MARKETING INNOVATIONS AT THE FUNCTION OF INSTITUTIONAL DEVELOPMENT: A CASE OF RESOURCE CONSTRAINTS

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Abstract
Existing literature gives a considerable significance to the role of innovation capacity and modern marketing tools as major drivers of firm performance. Marketing, organizational and technological capabilities often demonstrates high efficiency being complement each other in achieving strong competitiveness of the enterprise at domestic and world market. It is well known that a problem of resource constraints is typically faced by majority of enterprises at transitional economies.
The shares of public funding (central governments, local and regional authorities or international institutes and funds) in R&D and innovation expenditures as well as number of public – private partnerships in science, technique and innovation area are considerable less in transitional economies comparatively with EU, USA and other developed countries. Taking into consideration scarcity of internal resources under the conditions of global economic non - stability and permanent crisis symptoms, low interest and weak stimulus to invest funds into R&D, renovation of technology and new products, the alternative drivers of enterprises' performance are take on special significance.
The goal of the paper is being based on dataset of Eurostat and Ukrstat (Statistic Service of Ukraine) to compare the role of technological and non-technological (marketing and organizational) innovations in EU countries and Ukraine. In additional to this, the problem of special interest raised in the paper is in which extent technological and non-technological (marketing and organizational) innovation may substitute each other as drivers of economic performance. The main attention we pay to the role of marketing innovations.
In conclusion we ground that marketing (and organizational) innovations and technological innovations may be considered as substitutes under the condition of weak institutional environment, and as complementary phenomena under the condition of well-developed institutional environment.
Marketing (and organizational) innovations are the short term effective instrument to: a) ensure the enterprise performance under the resource constraints caused by global crisis effects; b) reinforce the competition as a market institute; b) contribute to overcome the restrictions to growth caused by institutional disbalances and unfavorable institutional environment at transitional economies. However the institutional reform at transitional and emergence economies aimed to transform the system of relationship concerning property rights, for encourage the enterprises to realize the long-term investments in R&D as well in equipment and technology renovation is of high importance as long-term period measure.
Key words: *Technological Innovation, Marketing Innovation, Organizational Innovation, Resource constraints, Institutional environment, Transition Economies.*

JEL Classification: O 043; O 057 ; M 31;
Review
Received: April 08, 2012 / Accepted: June 22, 2012

1. Introduction

Radical changes in society during the second half of the XX century led to changes in global economic paradigm. General slowdown in economic growth, increasing the instability of national economies associated with the formation of the global business cycle, transformational recession of 90-s in post-socialist countries made it necessary to switch to an innovative type of

economic development. G. Mensh (1997) convincingly proved that innovations are the main condition for overcoming the crisis at the national and global levels Innovations make possible systematically overcome resource constraints, intensify economic growth by providing human resources and technology of new generation.

Innovative development is a continuous and gradual, although its activity varies in different phases of the cycle. Global innovation development becomes an integral quality characteristic of the modern type of economic development (Kuzyk, Yakovets, 2009; Ivanova, 2009). Under the type of the development Russian researcher A. Fonotov (2010, p. 84) understands clearly traceable historical trend associated with sustained response to the needs and conditions of society. These requirements and conditions are perceived clearly defined for this type of way, which being allocated in particular public institutions, playing through these institutions, causing the system behavior under the new circumstances. At the heart of an innovative type of development is a continuous process of developing and implementing innovations that can improve the efficiency of production and living standards.

An innovative type of economic development requires an adequate institutional basis, which provides the formation of motives and conditions for the creation of innovations, mechanisms of their implementation in practice, effective use and diffusion of innovations. In terms of institutional imbalances in transition countries, increased economic uncertainty and competition in the global and local markets is of particular relevance introduction of less expensive non-technological innovations, including marketing and organizational ones.

We advance the hypothesis on complementary nature of technological and non - technological (marketing and organizational) innovation and in countries with strong institutional environment. Also we advance the hypothesis that marketing and organizational innovations are the substitutes of technological innovation mostly in the countries with relatively weak institutions.

2. Reasons that hamper innovation: the resource constraints

The study of recessions and recoveries in 21 advanced economies at the period from 1960 till present carried out by IMF economists M. Terrones, A. Scott, P. Kannan (World Economic Outlook. Crisis and Recovery, 2009), has revealed not less than 112 recessions, 234 falls on stock markets, 112 cases of credit constraints. Since 1975 there were four global recessions (1975, 1982, 1991-1993, 2008-2009). Due to economic shocks increase resource constraints and the problem of financing research and development at the global level that inhibits innovation development.

According to EU Industrial R&D Investment Scoreboard (2010), the expenses in R&D of 1400 leading companies reduced by 1,9% in 2009 comparatively the previous year. Such an absolute reduction was held for the first time in last decade. Financial difficulties during the global economic crisis led to a reduction in spending on R&D of 100 companies - the world's leading innovators of 3,7% over the year 2008 (Jaruzelski et al., 2011, p. 3). The study of the influence the global recession on the dynamics of innovation expenditure in the EU - 27 demonstrated that in 2008 the innovative cost reduction made 25% of companies, and in 2009 the number of such companies increased to 30% (The Impact of the Economic Crisis on Innovation, 2009).

In 2009-2010 compared with 2001-2002 the share of R&D expenditures in GDP reduced in Israel, Sweden, Iceland, France, Belgium, Netherlands, Canada and Russia. In 2009 the percentage of R&D expenditures in GDP of OECD countries averaged 2,33%; for the EU-27 countries it was 1,84%; for China 1,7%; for the Russian Federation 1,24% (OECD Factbook, 2011). The share of R&D expenditures in GDP of Ukraine was 0,86% in 2009 and declined to 0,82% in 2010. The total R&D expenditures of Ukrainian enterprises decreased in 2009 by 14,3% over the previous year (Ukrstat, 2010). Thus, the problem of resource constraints faced by companies of advanced countries and transition economies.

The author has summarized information on the causes that hampered the innovation activity of enterprises, according to the Community Innovation Survey (CIS-5) for 22 countries surveyed with the international methodology in 2006 (Table 1).

Table 1: Reasons that hamper the enterprises innovation activity, 2006
(% of the enterprises with technological innovations)

Countries	*Lack of funds within the enterprise or enterprise group*	*Lack of finance from sources outside the enterprise*	*Innovation costs too high,*	*Lack of qualified personnel*	*Lack of information on technology*	*Lack of information on markets*	*Difficulty in finding cooperation partners for innovation,*	*Markets dominated by established enterprises*	*Uncertain demand for innovative goods or services*	*No need to innovate because no demand for innovations*
Bulgaria	0,20	0,16	0,24	0,11	0,06	0,07	0,08	0,11	0,11	0,05
Czech Republic	0,22	0,13	0,17	0,14	0,03	0,01	0,02	0,15	0,07	0,01
Germany	0,20	0,15	0,15	0,24	0,03	0,03	0,04	0,09	0,03	0,03
Estonia	0,19	0,13	0,17	0,09	0,04	0,05	0,07	0,15	0,13	0,05
Ireland	0,19	0,15	0,08	0,27	0,29	0,34	0,18	0,25	0,24	0,24
Greece	0,26	0,24	0,33	0,15	0,10	0,07	0,17	0,19	0,17	0,05
Spain	0,19	0,18	0,28	0,14	0,07	0,03	0,07	0,08	0,15	:
France	0,27	0,24	0,35	0,19	0,10	0,02	0,13	0,23	0,18	0,01
Cyprus	0,24	0,20	0,30	0,26	0,01	0,05	0,09	0,18	0,08	0,02
Latvia	0,14	0,05	0,11	0,19	0,02	0,02	0,07	0,15	0,11	0,05
Lithuania	0,27	0,18	0,28	0,13	0,02	0,02	0,07	0,14	0,13	0,01
Luxembourg	0,11	0,11	0,15	0,08	0,03	0,04	0,07	0,11	0,12	:
Hungary	0,09	0,03	0,08	0,06	0,01	0,01	0,20	0,05	0,04	0,09
Malta	0,20	0,15	0,17	0,15	0,02	0,03	0,07	0,13	0,08	0,04
Netherlands	0,27	0,23	0,28	0,06	0,03	0,05	0,09	0,15	0,15	0,05
Austria	0,25	0,26	0,35	0,12	0,04	0,07	0,11	0,14	0,16	0,05
Poland	0,29	0,29	0,27	0,12	0,06	0,04	0,15	0,17	0,12	0,03
Portugal	0,19	0,15	0,21	0,10	0,02	0,02	0,06	0,13	0,07	:
Romania	0,14	:	0,10	0,16	:	:	:	0,13	:	:
Slovakia	0,14	0,07	0,16	0,12	0,02	0,02	0,02	0,05	0,05	0,01
Sweden	0,34	0,28	0,34	0,19	0,07	0,06	0,09	0,16	0,07	0,04
Norway	0,26	0,17	0,33	0,18	0,08	0,07	0,09	0,13	0,15	0,06

: no data

Source: Eurostat

The data revealed that the main reasons that hinder innovation, is the limited financial, human and information resources.

On the lack of own funds as a key barrier to implementation of innovations reported 26,82% firms in Portugal, 25,7% firms in Spain, 21% firms in Austria, 18.9% in Cyprus, 18,5% in Ireland and 15,5% in Sweden. For the "new" EU members such share is: 35,86% in Croatia, 30,6% in Romania, 28,92% in Latvia, 28,82% in Latvia and Poland, 21,86% in Czech Republic, 21.62% in Estonia, 25.1% in Lithuania. Insufficient funding from external sources is significant barrier for innovation activity for companies in Spain, Latvia, Poland, Portugal, Romania, Croatia. Lack of qualified personnel, high cost of innovation, high level of competition in the market, lack of demand for innovation, lack of information about technologies and markets also reduce the

level of innovation activity of enterprises in surveyed countries.

The problem of limited funding innovation arises in front of the former USSR countries. The lack of own funds as a key reason for the low innovation activity in 2009 indicated 39,1% of enterprises in the Russian Federation (Индикаторы инновационной деятельности: 2010, с. 423-424) In Ukraine, 44% of enterprises reported on limited funding as the main factor that prevents the introduction of advanced technologies.

Implementation of marketing and organizational innovations can partially solve the contradiction between the limited resources of enterprises and the need for innovation in business activities.

3. Methodology of research the marketing and organizational innovations

Despite the fact that innovation has traditionally been considered primarily in the technological context, we found reference to innovative marketing and organizational solutions in J. Schumpeter (1934). He treated innovation as a new scientific - and - organizational combination of production factors, and linking innovation with new or improved solutions not only in engineering and technology but also in the organization of production, distribution and supply processes.

However, the first fundamental research in this area belongs to T. Levitt, who in 1962 studied the possibility of growth the profit through marketing innovation. Levitt pointed to the underestimation of marketing innovation, stressed the importance of new marketing techniques for business and first proposed the concept of «marketing R&D» - research and development in the marketing field.

During the following decades, marketing and organizational innovations paid enough attention. Only in the first half of XXI century the research work appeared which has been expanded beyond the definition of innovation to include not only practices and market recognized product and technological innovations, but also marketing innovations. G. Reketty (2003) developed the concept of T. Levitt. He studies not only the combinations of product and marketing innovation, but also exclusively marketing innovations (marketing - mix - related type innovations) as a result of R&D aimed at creating new marketing solutions and marketing tools.

G. A. Moore (2004) proves the focus of marketing innovations to meet customer needs through innovative tools of communication (promotion) and marketing, such as e-commerce Amazon, on - line auctions e-Bay, and promotions on the Internet. The most appropriate use of marketing innovation, in his opinion, is possible at the stage of maturity and decline in product life cycle.

Marketing innovation is considered by Y. Chen (2006) in a double perspective: as such, giving the firm to effectively communicate with consumers, and reduce transaction costs.

T. Davila, M. Epstein and R. Shelton in their book “Making Innovation Work” (2006) consider the changed business models of companies as non - technological innovation that combines the features of organizational and marketing one to get the maximum value and emphasize the fact that technological and non - technological innovation go hand in hand and have taken and performed as an integrity.

The emergence of new forms of interactions between enterprises and within the organizations, particularly under the influence of globalization, the development of innovation in services, changes in the structure of society's needs led to formal recognition of marketing and closely associated with it organizational innovation by including it into the Third edition of the "Oslo Manual" (2005). A marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. Marketing innovations are aimed at better addressing customer needs, opening up new markets, or newly positioning a firm’s products on the market to increase sales (Oslo Manual, 2005, p. 49-50).

In its turn, an organizational innovation is the implementation of a new organizational method in the firm’s business practices, workplace organization or external relations as a result of strategic management decisions (Oslo Manual, 2005, p. 51). Organizational innovations inclu-

de the implementation of teaching methods and staff training, new systems of key business processes (supply chain management, business restructuring, and quality management), new methods of interaction with other enterprises or the state, outsourcing and more. In borderline cases it is difficult differ marketing and organizational innovation. If an innovation has characteristics of both types of innovation, then it is both marketing and organizational one. In our work we refer to marketing innovation in the broadest sense following non - technological innovations:

- marketing innovation an
- innovation that is both marketing and organizational.

Non - technological (marketing and organizational) innovations closely combined and interact with technological (product, process) innovations being generate the synergic effect. Using G. Reketty approach to distinguish technological and non-technological (marketing, organizational) innovations we suggest a matrix (Table 2), which contains four feature combination criteria of novelty product (service), as well as organizational and marketing tools that implemented in the firm's business - model or into the marketing mix:

- technology-oriented organization and / or marketing innovation;
- organizational and / or marketing innovation only;
- technological innovation only;
- non-innovative product (service).

Table 2. Matrix "technology innovation - organizational and / or marketing innovation"

		Business - model or a combination of marketing and organizational innovations	
		New	Not new
Product (service) / technology (process)	New	Technology (product or process) oriented organization and marketing innovation	technological innovation only
	Not new	organization and marketing innovation only	non-innovative product (service).
		Marketing Mix elements	
		Нові	Не є новими
Product (service) / technology (process)	New	Technology (product or process) oriented marketing innovation	technological innovation only
	Not new	marketing innovation only	non-innovative product (service).

Source: Author

So the statement on complementary disposition of technological (product and process) and non - technological (organizational and / or marketing) innovation may be done.

However, study more than 700 German companies allowed the team of researchers from the Universities of Oakland, Pittsburgh (USA), Copenhagen (Denmark) and Tilburg (Netherlands) suggests that non - technological (including marketing) and technological innovations are not only complementary phenomenon. In some case it may replace each other, being treated as a substitute. This assumption is important for start-ups, or financially unstable companies experiencing significant resource constraints, under the global recession and after-crisis instability (Bhargava et.al, 2011).

Marketing innovations are less expensive than technological innovation, so companies use is appropriate, particularly in periods of financial instability. Joint use non-technological and technological innovation enhances the effect of technological innovation on providing enterprise with competitive advantage based on a new market offerings and / or new technical - technological basis. Changing the modern companies business - models toward targeting concept of value

creation for customers and partners (stakeholders), reduce innovation budgets and cost of traditional marketing tools, including advertising, caused the increasing role of marketing innovations in a complex of measures aimed at achieving market goals.

4. The EU experience of implementation the marketing and / or organizational innovation

A study of innovative activity and implementation of marketing and organizational innovations in the EU and Croatia, Turkey, Iceland and Norway, conducted by the author according to the Community Innovation Survey (CIS-6) Eurostat data, showed the following.

The percentage of innovative enterprises in total number of surveyed EU companies is 51,6%. The highest share of innovative enterprises have Germany (79,9%), Luxembourg (64,7%), Belgium (58,1%), Portugal (57,8 %) and Ireland (56,5%). The lowest share of innovative enterprises have Latvia (24,3%), Poland (27,9%), Hungary (28,9%), Lithuania (30,3%) and Bulgaria (30,8%). Mostly innovative are the enterprises with more than 250 people (78,8%). In the group of enterprises with employees from 10 to 49 people only 47,7% are innovative.

In Ukraine the international methodology CIS-6 for examine innovative activity of enterprises was implemented in 2009. Revealed percentage of innovative enterprises was 18% (Ukrstat, 2010).

Data on the percentage of innovative enterprises that implement organizational and marketing innovation is given in Table 3.

Percentage of firms introducing marketing and organizational innovations in the total number of innovative enterprises has increased significantly during 2004 - 2008. Most active in implementation of marketing and organizational or marketing innovations only are: Belgium (respectively 45,0% and 29,5%), Czech Republic (47,0% and 35,6%), Germany (69,0% and 55,7%), and also Cyprus, Luxembourg, Iceland. Fall behind Bulgaria, Latvia, Lithuania, Hungary, Poland. These countries are also behind in terms of overall innovative activity of enterprises.

Companies employing 250 or more persons are the most active in implementing organizational and / or marketing innovations. While the share of firms that introduce organizational and / or marketing innovations is close to industrial and service sectors.

The research value of various new marketing methods for companies in different countries has shown the advantage of changes in design and packaging and new methods of promotion. Thus, significant changes in design and packaging are actively implementing more than 50% of innovation active enterprises Belgium, Bulgaria, Estonia, Ireland, France, Italy, Cyprus, Latvia, Lithuania, Malta, Austria, Portugal and Romania. New methods of promotion used by enterprises most countries, including 60% of innovation active enterprises Belgium, 72,4% of enterprises of the Czech Republic, 59,2% of enterprises Ireland, 73,5% of enterprises of Cyprus as well as enterprises Luxembourg, Malta, Netherlands, Portugal, Poland, Slovenia, Slovakia, Finland. Less common are new methods of distribution and pricing.

As to the reasons for the implementation of marketing innovations the following result was obtained. The most important is the drive for increase or maintain market share. This goal pursued by more than 50% of innovative enterprises of all countries, except Germany (24,2%), Spain (44,5%), Bulgaria (38,9%) and Lithuania (38,0%). Hungary's rate is 92,7%, Slovenia's is 86,0%. Reaching new groups of consumers by introducing marketing innovations attempting to 78,0% of total number of enterprises in Hungary, 74,2% in Slovenia, 61,1% in Austria, 60,0% in Ireland and Romania, 59,6% in Cyprus, 52,6% of enterprises in Finland, 51% of firms in Portugal. Entry into new geographical markets through the use of new marketing methods declared 40,1% of innovative enterprises in Slovenia, 35,8% enterprises in Portugal, 35,5% enterprises in Luxembourg, 32,3% enterprises of companies in Austria, 35,1% of enterprises in Ireland.

An important aspect is the wide implementation of marketing and organizational innovations by enterprises with technological innovation, compared with companies without technological innovation. For most EU countries the share of firms with technological innovation in the total number of firms that introduced organizational and / or marketing innovations typically is about 70 - 80%. This pattern confirms the assumption about the complementary nature of technologi-

cal and non-technological innovations and synergic result of their interaction. At the same time the percentage of firms with technological innovation in the total number of firms that implemented organizational and / or marketing innovations is lower in the "new" EU member states: Romania (49,7%), Poland (59,3%), Hungary (61,7%). For Ukraine this figure is 51,4%. The share of innovative enterprises with non-technological (organizational, marketing) innovation only, without technological innovation in these countries is higher. So the non-technological innovation substitutes technological innovation in emerging and developing economies. Non-technological innovation alone can not create long-term conditions for innovation development. They perform the crucial function in the innovation-oriented economy when operating in conjunction with technological (product, process) innovation, and enhance its effect by the effective commercialization of innovations, implementing new technology or product in a progressive business model, reducing transaction costs etc.

Table 3: Implementation of marketing and / or organizational innovation (share of firms in% of innovation active enterprises)

	Marketing and / or organizational innovation		*Organizational innovation only*		*Marketing innovation only*	
Countries	*2004*	*2008*	*2004*	*2008*	*2004*	*2008*
EU-27	26,2	40,1	23,9	31,0	13,1	26,6
Belgium	36,1	45,0	29,9	35,3	20,0	29,5
Bulgaria	8,4	18,4	6,6	15,2	6,2	10,5
Czech Republic	26.6	47,0	24,1	34.0	14,9	35,6
Denmark	42,1	41,5	39.4	33,3	15,9	28,8
Germany	47,0	69,0	42,3	50,3	21,8	55,7
Estonia	35,1	35,2	30,0	25,5	20,6	23,2
Ireland	36,3	42,6	33,5	32,3	19.2	27,0
Spain	20,9	30,9	19,7	27,0	8,6	15,5
France	23,1	39,8	20,0	33,8	12,0	21,0
Italy	21,3	41,2	19,0	31,1	11,2	27,1
Cyprus	34,5	48,0	27,4	39,0	23,8	33,0
Latvia	-	14,9	-	10,0	-	11,0
Lithuania	19,9	22,6	16,8	17,5	10,5	17,8
Luxembourg	42,7	54,6	39,5	45,0	23,7	35,1
Hungary	12,7	21,7	10,3	14,6	7,7	15,4
Malta	14,4	26,9	11,9	18,9	9,2	18,1
Netherlands	19,5	29,9	16,4	21,3	9,5	18,3
Austria	39,9	44,3	36,3	34,9	22,1	27,3
Poland	17,3	20,0	14,2	14,1	12,7	13,9
Portugal	29,7	44,5	27,0	36,2	15,4	30,8
Romania	13,8	26,8	5,7	20,8	1,0	19,8
Slovenia	-	41,2	-	29,8	-	29,9
Slovakia	14,1	29,7	12,5	20,1	6,9	20,1
Finland	-	33,0	-	24,7	-	21,7
Sweden	-	38,0	-	28,7	-	24,0
United Kingdom	-	31,5	-	27,6	-	17,8

- no data
Source: Eurostat

As shown above, the enterprises of advanced countries has complementary model of technological and non- technological innovation. Enterprises in post-socialist countries are more active in implementation the organizational and marketing innovation without technological innovation.

5. Influence of institutional environment on enterprises' innovative activity

Investigation of the role of technological and non-technological (marketing and organizational) innovations in advanced and transition economies should consider the conditions through the prism of the institutional environment.

Researchers V. Vishnevsky and V. Dementyev (2010) note that resource constraints, including financial constraints are the external causes that hinder the implementation of technological innovations, particularly in Russia and Ukraine. Based on the contribution of Nobel laureate Douglas North (1990), who described the mechanism of conservation of technological backwardness under inefficient institutions, V. Vishnevsky, V. Dementyev, V. Polterovich, I. Rozmainsky, O. Sukharev prove that in the post-soviet countries an economic order which makes resistance to innovation has been formed. Studies of such kind of economic order's specific features with institutional theory tools prove that the institutes formed as a result of the 1990s transformational reforms are ineffective in the innovation context.

The lack of effective demand for innovation by enterprises researchers explain by the concentration of economic power in the hands of individuals and their families (Rozmainsky, 2004). Private economic power is the most valuable resource, which gives the owner the possibility of obtaining rental income and provides greater returns than investment in innovation. Another reason for lack of interest of business owners to invest in innovation is the inability of the state to protect property rights and the rule of the so-called "short rules" as a factor of economic life. It provokes the dominance of short-term interests and "investment myopia". Competition for new technologies and quality products is replaced by competition for sources of power (Vishnevsky V., Dementyev V., 2010, c. 47-48). One way to gain share of "power resources" is a corruption, as well as "investments in power" by financing of political parties, promote their own representatives in government structures and others. The result of such a state was a lagging behind a number of post-socialist economies of the developed countries.

Although the institutional barriers to innovative development manifest themselves to the greatest extent in countries with weak institutions, Douglas North points out that such a problem presents in the advanced economies too (North, 1990). The Report on Competitiveness prepared by the European Commission argues that the gap in levels of productivity, innovation activity and the overall competitiveness of European producers compared to the U.S. producers caused mainly by institutional conditions that hamper diffusion of innovations, as well as by differences in the strategic behavior of companies (European Competitiveness Report, 2001).

The increased competition requires that firms create the competitive advantage of innovative character. Marketing and organizational innovations are less costly and may be an alternative to technological innovation in countries with weak institutions as well as to serve as substitutes of technological innovation.

We formulated the assumption that in countries with developed institutional system that promotes innovation, the technological and non technological innovations create mainly a complementary model. In countries with weak institutions and technological and non technological innovations mainly act as substitutes.

To confirm the hypothesis we investigated the correlation between the percentage of enterprises that implemented marketing and organizational innovations (with technological innovation and without it) in total number of enterprises in the country and sub-indexes "Institutional environment" as part of the Global Innovation Index which is calculated annually by experts of Lausanne business school INSEAD, Switzerland (Global Innovation Index – 2009-10, INSEAD, 2010).

The correlation coefficient values for sub-indexes "Institutional environment" and the percentage of innovative enterprises, including of marketing and organizational innovations in the total number of enterprises in EU-27 countries, Iceland, Norway, Croatia and Ukraine, for 2008 was calculated.

The correlation coefficients between the sub-indexes "Institutional environment" (Xi), and the percentage of innovative enterprises (Yn1), percentage of enterprises with marketing and organizational innovation (Yn2), percentage of enterprises that implemented marketing and organizational innovations with the technological innovation (Yn3), in total number of enterprises are the same:

Quantities	XiYn1	XiYn2	XiYn3
Correlation coefficients	0,61	0,50	0,57

The result demonstrates a satisfactory positive correlation between Xi and Yn1, Yn2, Yn3. To substantiate the hypothesis about the impact of institutional environment on the parity of technological and non-technological (marketing and organizational) innovations, the regression analysis using the package of Microsoft Excel was conducted.

According to the methodology set out in (Taranenko I., Taranenko Yu., 2011) found that in the regression model the best result (maximum coefficient R^2) for Yn1, Yn2, Yn3 is achieved for degree trends. These regression equations of degree trends:

$$Yn1 = 1{,}9223 * Xi^{1{,}9179} \quad (1)$$
$$R^2 = 0{,}5187$$

$$Yn2 = 1{,}3656 * Xi^{1{,}9437} \quad (2)$$
$$R^2 = 0{,}4091$$

$$Yn3 = 0{,}2781 * Xi^{2{,}6864} \quad (3)$$
$$R^2 = 0{,}5154$$

Examination the regression equations with Fisher's test (F-test) according to the method disclosed in (Taranenko I., Taranenko Yu., 2011) proved that all equations are adequate. The graphic images of dependences obtained are represented at Fig. 1a, 1b, 1c.

Figure 1a: Dependence of the percentage of innovative enterprises in total number of enterprises Yn1, on the index "Institutes" Xi, the degree trend

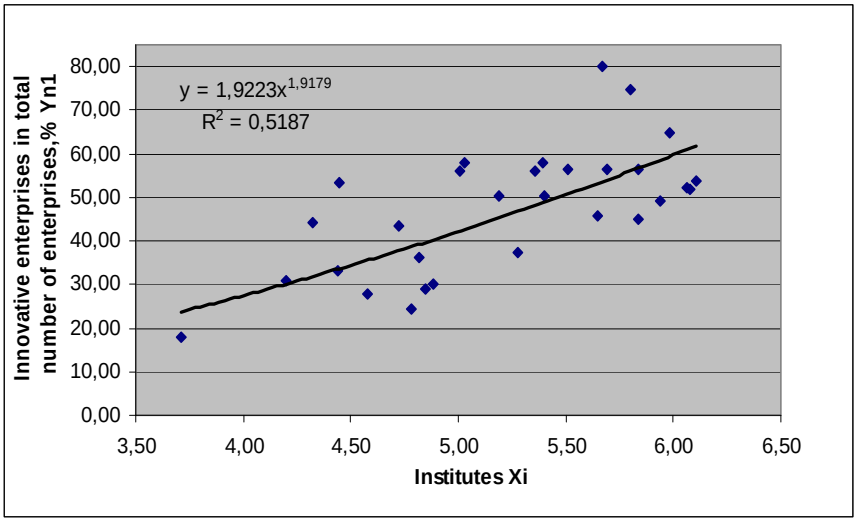


Figure 1b. Dependence of the percentage of enterprises with marketing and organizational innovation in total number of enterprises Yn2, on the index "Institutes" Xi, the degree trend

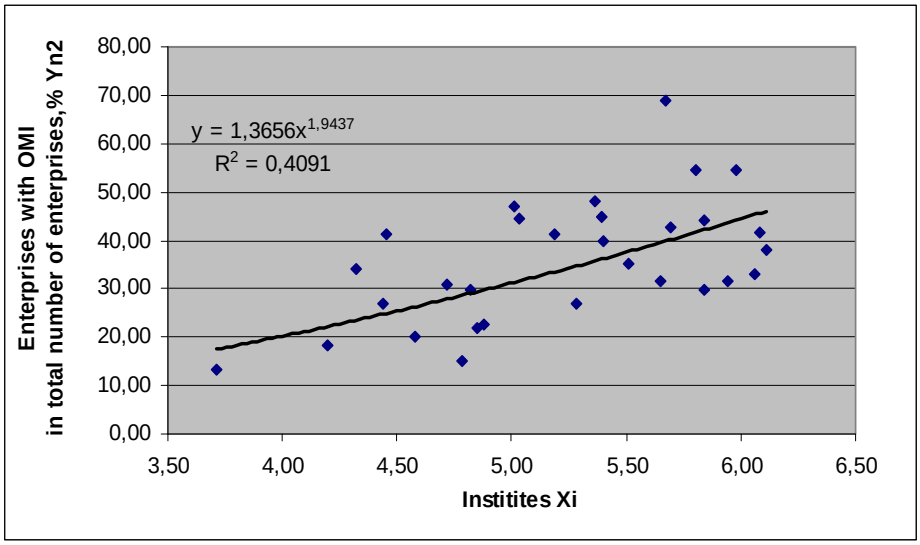
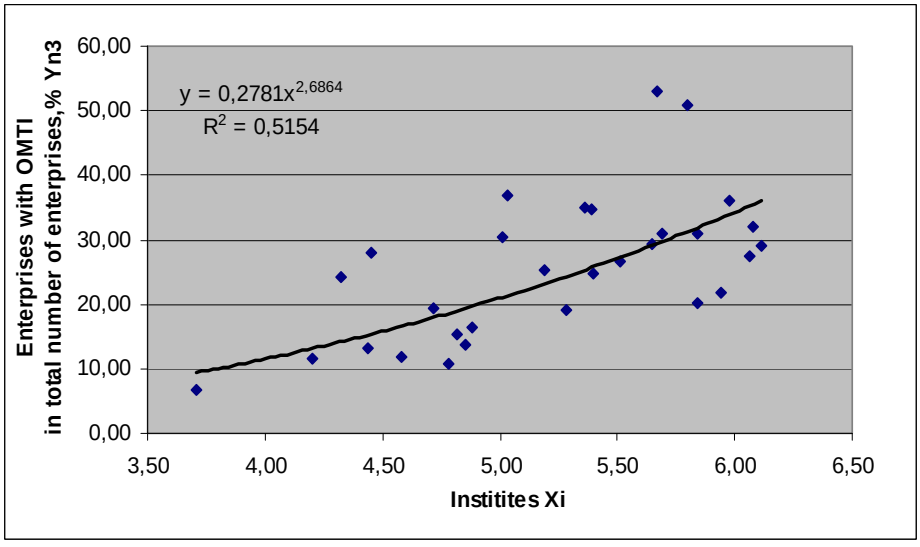


Figure 1c. Dependence of the percentage of enterprises with marketing and organizational innovation that have a technological innovation in total number of enterprises Yn3, on the index "Institutes" Xi, the degree trend



As we move from the countries with low index "Institutes" rates to the countries with high index "Institutes" rates the percentage of innovative enterprises, enterprises with marketing and organizational innovation, and firms that implement marketing and organizational innovation with technological innovation in the total number of enterprises increase steady.

The equations' coefficients and R^2 values indicate the strongest influence of institutes on the percentage of enterprises that implemented marketing and organizational innovations simultaneously with technological innovation in total number of enterprises (equitation 3), comparatively to the percentage of enterprises with marketing and organizational innovations regardless the technological innovation (equitation 2). This result supports the hypothesis of complementary nature of technological and non-technological innovation in countries with developed institutional environment.

Next, consider changing the percentage of enterprises with technological, marketing and organizational innovations in the total number of innovative enterprises depending on the institutional environment. The following correlation coefficients were calculated between the sub-index "institutional environment" Xi, the percentage of enterprises with technological innovation (regardless of organizational and marketing innovations) Y1, the percentage of enterprises with marketing and organizational innovations that have the technological innovation Y2, enterprises with marketing and organizational innovation without technological innovation Y3, in the total number of innovation active enterprises:

Quantities	XiY1	XiY2	XiY3
Correlation coefficients	0,51	0,53	-0,52

The positive correlation between Xi and Y1, Y2, and negative correlation between Xi and Y3 were revealed. The maximum coefficients of R^2 for Y1, Y3 are achieved for a linear trend. The maximum coefficient of R^2 for Y2 is achieved for degree trend. These regression equations:

$$Y1 = 5{,}8164Xi + 45{,}981 \quad (4)$$
$$R^2 = 0{,}2605$$
$$Y2 = 15{,}619 * Xi^{0{,}716} \quad (5)$$
$$R^2 = 0{,}3243$$
$$Y3 = -6{,}5177Xi + 57{,}173 \quad (6)$$
$$R^2 = 0{,}2728$$

Determine whether the regression equations for the observed value of Fisher's exact test showed that all equations are adequate. The graphic images of dependences obtained are represented at Fig. 2a, 2b, 2c.

Figure 2a. Dependence of the percentage of enterprises with technological innovation (regardless the marketing and organizational innovation) in total number of innovative enterprises Y1, on the index "Institutes" Xi, the linear trend

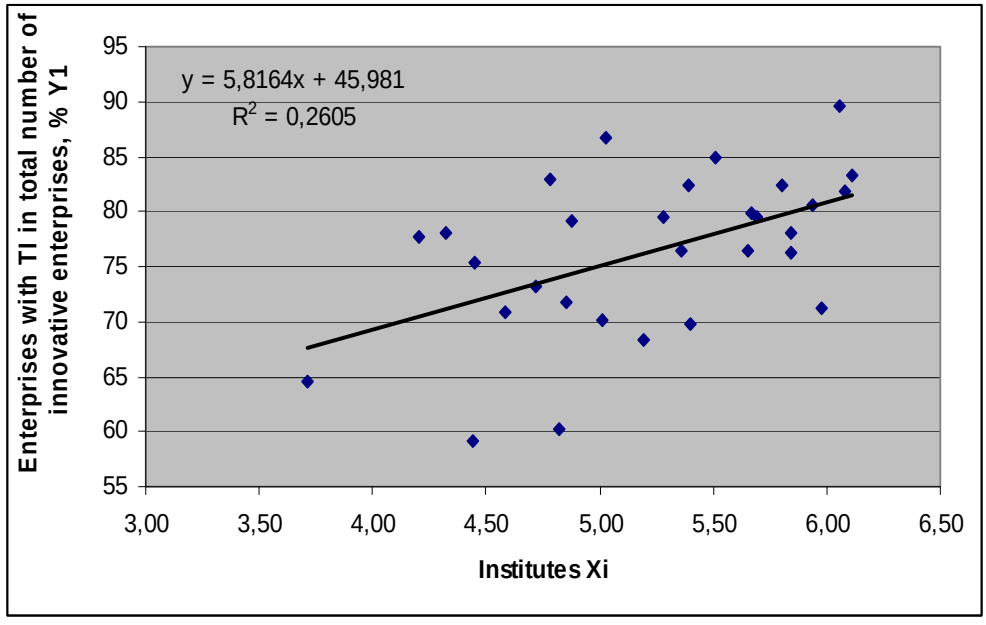


Figure 2b. Dependence of the percentage of enterprises with marketing and organizational innovation that have a technological innovation, in total number of innovative enterprises Y2, on the index "Institutes" Xi, the degree trend

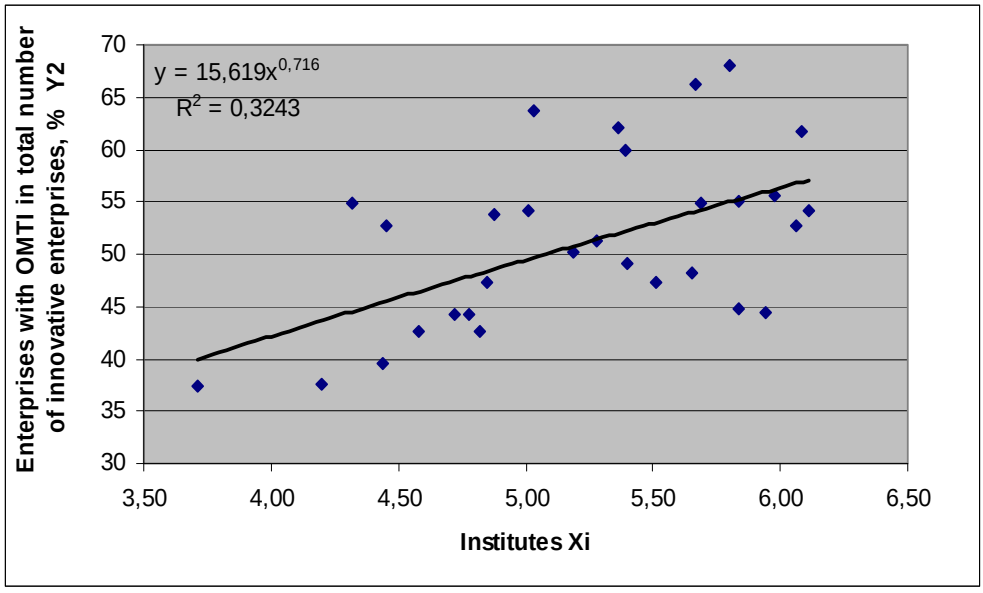
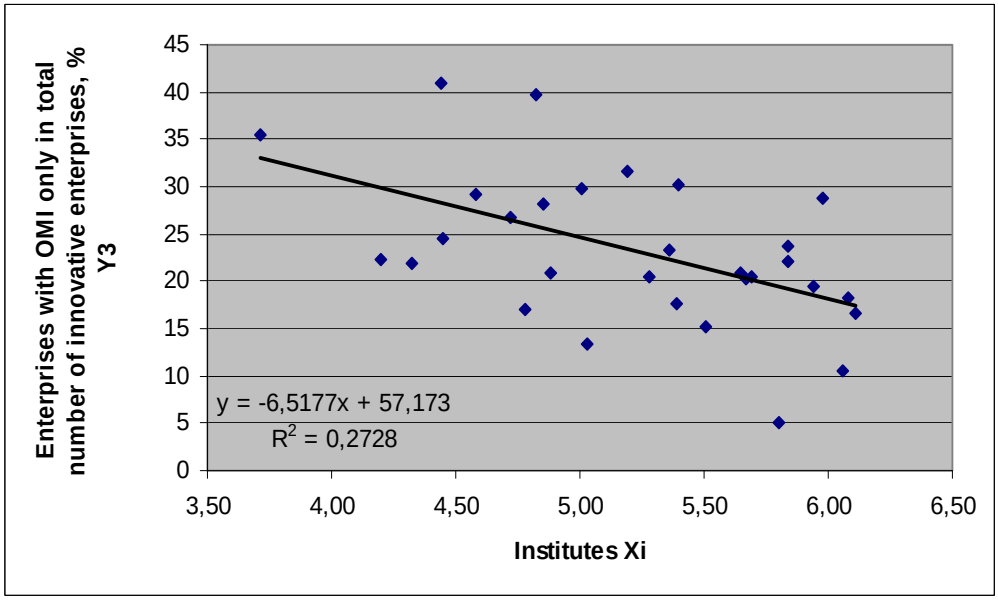


Figure 2c. Dependence of the percentage of enterprises with marketing and organizational innovation without technological innovation, in total number of innovative enterprises Y3, on the index "Institutes" Xi, the linear trend



As we move from countries with low index of institutional environment to countries with a high one, the percentage of firms introducing technological innovations, regardless the marketing and organizational innovations in total number of innovative enterprises increase at linear function (Fig. 2a). Similarly, the percentage of firms introducing marketing and organizational innovations that have technological innovation increases at degree function (Fig. 2b).

At the same time the percentage of firms introducing marketing and organizational innovation without technological innovation in total number of innovative enterprises reduces for the countries with strong institutes (Fig. 2c). That is to say that at the enterprises in countries with relatively weak institutions, marketing and organizational innovations are the substitute of technological innovation. As the institutional environment becomes more favorable, the percentage of firms with marketing and organizational innovation (without technological innovation) is reduced. Instead of them arise mostly enterprises that use both technological and non-technological innovation to create synergic effect.

6. Conclusion

The study revealed that the introduction of marketing as well as organizational innovation becomes especially important at the periods of economic instability and/or under the weak institutional environment where enterprises are feeling the significant resource constraints.

As we move from the countries with low index "Institutes" value to countries with high one, the percentage of innovative enterprises, enterprises with marketing and organizational innovations, and firms that implement marketing and organizational innovation with technological innovation in the total number of enterprises increase at degree function.

The high correlation and direct dependence between the index "Institutes" value and percentage of innovative enterprises, enterprises with marketing and organizational innovation, and companies with marketing and organizational innovation with technological innovation in the total number of enterprises confirms the hypothesis on complementary nature of technological and non - technological innovation and in countries with strong institutional environment.

At the same time marketing and organizational innovations are the substitutes of technological innovation mostly in the countries with relatively weak institutions.

Marketing as well as organizational innovations are effective tools to speed up economic development in the short term under the resource constraints, institutional imbalances and unfavorable institutional environment, particularly in transition economies.

Institutional reform in transitional and developing countries aimed at overcoming the barriers to innovation activity, particularly related to property rights, should enhance R&D and implementation the innovation in the long run, and promote transition to an innovative type of development.

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