propiedad intelectual -derechos de autor y marcas, además de las patentes- en el crecimiento económico y la innovación.

TRANSLATED VERSION: FRENCH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUITE: FRANÇAIS

Voici une traduction approximative des idées présentées ci-dessus. Cela a été fait pour donner une compréhension générale des idées présentées dans le document. Veuillez excuser toutes les erreurs grammaticales et ne pas tenir les auteurs originaux responsables de ces erreurs.

INTRODUCTION

Aujourd'hui, les sociétés du monde sont confrontées à de graves défis économiques et sociaux. Le ralentissement économique de 2008-2009 a entraîné une baisse de la croissance, une hausse du chômage et une hausse de la dette publique. Pour se redresser, les pays doivent trouver de nouvelles sources de croissance durables. L'innovation — l'introduction d'un nouveau produit, d'un procédé ou d'une méthode nettement amélioré — est la clé pour stimuler la croissance économique et la productivité. L'innovation a des implications beaucoup plus vastes que la recherche et le développement et est influencée par un plus large éventail de facteurs. L'innovation peut contribuer à accélérer la reprise économique et à mettre les pays sur la voie d'une croissance durable et plus verte. L'innovation permet à un pays de découvrir des opportunités qui existent ou qui sont susceptibles d'émerger dans le temps, de se concentrer sur les processus et les pratiques d'affaires existants qui améliorent l'efficacité, de trouver des clients potentiels, de minimiser le gaspillage et d'augmenter les profits.

L'innovation est un moteur clé du développement technologique et de la croissance économique. Il fournit un moyen de satisfaire les exigences du marché actuel et les besoins potentiels des marchés futurs. L'innovation est obtenue grâce à des produits, des processus, des services ou des technologies plus efficaces qui sont facilement accessibles au marché actuel. Les décideurs nationaux sont de plus en plus sensibilisés et reconnus à l'innovation comme facteur clé de la croissance économique. De nombreux pays membres de l'ocde (Organisation de coopération et de développement économiques) ont mis en œuvre des stratégies et des politiques visant à améliorer l'innovation et le développement économique.

L'innovation a des implications différentes pour différentes économies telles que le développement, l'émergence et le développement. Il est important que nous développions des outils pour mesurer l'innovation dans diverses économies. Divers indicateurs financiers, industriels, économiques et sociaux sont associés aux tendances de l'innovation.

L'innovation est un facteur crucial du progrès national. L'application de la technologie de pointe ainsi que les approches de l'entrepreneuriat et de l'innovation dans la création de biens et de services se traduit par la traduction des progrès scientifiques et technologiques en activités économiques productives. Cela contribue à la croissance économique lorsqu'il est aidé par des structures environnementales et réglementaires. Les décideurs s'tournent vers le cadre réglementaire comme un instrument de promotion de l'innovation (Blind et coll., 2004). Le pont entre les réglementations administratives ou institutionnelles et l'innovation passe par des droits de propriété intellectuelle (tels que les brevets et les droits d'auteur). Les décideurs peuvent calibrer la force des droits de protection des brevets pour avoir une influence sur l'innovation du pays. Dans l'état actuel des choses, la recherche sur l'innovation est fragmentée. Un cadre général d'analyse et une plus grande coordination des efforts de recherche serviront à offrir une vision globale du phénomène, en commençant par ses apports à son impact économique et social. L'innovation est devenue un concept multidimensionnel; il ne s'agit pas seulement de produire de nouveaux produits. Il s'agit aussi de services, de normes techniques, de modèles d'affaires et de processus.

Quels sont les principaux facteurs économiques qui déterminent le succès de l'innovation au niveau national? Cette étude aborde la question en explorant l'association entre les indicateurs économiques et l'innovation (représentée par les brevets) pour les pays de l'ocde pour les années 2000 à 2010. Bien que d'autres études aient porté sur la croissance économique et l'innovation, le caractère unique de notre étude réside dans l'utilisation d'un grand ensemble de données qui s'étend sur une période longitudinale et dans le déploiement d'un outil analytique sophistiqué comme Cognos, dans le forage et l'identification des modèles et des relations dans les données.

Le reste du présent document est organisé comme suit : La section « Contexte de recherche » fournit des antécédents en recherche; La section « Méthodes » décrit la méthodologie de recherche; La section « Résultats et discussion » contient les résultats et la discussion des analyses de données; La section « Portée et limites » décrit la portée et les limites de la recherche; et la section « conclusions » présente des conclusions ainsi que des contributions et des implications.

CONCLUSION

Malgré ses limites, notre étude apporte plusieurs contributions importantes à la littérature sur l'innovation et la croissance économique au niveau national. Alors que la plupart des études sur l'innovation se concentrent sur l'innovation au niveau des entreprises ou des entreprises, notre étude analyse l'innovation au niveau des pays. En outre, il intègre un ensemble de données complet et important de l'ocde qui permet des analyses longitudinales.

Nous contribuons également en termes de méthodologie d'analyse utilisée dans la recherche. Cette technique émergente offre un potentiel dans divers domaines, y compris l'innovation. Nous démontrons comment l'analyse axée sur les données peut aider à prendre des décisions éclairées sur l'innovation et la croissance économique. La recherche s'ajoute à la littérature d'études empiriques sur l'innovation qui déploient une approche analytique.

En identifiant un portefeuille de facteurs économiques qui influencent l'innovation, nous offrons des idées que les décideurs peuvent faire appel à la conception de politiques efficaces visant à promouvoir et à encourager l'innovation. Notre analyse des industries ayant le plus de potentiel d'innovation offre des repères pour l'allocation efficace des ressources ou l'affectation incitative dans les industries fécondes. Les incitations peuvent prendre la forme de subventions, d'allègements fiscaux, de subventions ou de services d'incubation d'entreprises qui facilitent l'innovation. De plus, nos résultats offrent des points de repère pour une répartition efficace des ressources entre les industries.

La relation entre les dépenses de R&D et les efforts novateurs d'un pays a été soulignée par des modèles de croissance endogènes (Romer, 1994; Zachariadis, 2003). À cet égard, nous montrons que si la R&D est un indicateur important de l'innovation, seuls certains pays de l'ocde innovent en augmentant leurs investissements dans la R&D. D'autres font la promotion de leur innovation par des retombées technologiques provenant d'autres pays de l'ocde (Acemoglu et Linn, 2004; Wang 2010). Ces pays utilisent le savoir-faire généré par d'autres pays (Guloglu et Tekin 2012). Cette constatation ne signifie pas que la R&D n'est pas importante pour la croissance à long terme. Au lieu de cela, cela implique que la mesure de la R&D ne peut pas être interprétée comme une mesure complète de l'innovation : d'autres facteurs doivent être pris en considération (Aghion et Howitt, 1998).

Sur le plan socio-économique, nos résultats sur l'association entre le niveau de vie (salaire minimum réel, coût de la main-d'œuvre) et l'innovation suggèrent que pour améliorer l'innovation et la croissance économique, les pays doivent se concentrer sur l'amélioration du niveau de vie en termes de salaires minimums élevés, de faible coût de la main-d'œuvre et de meilleures conditions de travail.

Une contribution notable de notre recherche réside dans la dimension de l'internationalisation et de la propriété de l'innovation technologique (brevets). Nous montrons que les pays qui sont très propriétaires étrangers de brevets ont de faibles recettes fiscales en pourcentage du PIB. Une exploration du concept de revenu provenant de la propriété intellectuelle (PI) est utile pour interpréter davantage cette association. En général, les revenus tirés de la propriété intellectuelle sont mobiles parce qu'ils n'ont pas de coûts commerciaux connexes (Griffith et coll., 2014). Ainsi, la propriété de brevets peut être trouvée dans des

endroits autres que le pays dans lequel ils ont été créés. Les multinationales, grande source de brevets, exploitent généralement cette mobilité en localisant leur propriété intellectuelle dans des pays à faible imposition (appelés paradis fiscaux) réduisant ainsi leur charge fiscale (Lipsey, 2010). Il n'est pas étonnant que les pays qui voient une forte proportion de brevets détenus par des résidents étrangers se sont de plus en plus inquiétés des pertes fiscales découlant de ces programmes de relocalisation. Pour remédier à cette situation, certains pays ont mis en place des boîtes de brevets pour réduire le taux d'imposition sur les revenus tirés des brevets. La Belgique, par exemple, a introduit une boîte de brevets en 2007, réduisant le taux d'imposition de 34 à 6,8%. Les Pays-Bas ont réduit le taux d'imposition de 31,5 à 10 %. En 2008, le Luxembourg a réduit le taux de 30,4 à 5,9 %; et en 2013, le Royaume-Uni a introduit une boîte de brevets au taux de 10 % réduisant le taux d'imposition de 30 à 24 % (Griffith et al., 2014). Nous suggérons que les pays s'attaquent à la propriété des brevets et encouragent davantage les résidents locaux et moins par les résidents étrangers, afin d'accroître l'innovation et de stimuler les recettes fiscales qui se traduisent par la croissance économique.

En ce qui concerne l'éducation à l'influence de l'innovation, nous soulignons l'importance d'avoir un programme d'études intégré qui offre aux étudiants les compétences en arts libéraux (analyse, évaluation, pensée critique et créative, communication écrite et orale) ainsi que les compétences quantitatives et techniques nécessaires au milieu de travail. La plupart des employeurs veulent que les employés aient la capacité d'apprendre et de synthétiser de nouvelles idées, d'être réfléchis et articulés, et d'avoir d'excellentes compétences en organisation et en gestion du temps. Nous renforçons la nécessité pour les politiques gouvernementales de mettre l'accent sur l'amélioration de la qualité de l'éducation afin de faciliter le transfert des connaissances nécessaire à l'innovation au niveau des pays. Proposer un cadre réglementaire pour promouvoir l'innovation est une tâche difficile parce qu'en plus de la croissance économique, ce cadre doit répondre aux objectifs sociaux et environnementaux. Des recherches plus théoriques et empiriques sont nécessaires. Une autre orientation importante pour les travaux futurs est l'analyse de l'impact d'autres formes de propriété intellectuelle - droits d'auteur et marques de commerce en plus des brevets - sur la croissance économique et l'innovation.

TRANSLATED VERSION: GERMAN

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ÜBERSETZTE VERSION: DEUTSCH

Hier ist eine ungefähre Übersetzung der oben vorgestellten Ideen. Dies wurde getan, um ein allgemeines Verständnis der in dem Dokument vorgestellten Ideen zu vermitteln. Bitte entschuldigen Sie alle grammatikalischen Fehler und machen Sie die ursprünglichen Autoren nicht für diese Fehler verantwortlich.

EINLEITUNG

Heute stehen die Gesellschaften der Welt vor ernststen wirtschaftlichen und sozialen Herausforderungen. Der wirtschaftliche Abschwung von 2008 bis 2009 hat zu einem Rückgang des Wachstums, steigender Arbeitslosigkeit und einer steigenden Staatsverschuldung geführt. Um sich zu erholen, müssen die Länder neue und nachhaltige Wachstumsquellen finden. Innovation – die Einführung eines neuen oder deutlich verbesserten Produkts, Prozesses oder verfahrens – ist der Schlüssel zur Steigerung von Wirtschaftswachstum und Produktivität. Innovation hat viel breitere Implikationen als Forschung und Entwicklung und wird von einer breiteren Palette von Faktoren beeinflusst. Innovation kann dazu beitragen, die wirtschaftliche Erholung zu beschleunigen und die Länder auf den Weg zu nachhaltigem und grünem

Wachstum zu bringen. Innovation ermöglicht es einem Land, Chancen zu entdecken, die es gibt oder mit der Zeit entstehen wird, sich auf bestehende Geschäftsprozesse und -praktiken zu konzentrieren, die die Effizienz verbessern, potenzielle Kunden zu finden, Verschwendung zu minimieren und Gewinne zu steigern.

Innovation ist ein wichtiger Motor für Technologieentwicklung und Wirtschaftswachstum. Sie bietet ein Mittel, um die Anforderungen des gegenwärtigen Marktes und die potenziellen Bedürfnisse zukünftiger Märkte zu befriedigen. Innovation wird durch effektivere Produkte, Prozesse, Dienstleistungen oder Technologien erreicht, die dem aktuellen Markt leicht zugänglich sind. Die nationalen politischen Entscheidungsträger sind stärker für Innovation als Schlüsselfaktor für wirtschaftswachstum sensibilisiert. Viele OECD-Mitgliedstaaten (Organisation für wirtschaftliche Zusammenarbeit und Entwicklung) haben Strategien und Strategien zur Förderung von Innovation und wirtschaftlicher Entwicklung durchgesetzt.

Innovation hat unterschiedliche Auswirkungen auf verschiedene Volkswirtschaften wie Entwicklung, Schwellen und Entwicklung. Es ist wichtig, dass wir Instrumente entwickeln, um Innovationen in verschiedenen Volkswirtschaften zu messen. Verschiedene Finanz-, Industrie-, Wirtschafts- und Sozialindikatoren sind mit Innovationstrends verbunden.

Innovation ist ein entscheidender Faktor für den nationalen Fortschritt. Die Anwendung fortgeschrittener Technologien sowie unternehmerische und innovationsfördernde Ansätze bei der Schaffung von Waren und Dienstleistungen führen zur Umsetzung des wissenschaftlichen und technologischen Fortschritts in produktive Wirtschaftstätigkeit. Dies trägt zu Wirtschaftswachstum bei, wenn die Umwelt- und Regulierungsstrukturen unterstützt werden. Die politischen Entscheidungsträger sehen den Rechtsrahmen als Instrument zur Innovationsförderung (Blind et al. 2004). Die Brücke zwischen administrativen oder institutionellen Vorschriften und Innovation schlägt durch Rechte des geistigen Eigentums (wie Patente und Urheberrechte) über. Politische Entscheidungsträger können die Stärke der Patentschutzrechte kalibrieren, um Einfluss auf die Innovation des Landes zu nehmen. In ihrer jetzigen Form ist die Innovationsforschung fragmentiert. Ein allgemeiner Analyserahmen und eine stärkere Koordinierung der Forschungsanstrengungen werden dazu dienen, einen ganzheitlichen Überblick über das Phänomen zu bieten, beginnend mit seinen Inputs bis hin zu seinen wirtschaftlichen und sozialen Auswirkungen. Innovation ist zu einem multidimensionalen Konzept geworden; es geht nicht nur darum, neue Produkte zu produzieren. Es geht auch um Dienstleistungen, technische Standards, Geschäftsmodelle und Prozesse.

Welches sind die wichtigsten wirtschaftlichen Faktoren, die den Erfolg von Innovationen auf Länderebene bestimmen? Diese Studie befasst sich mit dieser Frage, indem sie den Zusammenhang zwischen Wirtschaftsindikatoren und Innovation (durch Patente) für die OECD-Länder für die Jahre 2000 bis 2010 untersucht. Obwohl andere Studien sich mit Wirtschaftswachstum und Innovation befasst haben, liegt die Einzigartigkeit unserer Studie in der Verwendung eines großen Datensatzes, der eine Längsschnittperiode umfasst, und in der Bereitstellung eines ausgeklügelten Analysewerkzeugs wie Cognos, in der Ausbohrung und Identifizierung von Mustern und Beziehungen in den Daten.

Der Rest dieses Papiers ist wie folgt organisiert: Abschnitt "Forschungshintergrund" bietet Forschungshintergrund; Abschnitt "Methoden" beschreibt die Forschungsmethodik; Abschnitt "Ergebnisse und Diskussion" enthält die Ergebnisse und die Diskussion von Datenanalysen; In Abschnitt "Umfang und Einschränkungen" werden Umfang und Grenzen der Forschung dargelegt; und Abschnitt "Schlussfolgerungen" enthält Schlussfolgerungen sowie Beiträge und Implikationen.

SCHLUSSFOLGERUNG

Trotz ihrer Einschränkungen leistet unsere Studie mehrere wichtige Beiträge zur Literatur über Innovation und Wirtschaftswachstum auf nationaler Ebene. Während sich die meisten Studien über Innovation auf Unternehmens- oder Unternehmensebene konzentrieren, analysiert unsere Studie Innovationen auf Länderebene. Darüber hinaus enthält es einen umfassenden und umfangreichen Datensatz der OECD, der Längsanalysen ermöglicht.

Wir tragen auch zur Methodik der Inforschenden bei. Diese aufkommende Technik bietet Potenzial in verschiedenen Bereichen, einschließlich Innovation. Wir zeigen, wie datengesteuerte Analysen dazu beitragen können, fundierte Entscheidungen über Innovation und Wirtschaftswachstum zu treffen. Die Forschung ergänzt die empirische Studienliteratur über Innovation, die einen analytischen Ansatz verfolgt.

Indem wir ein Portfolio wirtschaftlicher Faktoren identifizieren, die Innovation beeinflussen, bieten wir Erkenntnisse, die politische Entscheidungsträger dazu aufrufen können, wirksame Strategien zu entwickeln, die auf die Förderung und Förderung von Innovation abzielen. Unsere Analyse von Branchen mit dem größten Innovationspotenzial bietet Benchmarks für eine effektive Ressourcenallokation oder Anreizzuweisung in fecund-Branchen. Anreize können in Form von Subventionen, Steuererleichterungen, Zuschüssen oder Unternehmensinkubationsdiensten erfolgen, die Innovationen erleichtern. Darüber hinaus bieten unsere Ergebnisse Benchmarks für eine effiziente Ressourcenallokation zwischen Branchen.

Der Zusammenhang zwischen fue-Ausgaben und innovativen Anstrengungen eines Landes wurde durch endogene Wachstumsmodelle hervorgehoben (Romer 1994; Zachariadis 2003). In diesem Zusammenhang zeigen wir, dass F&E zwar ein wichtiger Indikator für Innovation ist, aber nur einige OECD-Länder innovativ sind, indem sie ihre Investitionen in Forschung und Entwicklung erhöhen. Andere fördern ihre Innovation durch Technologie-Spillover aus anderen OECD-Ländern (Acemoglu und Linn 2004; Wang 2010). Diese Länder nutzen das Know-how, das von anderen Ländern generiert wird (Guloglu und Tekin 2012). Diese Feststellung bedeutet nicht, dass F&E für langfristiges Wachstum nicht wichtig ist. Sie impliziert vielmehr, dass das Maß der F&E nicht als vollständiges Maß an Innovation ausgelegt werden kann: Andere Faktoren sind zu berücksichtigen (Aghion und Howitt 1998).

Auf sozioökonomischer Ebene legen unsere Ergebnisse über den Zusammenhang zwischen Lebensstandard (reale Mindestlöhne, Arbeitskosten) und Innovation nahe, dass sich die Länder zur Verbesserung von Innovation und Wirtschaftswachstum auf die Verbesserung des Lebensstandards in Bezug auf hohe Mindestlöhne, niedrige Arbeitskosten und bessere Arbeitsbedingungen konzentrieren müssen.

Ein bemerkenswerter Beitrag unserer Forschung liegt in der Dimension der Internationalisierung und der Eigenverantwortung für technologische Innovationen (Patente). Wir zeigen, dass Länder mit hohem ausländischen Patentbesitz niedrige Steuereinnahmen in Prozent des BIP haben. Eine Untersuchung des Konzepts der Einkünfte aus geistigem Eigentum (IP) ist hilfreich, um diesen Zusammenhang weiter zu interpretieren. Im Allgemeinen sind die Einnahmen aus dem UZ mobil, da sie keine damit verbundenen Handelskosten haben (Griffith et al. 2014). Somit kann das Patenteigentum an anderen Orten als dem Land, in dem sie geschaffen wurden, gefunden werden. Multinationale Unternehmen, eine große Quelle für Patente, nutzen diese Mobilität in der Regel aus, indem sie ihr geistiges Eigentum in Niedrigsteuerländern (sogenanntesteueroasen) ansiedeln und so ihre Steuerlast verringern (Lipsey 2010). Es ist kein Wunder, dass Länder, die einen hohen Anteil von Patenten im Besitz ausländischer Einwohner sehen, zunehmend besorgt über die Steuereinnahmenverluste sind, die sich aus solchen Umsiedlungsplänen ergeben. Um diesem Problem zu begegnen, haben einige Länder Patentboxen eingeführt, um den Steuersatz für Einkünfte aus Patenten zu senken. Belgien beispielsweise führte 2007 eine Patentbox ein, die den Steuersatz von 34 auf 6,8 % senkte. Die Niederlande senkten den Steuersatz von 31,5 auf 10 %. Im Jahr 2008 senkte Luxemburg den Satz von 30,4 auf 5,9 %; und im Jahr 2013 führte das Vereinigte Königreich eine Patentbox mit einem Satz von 10 % ein, die den Steuersatz von 30 auf 24 % senkte (Griffith et al. 2014). Wir schlagen vor, dass die Länder sich mit dem Eigentum an Patenten befassen und mehr Eigenverantwortung von Anwohnern und weniger von ausländischen Einwohnern fördern sollten, um Innovationen zu steigern und die Steuereinnahmen zu steigern, die zu Wirtschaftswachstum führen.

Im Hinblick auf die Bildung bei der Beeinflussung von Innovation unterstreichen wir die Bedeutung eines integrierten Curriculums, das den Studierenden die Fähigkeiten der freien Künste (analytisches, evaluatives, kritisches und kreatives Denken sowie schriftliche und mündliche Kommunikation) sowie quantitative und technische Fähigkeiten bietet, die für den Arbeitsplatz erforderlich sind. Die meisten Arbeitgeber möchten, dass Arbeitnehmer in der Lage sind, neue Ideen zu lernen und zu synthetisieren, reflektierend und artikulierend zu sein und über ausgezeichnete Organisations- und

Zeitmanagementfähigkeiten zu verfügen. Wir verstärken die Notwendigkeit staatlicher Maßnahmen, sich auf die Verbesserung der Qualität der Bildung zu konzentrieren, um den Wissenstransfer zu erleichtern, der für Innovationen auf Länderebene erforderlich ist. Die Vorlage eines Rechtsrahmens zur Förderung von Innovation ist eine schwierige Aufgabe, da dieser Rahmen neben dem Wirtschaftswachstum auch soziale und ökologische Ziele angehen muss. Weitere theoretische und empirische Forschung ist erforderlich. Eine weitere wichtige Richtung für die künftige Arbeit ist die Analyse der Auswirkungen anderer Formen von Urheberrechten und Marken an geistigem Eigentum sowie patenten – auf Wirtschaftswachstum und Innovation.

TRANSLATED VERSION: PORTUGUESE

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSÃO TRADUZIDA: PORTUGUÊS

Aqui está uma tradução aproximada das ideias acima apresentadas. Isto foi feito para dar uma compreensão geral das ideias apresentadas no documento. Por favor, desculpe todos os erros gramaticais e não responsabilize os autores originais responsáveis por estes erros.

INTRODUÇÃO

Hoje, as sociedades mundiais enfrentam severos desafios econômicos e sociais. A crise econômica de 2008-2009 levou à redução do crescimento, ao aumento do desemprego e ao aumento da dívida pública. Para se recuperar, os países precisam encontrar novas e sustentáveis fontes de crescimento. A inovação — a introdução de um produto, processo ou método novo ou significativamente melhorado — tem a chave para impulsionar o crescimento econômico e a produtividade. A inovação tem implicações muito mais amplas do que a Pesquisa e o Desenvolvimento e é influenciada por uma gama mais ampla de fatores. A inovação pode ajudar a acelerar a recuperação econômica e colocar os países em um caminho para um crescimento sustentável e mais verde. A inovação permite que um país descubra oportunidades que existem ou provavelmente surgirão no tempo, para focar nos processos e práticas de negócios existentes que melhorem a eficiência, encontrem potenciais clientes, minimizem o desperdício e aumentem os lucros.

A inovação é um dos principais impulsionadores do desenvolvimento tecnológico e do crescimento econômico. Fornece um meio de satisfazer as demandas do mercado atual e as necessidades potenciais dos mercados futuros. A inovação é alcançada por meio de produtos, processos, serviços ou tecnologias mais eficazes que estejam prontamente disponíveis para o mercado atual. Há uma maior conscientização e reconhecimento entre os formuladores de políticas nacionais sobre a inovação como fator-chave no crescimento econômico. Muitos países membros da OCDE (Organização para a Cooperação e Desenvolvimento Econômico) têm aplicado estratégias e políticas para melhorar a inovação e o desenvolvimento econômico.

A inovação tem diferentes implicações para diferentes economias, como desenvolvimento, emergente e desenvolvimento. É importante que desenvolvamos ferramentas para medir a inovação em diversas economias. Vários indicadores financeiros, industriais, econômicos e sociais estão associados às tendências de inovação.

A inovação é um fator crucial no progresso nacional. A aplicação da tecnologia avançada junto com abordagens de empreendedorismo e inovação na criação de bens e serviços resulta na tradução dos avanços científicos e tecnológicos para a atividade econômica produtiva. Isso contribui para o crescimento econômico quando auxiliado por estruturas ambientais e regulatórias. Os formuladores de políticas olham para o marco regulatório como um instrumento para promover a inovação (Blind et al. 2004). A ponte entre

regulamentos administrativos ou institucionais e inovação é por meio de direitos de propriedade intelectual (como patentes e direitos autorais). Os formuladores de políticas podem calibrar a força dos direitos de proteção de patentes para influenciar a inovação do país. Do jeito que está agora, a pesquisa sobre inovação está fragmentada. Um quadro geral de análise e maior coordenação dos esforços de pesquisa servirão para oferecer uma visão holística do fenômeno, a partir de seus insumos ao seu impacto econômico e social. A inovação tornou-se um conceito multidimensional; não se trata apenas de produzir novos produtos. Trata-se também de serviços, normas técnicas, modelos de negócios e processos.

Quais são os principais fatores econômicos que determinam o sucesso da inovação a nível nacional? Este estudo aborda a questão explorando a associação entre indicadores econômicos e inovação (representada por patentes) para os países da OCDE para os anos de 2000 a 2010. Embora outros estudos tenham olhado para o crescimento econômico e a inovação, a singularidade do nosso estudo está na utilização de um grande conjunto de dados que abrange um período longitudinal e na implantação de uma ferramenta analítica sofisticada, como a Cognos, na perfuração e identificação de padrões e relacionamentos nos dados.

O restante deste artigo é organizado da seguinte forma: A seção "Fundo de pesquisa" fornece formação em pesquisa; A seção "Métodos" descreve a metodologia de pesquisa; A seção "Resultados e discussão" contém os resultados e a discussão das análises de dados; A seção "Escopo e limitações" descreve o escopo e as limitações da pesquisa; e a Seção "Conclusões" oferece conclusões, juntamente com contribuições e implicações.

CONCLUSÃO

Apesar de suas limitações, nosso estudo faz várias contribuições importantes para a literatura sobre inovação e crescimento econômico a nível nacional. Enquanto a maioria dos estudos sobre inovação se concentra em inovação em nível firme ou empresarial, nosso estudo analisa a inovação em nível nacional. Além disso, incorpora um conjunto abrangente e amplo de dados da OCDE que permite análises longitudinais.

Também contribuimos em termos da metodologia de análise utilizada na pesquisa. Esta técnica emergente oferece potencial em vários domínios, incluindo a inovação. Demonstramos como as análises baseadas em dados podem ajudar a tomar decisões informadas sobre inovação e crescimento econômico. A pesquisa se soma à literatura de estudos empíricos sobre inovação que implantam uma abordagem analítica.

Ao identificar um portfólio de fatores econômicos que influenciam a inovação, oferecemos insights que os formuladores de políticas podem recorrer a projetar políticas eficazes voltadas para a promoção e incentivo à inovação. Nossa análise de indústrias com maior potencial para inovação oferece benchmarks para alocação eficaz de recursos ou cessão de incentivo em indústrias fecund. Os incentivos podem assumir a forma de subsídios, incentivos fiscais, subvenções ou serviços de incubação de empresas que facilitam a inovação. Além disso, nossos resultados oferecem benchmarks para alocação eficiente de recursos entre as indústrias.

A relação entre os gastos com P&D e os esforços inovadores de um país tem sido enfatizada por modelos de crescimento endógeno (Romer 1994; Zachariadis 2003). Nesse sentido, mostramos que, embora a P&D seja um importante indicador de inovação, apenas alguns países da OCDE inovam aumentando seu investimento em P&D. Outros promovem sua inovação por meio de vazamentos tecnológicos de outros países da OCDE (Acemoglu e Linn 2004; Wang 2010). Esses países utilizam o know-how gerado por outros países (Guloglu e Tekin 2012). Esse achado não significa que a P&D não seja importante para o crescimento a longo prazo. Em vez disso, implica que a medida de P&D não pode ser interpretada como uma medida completa de inovação: outros fatores devem ser considerados (Aghion e Howitt 1998).

Em um nível socioeconômico, nossos achados sobre a associação entre o padrão de vida (salários mínimos reais, custo do trabalho) e a inovação sugerem que, para melhorar a inovação e o crescimento econômico, os países precisam se concentrar em melhorar o padrão de vida em termos de altos salários mínimos, baixo custo de trabalho e melhores condições de trabalho.

Uma contribuição notável de nossa pesquisa está na dimensão da internacionalização e propriedade da inovação tecnológica (patentes). Mostramos que países com alta propriedade estrangeira de patentes têm baixas receitas fiscais como porcentagem do PIB. Uma exploração do conceito de renda da propriedade intelectual (IP) é útil para interpretar ainda mais essa associação. Em geral, a renda do PI é móvel porque não tem custos comerciais associados (Griffith et al. 2014). Assim, a posse de patentes pode ser encontrada em locais diferentes do país em que foram criadas. As empresas multinacionais, uma grande fonte de patentes, normalmente exploram essa mobilidade, localizando sua propriedade intelectual em países com baixos impostos (chamados de paraísos fiscais) diminuindo assim sua carga tributária (Lipsey 2010). Não é à toa que os países que veem uma alta proporção de patentes de residentes estrangeiros têm se preocupado cada vez mais com as perdas de receita fiscal decorrentes desses esquemas de realocação. Para lidar com isso, alguns países introduziram caixas de patentes para reduzir a alíquota sobre os rendimentos derivados de patentes. A Bélgica, por exemplo, introduziu uma caixa de patentes em 2007, reduzindo a alíquota de 34 para 6,8%. Os Países Baixos reduziram a alíquota de 31,5% para 10%. Em 2008, Luxemburgo reduziu a taxa de 30,4 para 5,9%; e em 2013, o Reino Unido introduziu uma caixa de patentes à taxa de 10% reduzindo a taxa de imposto de 30 para 24% (Griffith et al. 2014). Sugerimos que os países devem abordar a propriedade de patentes e incentivar mais propriedade por residentes locais e menos por residentes estrangeiros, a fim de aumentar a inovação e aumentar as receitas fiscais que resultam em crescimento econômico.

Em termos de educação para influenciar a inovação, destacamos a importância de ter um currículo integrado que ofereça aos alunos as habilidades de artes liberais (pensamento analítico, avaliativo, crítico e criativo e comunicação escrita e oral) bem como habilidades quantitativas e técnicas necessárias para o local de trabalho. A maioria dos empregadores quer que os funcionários tenham a capacidade de aprender e sintetizar novas ideias, serem reflexivos e articulados, e tenham excelentes habilidades de organização e gerenciamento de tempo. Reforçamos a necessidade de políticas governamentais se concentrarem em melhorar a qualidade da educação para facilitar a transferência de conhecimento necessária para a inovação em nível nacional. Propor um marco regulatório para promover a inovação é uma tarefa desafiadora porque, além do crescimento econômico, esse quadro tem de abordar metas sociais e ambientais. Mais pesquisas teóricas e empíricas são necessárias. Outra direção importante para o trabalho futuro é a análise do impacto de outras formas de direitos autorais e marcas de propriedade intelectual, além de patentes sobre crescimento econômico e inovação.