

# TRUST, INNOVATION AND PROSPERITY

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## 1 INTRODUCTION

In the field of society development and economic growth, many studies claim that difference between long-term economic success and failures depends on individual efforts to maximize their wealth. Relative profits from production are determined by legislative mechanisms, which are forming our environment in the field of law enforcement and intellectual property rights. Although one of the crucial conditions is the social norm and interpersonal trust support (Knack, 2001). According to several authors (Fukuyama, 1995; Ganesan, 1994; Olson 1996; Knack a Keefer 1995; Zak a Knack 1998; Durlauf and Fafchamps, 2005; Uslaner, 2002; Bjornskov, 2004), the role of trust is mainly in achieving economic goals due to reducing transaction costs, risks, increasing investments or social responsibility, etc.

The importance of innovation for economic growth is also widely recognized in scientific literature. From the time of Schumpeter (1932), the process of industrial innovation has been seen as important to the economy. The importance of innovation activities were recognized as important determinant for economic growth within models of Romer (1986, 1990) and Stokey (1995), Mansfield (1980), Maryska, Doucek and Kunstova (2012), Delina and Tkac (2010), Sudzina, Pucihar and Lenart (2012), Vajda and Delina (2009), Dorčák and Delina (2011) and Maxwell (2009). The importance of innovation measurement for achieving economic performance was analyzed by Gavurová (2012).

Trust is also considered as especially problematic in the field of innovations (Nooteboom, 2013). One needs trust under uncertainty and in innovation uncertainty is high. If one were certain about conditions, conduct and outcomes one would no longer talk about trust. This is related to a paradox of information concerning trust (Pagden, 1988). Trust is needed in situation, where high risk appears and if it is uncertain about actions which can be vulnerable to actions of other. But on the other hand, trust is seldom completely uninformed, and is to some extent based on information, in attributions of trustworthiness or lack of it based on observed or reported behavior. Electronic trust significance for economic development was recognized in Delina (2011).

## 2 METHODOLOGY

According to several studies mentioned above, the trust seems to be one of the most crucial factors of economic and social development. Together, innovation and its implications for economic development were also broadly studied and generally we can accept the causality where innovation is a driver for economic development and prosperity. Although, the role of trust, within this innovation-economic growth relation, is still underestimated and it requires deeper research. That's why we would like to examine problematic relations between innovation, trust and prosperity on the country based data. As trust is needed under uncertainty and innovation as a process is highly uncertain we will assume that trust is the driver for innovation which will have synergic effect on prosperity.

Our analysis is then focused on the (causal) relations between trust, innovation and prosperity country based indexes with special attention on the role of trust as assumed basic driving factor. The research methodology is then based on examining related data through basic correlation tests and knowledge discovery techniques to identify some causal directions between examined indexes.

As the research is based on trust, we have to accept present status of trust related data availability. We assume that trust related to innovation acceptance and adoption is based on non-institutional trust. That's why we use interpersonal trust country based data provided by The World Values Survey (WVS). It is the most commonly used cross-country survey to measure interpersonal trust. The WVS measures interpersonal trust relying on the question developed by Rosenberg (1956): "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" (WVS, 2009). For the prosperity issues, we use the basic and most commonly used concept of GDP per capita. GDP per capita can be taken as a measurement for the prosperity of countries (Schuller, 2013). Although, some studies argue, that prosperity is more than GDP. According to Webster's dictionary (2009) the prosperity is the state of flourishing, thriving, good fortune and/or successful social status. Prosperity is often considered as wealth but also includes others factors, such as happiness and health. For our purpose to avoid subcomponents related to innovations which is our third examined field, we will accept the most common wealth concept expressed as GDPpC. To enhance our model, we will involve also Gini index as socio-economic feature. Gini index is a measure of statistical dispersion intended to represent the income distribution of a nation's residents [The World Bank]. Together, we have used some Global Competitiveness Index (GCI) subcomponents according to interpretation from World Economic Forum. All data from surveys are related to specific examined year according to interpersonal trust survey.

According to our motivation mentioned above we will formulate working hypothesis as "*Interpersonal trust is the key driver for innovation and prosperity.*"

It should support finding answers on our working question:

*How is the role of trust in supporting innovation and prosperity. Is trust more significant for prosperity or for innovation development?*

For our research, the interpersonal trust data are the most crucial and most limiting factor. Interpersonal trust data are provided only by World Values Survey and these surveys are realized sporadically with nonhomogeneous sample (different surveys contain different countries). Although, we have to accept these limitations as similar data are not possible to obtain from another sources.

Within research assumptions and for the purpose of analyzing our working questions we will use correlation tests for significance of the relations between examined indexes. It means, we have to test normality inside the sample by Shapiro-Wilk test. According to results of Shapiro-Wilk test (Table 1) we cannot reject normal distribution or set unique correlation methods for a whole sample. That's the reason we will use for correlation test both parametric and non-parametric tests.

*Table 1 Normality test*

Index	Shapiro-Wilk Statistic	
	Stats	Sig.
GCI 9th pillar: Technological readiness, 1-7 (best)	.811	.099
GCI Innovation and sophistication factors, 1-7 (best)	.890	.355
GCI 11th pillar: Business sophistication , 1-7 (best)	.976	.912
GCI 12th pillar: Innovation, 1-7 (best)	.907	.448
Interpersonal trust in year t	.932	.612
GCI Basic requirements 1 7 (best)	.975	.906
GCI 3rd pillar: Macroeconomic environment, 1-7 (best)	.982	.945
GCI B. Quality of education, 1-7 (best)	.857	.218
GCI B. Trustworthiness and confidence, 1-7 (best)	.995	.995
GINI 3y_bef	.907	.449
GINI 2y_bef	.847	.186
GINI 1y_bef	.917	.509
GINI current	.858	.221
GINI 1y_after	.903	.428
GINI 2y_after	.866	.249
GINI 3y_after	.870	.267

### 3 RESEARCH RESULTS

According to Table 2, correlation tests reveal strong relations between interpersonal trust and almost all indexes. According to values, the strongest relations related to our research problem exist between innovation vs. GDPpC and trust vs. innovation. It is stronger that between trust and GDPpC. Interesting is also the fact, that GINI is correlated significantly only with trust and

technological readiness. It means, it can be explanatory parameter to all examined fields (trust, innovation and prosperity).

Table 2 Partial correlation matrix between examined parameters

	Interpersonal trust in year t		Macroeconomic environment		Technological readiness		Business sophistication		Innovation	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
<i>Interpersonal trust in year t</i>	1	1.00	.34	.35	.62	.55	.54	.50	.67	.60
			.00	.00	.00	.00	.00	.00	.00	.00
<i>Basic requirements</i>	.60	.54	.51	.55	.87	.84	.84	.84	.82	.82
	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
<i>Macroeconomic environment</i>	.34	.35	1	1.00	.35	.41	.30	.36	.30	.40
	.00	.00			.00	.00	.01	.00	.01	.00
<i>Quality of education</i>	.57	.57	.38	.43	.84	.85	.80	.79	.79	.79
	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
<i>Technological readiness</i>	.63	.56	.35	.41	1	1.00	.85	.84	.83	.80
	.00	.00	.00	.00			.00	.00	.00	.00
<i>Innovation and sophistication factors</i>	.62	.60	.33	.39	.87	.85	.96	.96	.95	.93
	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00
<i>Business sophistication</i>	.53	.50	.30	.36	.85	.84	1	1.00	.91	.89
	.00	.00	.01	.00	.00	.00			.00	.00
<i>Innovation</i>	.67	.60	.30	.40	.83	.80	.91	.88	1	1.00
	.00	.00	.01	.00	.00	.00	.00	.00		
<i>GDP per capita (current US\$) current</i>	.58	.50	.38	.41	.81	.90	.69	.76	.70	.73
	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINI 2y_bef	-.26	-.25	-.03	.06	-.32	-.38	.19	.20	.00	-.11
	.23	.25	.89	.79	.17	.09	.43	.39	.98	.66
GINI 1y_bef	-.36	-.33	-.19	-.15	-.48	-.48	-.01	.03	-.15	-.11
	.05	.09	.36	.46	.01	.01	.94	.90	.47	.60
GINI current	-.31	-.34	.15	.18	-.18	-.22	.22	.20	.12	.05
	.05	.02	.36	.26	.26	.17	.17	.21	.46	.76
GINI 1y_after	-.27	-.30	-.15	-.08	-.55	-.66	.16	.19	-.12	-.24
	.29	.25	.59	.78	.03	.01	.55	.47	.65	.38
GINI 2y_after	-.49	-.35	-.63	-.64	.21	.29	.41	.52	.03	-.19
	.15	.33	.09	.09	.62	.49	.32	.18	.95	.65

First value: Strength of test, Second value: Significance

To identify causalities between Innovation and related input parameters, we have used decision tree techniques based on C5.0 algorithm using SPSS Clementine.

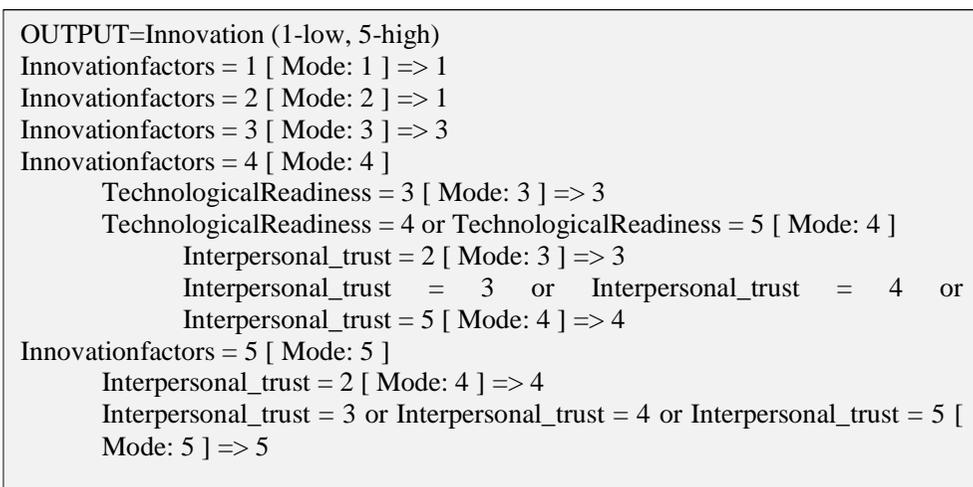


Figure 1 Decision tree model for Innovation driving factors

On following Fig.1, we see the evidence, that for achieving higher innovation (it was binned into 5equal intervals), higher innovation factors (4<sup>th</sup> and 5<sup>th</sup> quantile)

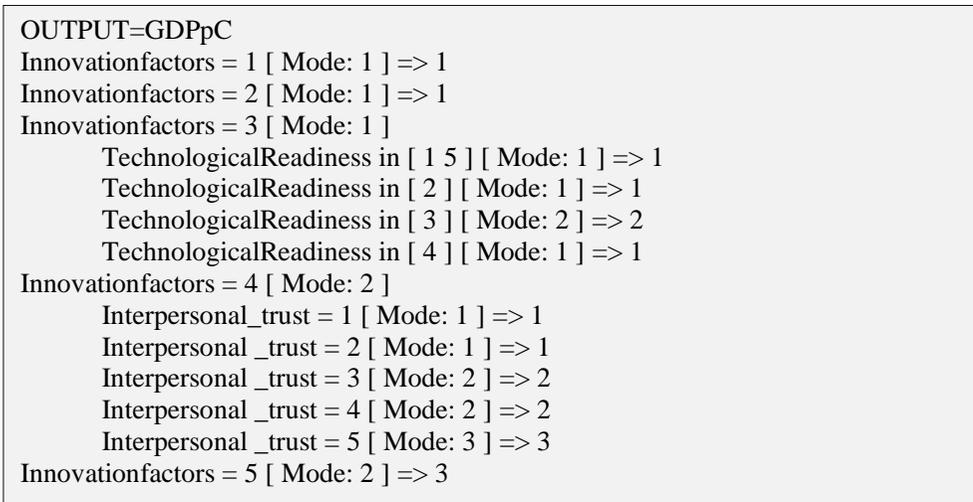


Figure 2 Decision tree model for GDPpC driving factors

Support through the trust between people (interpersonal trust) is necessary. It can be explained as, for achieving innovation as uncertain factor, we have to trust between us to accept this innovation and support their development and exploitation.

For identifying relations between prosperity presented by GDPpC and all other input parameters, we also see that higher GDPpC (4th and 5th interval) is supported by higher level of innovation factors which is built by interpersonal trust. It means, higher trust leads to higher innovation factors for achieving higher GDPpC although in the highest GDPpC interval the trust didn't appear.

#### **4 CONCLUSION**

According to our research, we have identified that trust between people plays a significant role for achieving prosperity through innovation as intermediary parameter. It helps to answer on recent debate of the role or position of trust in economic growth or prosperity in relevant countries. We are aware about research constraints resulting from nonhomogeneous sample, but due to insufficient survey in this field we have to accept these limitations. On the other hand, on the base of our results we can assume, that interpersonal trust seems to be very crucial for innovation much more then directly to economic growth as it was presented by several former studies mentioned above.

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