

SOME INDEXES TO MEASURE INNOVATIVENESS AS AN ECONOMIC GROWTH

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Abstract: The problem of innovation and innovativeness of economy is very important in nowadays economy. The main problem is how to measure the level of innovativeness, because there are many ways to do it. One of the ways of this is to use complex innovative. The aim of the publication is to analyze some potential indexes that can be used to innovativeness as a measure of economic growth.

Keywords: innovativeness, innovation, innovation index, business indexes, economic growth.

1. Introduction

A paradigm of economy based on knowledge induces to a different attitude to an innovation than before (Pichlak, 2016; Pichlak 2017; Olkiewicz et al., 2017a; Olko, 2017; Michna, and Kmiecik, 2014; Wolniak, and Grebski, 2018a; Wolniak, and Grebski, 2018b; Wolniak, and Grebski, 2018c; Skotnicka-Zasadzień, and Wolniak, 2017).. The product innovations, which are an effect of international cooperation, have been becoming more and more important in recent years (Wolniak, 2014; Wolniak, 2010; Wolniak, and Sędek, 2009, Bober et al., 2017; Rostecka, and Wolniak, 2016). Moving a centre of gravity in activities of innovative companies from a single organization to a chain of companies cooperating with each other is underlined in the literature. J.A. Schumpeter was a forerunner of the idea of innovation in the XIX century (Wolniak, and Skotnicka-Zasadzień, 2014; Wolniak, 2016a; Wolniak, 2016b; Wolniak, 2017a; Wolniak, 2017b; Wolniak, and Grebski, 2017). According to J. Schumpeter, the essence of innovation is the use of production reserves in a new way, which has not been used simultaneously with their release from other usages so far (Carlson, and Sullivan, 1999; Feisel, and Rosa, 2015; Grebski, and Wolniak, 2016; Kyaga et al., 1999).

Also it is important to measure firm innovativeness (Ober, and Karwot, 2017; Szwajca, 2016; Osika, 2016; Jonek-Kowalska, 2011; Kozubek, 2016; Orbik, 2017). To do this company should use various set of innovation metrics – which are organizational measurement that help classify the organization's ability to innovate and its record of success are valuable (Dolińska-Weryńska, 2017; Kochmańska, 2017; Krzemień, and Wolniak, 2016; Knop, and Brzóska, 2016; Knop, and Olko, 2017; Michna, and Kmiecik, 2014). Innovations metrics are very important for either small start-up company or a stable international company, because metrics affect a company's operation in line with its goals and best interests and assist managers to make decision based on objective data (Pichlak, 2016; Pichlak 2017; Olkiewicz et. al., 2017a; Olko, 2017; Michna, and Kmiecik, 2014; Wolniak, and Grebski, 2018a; Wolniak, and Grebski, 2018b; Wolniak, and Grebski, 2018c; Skotnicka-Zasadzień, and Wolniak, 2017).

Measuring success in innovation depends on the type of innovation and the firm's approach to measuring success. Since each innovation is different and all firms have different priorities, the methods will vary. Some can focus on the quantifiable financial expectations, while others will use a blend of the quantifiable and the qualitative.

The aim of the publication is to analyze some potential indexes that can be used to innovativeness as a measure of economic growth.

2. Creation of jobs as a factor to measure economic growth

The United States employment options and job creation are very limited for small businesses. Small businesses are often begun by families and/or passed down through families. Because of the limited resources that families may have, there is a limit to how many employees that the business can afford.

Table 1 shows the percentage of employees in relation to the age of the company and the number of employees in the company.

Table 1.

United States firm size by age and percentage of employees

Employees (%)	1-4	5-9	10-19	20-99	100-499	500+
Age						
0 years	82.4%	7.7%	3.1%	1.7%	0.1%	0.0%
1 year	67.8%	17.8%	8.5%	5.4%	0.5%	0.1%
3 years	62.5%	19.5%	10.4%	6.9%	0.6%	0.1%
5 years	61.3%	20.2%	10.7%	7.0%	0.6%	0.1%

Source: Business Dynamic Statistics, U.S. Census Bureau, 2012.

In Luzerne County (Pennsylvania), where CAN-BE is located, the job level change in 2015 was from 0% to 2.8%. At the same time, the small business employment percentage was from 37% to 50%. This indicates that Luzerne County is a region with the lowest small business employment. Pennsylvania ranked 5th out of 50 states for the highest number of small business employees in 2012 (percentage of firms, 2018).

The contribution to economic growth by small businesses can also be measured in terms of job creation. Measuring economic growth by evaluating job creation is a significant criterion. Between 1969 and 1976, 80% of the jobs created in the United States were in firms employing less than 100 employees. Between 1980 and 1985, start-ups generated nearly twice as many jobs as those created by the expansion of existing firms. Studies of the United State economy in 1990 showed that start-ups in the pre-incubation, incubation and post-incubation stages were the major sources of job creation and therefore played a significant positive role in regional economic growth (table 2, table 3).

Measurement criteria related to the quality of job creation indicate that small businesses provide low quality jobs to their employees compared to large businesses. Empirical evidence indicates that large firms provide more stable employment, higher wages and more non-wage benefits than small businesses. Health benefits are an example of a non-wage benefit (Pennsylvania Small Business Profile, 2016).

Table 2.

Percentage of firm by size/employees offering health benefits

Firm Size (Employees)	2005	2006	2007	2008	2009	2010	2011
3-9	48%	49%	45%	50%	48%	59%	49%
10-24	71%	72%	78%	79%	71%	76%	71%
25-49	88%	88%	82%	90%	88%	91%	85%
50-199	92%	92%	95%	95%	96%	96%	92%
200+	97%	98%	99%	99%	98%	99%	99%

2005 2006 2007 2008 2009 2010 2011

Source: Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2005-2011.

Table 3.

Workers ages 18-64 without health insurance by firm size

Firm Size (Employees)	2005	2006	2007	2008	2009	2010
<10	14%	13%	13%	14%	15%	14%
100-499	16%	16%	15%	15%	18%	16%
<500	22%	25%	24%	25%	27%	26%
500+	35%	35%	34%	36%	37%	36%
Self-employed	27%	28%	27%	28%	29%	28%

2005 2006 2007 2008 2009 2010

Source: Employee Benefits Research Institute (Population survey-2017).

3. Tax revenue as a factor to measure economic growth

OECD defines tax revenue as the revenues collected from taxes on income and profits, social security contributions, taxes levied on goods and services, payroll taxes, taxes on the ownership and transfer of property and other taxes. Table 4 compares tax revenue data for Poland and the United States.

Table 4.

Comparison of tax revenue and tax revenue as % of GDP for Poland and the United States from 1995-2015

<i>Year</i>	<i>Poland Tax Revenue</i>	<i>United States Tax Revenue</i>	<i>Poland Tax as % of GDP</i>	<i>United States Tax as % of GDP*</i>
2015	n/a*	26.4	n/a*	18.3%
2010	31.1	23.5	33.8%	14.6%
2005	33.1	25.9	34.0%	16,7%
2000	32.9	28.2	33.8%	20.0%
1995	37.7	26.5	37.4%	17.8%

*data is not available.

Source: OECD.

From 1995 through 2015, Poland has shown higher tax revenue than the United States and the percentage of tax to GDP was higher in Poland than in the United States.

Another comparison of tax revenue looks at GDP ranking and percentages of Poland and the United States (table 5).

Table 5.

Comparison of the GDP ranking and percentage for Poland and the United States

Country	Tax Revenue to GDP Ranking	Percentage
Poland	23 out of 35	32.1%
United States	31 out of 35	26.4%

Source: Bureau of Labor Statistics (US).

In a ranking of thirty-five countries, Poland gets less in tax revenue when compared to GDP. Tax revenue and the impact of government regulations are a consideration for the success of startups and economic growth.

4. Number of startups and closures as a method to measure economic growth

National statistics indicate that two out of three business start-ups fail within the first five years, but 87 percent of businesses started in an incubator are still viable after five years. Between 1994 and 2013, start-up survival rates as tracked by the Small Business

Administration (US) indicated only a 48.8% chance of survival after five years. A comparison of start-up and exit rates from the same sources can be evaluated by the economic conditions over those periods (table 6).

Table 6.

Average establishment survival rates in the United States from 1994-2013

Years Since Startup	Survival Rate (%)
1	78.5%
2	67.2%
3	59.4%
4	53.3%
5	48.2%
6	44.1%
7	40.8%
8	38.1%
9	35.7%
10	33.5%

Source: Business Employment Dynamics, Bureau of Labor Statistics.

Different comparisons using different criteria provide a challenge in analyzing what are the rates of success and failure. Then, the identification of best practices can include the factors of longevity of the company, employment rates and percentage comparison of start-up and failures over six years.

The numbers and percentage as related to start-ups and economic growth and lowdown show dramatic changes from 2008 to 2010. Pennsylvania's data supports this analysis (table 7).

Table 7.

Pennsylvania startups and exits from 2000-2016

Year	Startups	Exits
2000	7.3K	6.5K
2008	7.0K	6.8K
2016	7.0K	6.8K

Source: (entrepreneur, 2018).

The business incubator center helps the community in many ways. Five ways are as follows:

1. Those who have lost their jobs can find support and guidance in developing ideas for their new business and launching a new venture.
2. A spirit of entrepreneurship within a community can build a sense of pride in home-grown businesses that are locally owned and operated.
3. Technology transfers encourage participation with colleges and universities.
4. College students are provided with internship opportunities in their fields.
5. Employment opportunities are provided for recent college graduates seeking to remain in the community.

The role of small businesses (startups) in an economy has frequently been undermined and even misinterpreted. In the past, small businesses were believed to impede economic growth by attracting scarce resources from their larger counterparts.

Present analysis indicates that start-ups nationally and regionally reflect the general economic climate. Around 2008, the world and United States economy were entering an economic recession. The economy was in flux. The job market and company start-ups and failures were at a crossroads. Economic growth must rely on many factors. To develop a best practices model, this dissertation must find those factors which have the most significant effect.

5. Conclusion

This statement reinforces many of these six criteria. According to the World Economic Forum, inclusive cities provide jobs for the people who live there and are innovative. Antoine Frerot, CEO/Chairman of Veolia Environment also reinforces the six criteria with an example of what is happening in energy usage. In Europe, 13% of homes are in a situation of energy insecurity. By equipping the public networks of Prague and Warsaw with sensors and expert systems to collect and process data (innovative solutions), urban heating price controls result in lower personal consumption expenditures, Information management/digital technology will foster economic growth. World Economic Forum, Brookings Institution, World Bank and The Bloomberg Innovation Index are a few sources which offer conflicting data about the countries and/or cities which show economic growth and economic slowdown.

Identifying methods of measuring economic growth and economic slowdown present a challenge. The most consistent factor is innovation, that is, the creation of products and services that make life better whether it is air conditioning, vaccines, or text messaging.

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