

APPROACH TO INNOVATION AND INNOVATIVE INDUSTRIAL ENTERPRISE INFRASTRUCTURE

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Abstract

It appears that in contemporary entrepreneurial environment industrial enterprises that are able to realize regular and targeted changes survives. These changes or innovations are implemented not only for survival, but also for gaining significant market position. Innovation is supposed to be a creative destruction of current status, and a tool to enhance long-term competitiveness and necessary condition for successful business. Innovation should contain development impulse, should lead to enhanced performance, return and utility features. In industrial company a precondition for successful innovation implementation is an existence of innovative infrastructure that enables to create, transform and amplify resources (especially organizational and human capital) to required effect (e.g. financial capital). The aim of the paper is the confirmation of enterprise infrastructure at a sample of 99 large industrial companies and insight into one metallurgical company in the Czech Republic. First data were gained by empirical probe.

Keywords: Innovations, innovative infrastructure, industrial enterprise, empirical survey

1. INTRODUCTION

Industrial enterprises put a lot of changes into practise in a form of innovations to survive and gain a significant position in the market. Here the identification of opportunities and creation of new methods how to use them is essential. It could be not only technical, technological or product innovations, but it concerns not to the small extent the business practice, forms of services provided in the existing market, acquisition of new market, it can be matter of corporate management etc. To recognize the need of change is not easy. There the loss of company competitiveness can follow.

Successfully implemented innovation represents an existential and developing condition. Nowadays we can find out that increasingly bigger attention of world-famous companies is devoted to innovations that vastly change managerial and entrepreneurial system. To be the technical and technological innovations successful, the business and managerial activities have to create a sufficient space for it. They have to change themselves radically. Apart from that, the innovations of entrepreneurial system can be the main source of long-term prosperity of a company and a starting point for formulating of changes in company's strategy, in the way of thinking and the company management. This is connected mainly with the questions of human potential and intellectual base of the company, related to deployment of the sources.

The share of innovating companies producing metals, metallurgical and metal-working products in the Czech Republic (see the statistical research 2010-2012) is slightly above the average of manufacturing industry companies and has reaches 46.7%. With these innovative companies there prevail the companies that have been putting into practice technical and non-technical innovations (55%). Only 31.6% of companies were with the technical innovations and just 13.4% were the companies with only non-technical innovations. [1]

It can be observed that innovative processes in metallurgy are usually oriented on the improvement of current technological processes and modernization of technological equipments with the aim to produce a product with higher utility value, i.e. better mechanical qualities. At the same time the innovations in metallurgy are focused on greening of metallurgical production devices of the processes with minimization of the

environmental impacts. These are solutions aimed at reduction of energy and material demands of the production.

The successful companies have found the value potential where the others had overlooked it [2], [3]. They can release and use it. Sometimes it is inside, sometimes outside of the company. If some changes in management are innovative, systematically interconnected and as a part of creative programme of the company they have created a distinctive competitive advantage compared to the innovation of different character [4], [5].

The gained and accumulated findings and experience are the core of the company's innovative infrastructure. They concerned both common running and its development. The aim of the contribution is an evaluation of innovative infrastructure level for big industrial companies in the Czech Republic. Own method operationalization of Kiernan's innovative rules and comparison of results with reference model were used. First data were gained by empirical questionnaire probe.

2. APPROACHES TO INNOVATION

We can look at innovations that the company is carried out from various points of view. It can be the point of view of a subject (product, process, marketing, organizational innovation), standpoint of the implemented changes originality (invention, enlargement, duplication, synthesis), standpoint of an innovation newness (absolute and relative innovation), standpoint of complexity of the innovation (change of quantity, intensity, reorganization, qualitative adaptation, variant, generation, kind, family line, tribe, stem, standpoint of participation of subjects in the process of creation of the innovation (open innovations and closed innovations), standpoint of the market acquisition (fluent innovations and turning innovations), methodology of the innovation origin (stimulating elementary innovations and inducted elementary innovations) [6], [7], [8].

A danger of competitiveness loss has caused the necessity of comparison of innovations among the companies on the international scale. At the same time we can meet with ambiguity in the process of the term innovations. Innovations are confused with innovative solution and innovative ideas that have got various awards but customers don't buy them [9], [10]. Therefore, the implemented and value change that should bear an effect both for the user and the company can be considered to be a legitimate demand on innovation. This requires a sophisticated relationship between costs and utility value created (product, service). The mutual interconnection not only user - company but also interconnection of technical and technological aspect of the product and entrepreneurial model is there necessary.

In the European Union countries the innovations are monitored by means of sample survey. They are divided into technical (technological) and non-technical (non-technological) innovations. Product and process innovations rank among the technical innovations. Marketing and organizational innovations are a part of nontechnical innovations. From statistical survey on firms' innovativeness in the Czech Republic (2010-2012) results that about 44% of businesses from total number of economically active companies during 2010-2012 implemented some innovation of object kind. The most innovations are implemented by businesses in branch of information and communication activities. Then manufacturing industry follows. Bigger attention is devoted to technical and non-technical innovations in all branches [11], [12].

In the process of innovations the time is increasingly more important factor. It is not only a matter of recognition and a new innovation entrance into the market timing but it relates to the whole value chain in the company, company corporate culture, the courage to do experiments, new solutions. There is also the right to make mistake that bears the costs but also invaluable experience that should be recast to find out viable and mellow solutions.

With any project, and more and more with innovations, there is valid that what sort of people we have such innovations we can have. Innovative infrastructure of a company is one of the conditions of systematic work.

3. INNOVATIVE INFRASTRUCTURE

From this point the attention of company is aimed at hidden sources of company abilities and ways of their involvement in new values creation. Recommended principles for creation of innovative structure of a business we can find e. g. in M. J. Kiernan. The stated attitude was an inspiration to perform some empirical probes to the real conditions of corporate sphere. Its aim was to find out if and to what extent the recommended Kiernan's innovative rules are used for big companies management in the Czech Republic and thus what level of company innovative infrastructure would be possible to talk about.

It was necessary to transform the Kiernan's concept into operational position, e.g. into some empirically observable and measurable characteristics in the company. To simplify an experiment, every rule is here represented by one factor see **Table 1**.

Table 1 Operationalization of Kiernan's rules for the innovative infrastructure creation

Serial number	Kiernan's concept	Operationalization		
	Commandments	Assessed factors (abilities)	Measurable field	Way of measurement
1.	They do not follow the rules prevailing in your field	Establishment / development of the business field	Business effect on the field in the last 3-5 years	Qualitative scale
2.	Get innovative, or get dead!	Innovative products or services	The share of revenues from products and services, not older than 4 years	The percentage scale
3.	Explore your business, find hidden assets and Make the most of them.	Development project	Number of active projects	Qualitative scale
4.	Focus on speed and agility	The effect of the external environment	The ability to respond to changes in the business environment	Qualitative scale
5.	Be proactive and experiment	Experimenting in the enterprise	The willingness to experiment with	Qualitative scale
6.	Break down boundaries	Interdisciplinary cooperation	The ability to realize mutually beneficial cooperation with other	Qualitative scale
7.	Constantly take advantage of all the employees and everything they can	Intellectual potential of employees	Ability to use all the employees can do	Qualitative scale
8.	Globalize your real and knowledge base	National and multinational contacts	Number of significant markets	Qualitative scale
9.	Acknowledge that eco industrial revolution affects all of us	Long-term survival of the business	Technological and managerial eco industrial activities	The range of case enumerations
10.	Make the continuing education of corporate religion	a) The organizational learning b) The intellectual base of enterprise	The role of education in the enterprise rate of utilization of the intellectual base	The range of case enumerations The percentage scale

Source: Own elaboration with several data adopted from Kiernan's rules

For finding out existence and assessment of characteristics of particular factors in corporate practice it was chosen a measurement in a form of questionnaire scale (very high fulfilment, high, average, commonly for

given branch, low, very low, I don't know/we don't observe) or by means of exemplary enumeration of the possibilities.

The results of the probe were compared with the reference model which is a benchmark for the level of fulfilment of particular innovative factors among them evaluation, or rather the rate of fulfilment of innovative factors for particular companies see **Table 2**. Comparative reference level is always created by the highest point evaluation possible to reach for each particular case.

Table 2 Reference model - assessment of innovative factors

Level of reaching reference level in %	Indication	Influence of innovative factors on company innovativeness
100-81	A	high, almost guaranteed with a significant positive effect
80-61	B	passable with some of the more progressive elements
60-41	C	problematic, significantly manifested stagnation elements
40-21	D	low, significantly manifested degeneration elements
20-0	E	unsatisfactory, state of emergency

Source: Own elaboration

It was founded as a result of comparison between gained appraised empirical values from 99 big companies (with the number of employees up to 1000) with the reference model see **Table 3**, that overall monitored sample of companies is a sign of acceptable state of corporate innovative culture (evaluation B).

It means that rather routine forms of management and use of monitored innovative factors prevail. Particular innovative factors with two exceptions show the evaluation B, too. From the innovative factors relatively the biggest importance is attributed to attitudes to monitoring of strategic performance of a company. On the contrary as a problematical factor appears the company's influence on the development of a branch (evaluation D, where already can be detected some elements of degeneration). Also there are relatively big reserves in the use of intellectual base of companies - knowledge about relatively low use and assessment were gained (evaluation C).

Table 3 Level of innovative factors

Indicator	Innovative factors											Empirical level Total
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	
Points in total	168	304	312	339	309	305	344	350	372	216	382	3401
Rate of reference factor fulfilment in %	33.9	61.4	63.0	68.4	62.4	61.6	69.4	70.7	75.1	43.6	77.1	62.5
Evaluation	D	B	B	B	B	B	B	B	B	C	B	B

Note: Numbers in legend of innovative factors are expressing the considered factors see **Table 1**.

Source: Own elaboration

Empirical probe based on the Kerman's innovativeness of company conception pointed out that innovations are always the big challenge within the monitored sample of big companies in the Czech Republic. Nowadays there prevail routine forms of innovative factors use in the management. It is a question if it is sufficient for their next perspective and development. To be problematical seems the lower exercise of company development and research, stagnation of meaningful development and use of own intellectual base. Only for approximately 2-5% of companies it was possible to state that they fulfil stronger criteria (rules) required for corporate innovative infrastructure. In given cases also the reached very good economic results have corresponded to the qualitative finding.

4. INNOVATIVE ACTIVITIES IN CHOSEN METALLURGIC COMPANY

For approximate insight into innovative infrastructure of metallurgical sector one of metallurgic plants in the Czech Republic was chosen. Under its specific conditions the attention was concentrated on the main areas where the company realizes the need of innovation. There emerged the three main areas: investment activity, own research and development and individual innovative activities of the employees.

The investment activity. Level and extent of introduction of innovations by means of the investment purchases are various, depending on seriousness and scale of the problem that has to be solved. Investment activity here is connected either with acquiring of licence to use of a single invention or with overhaul of particular large production equipment.

The orientation of research and development is aimed mainly at application of new technological procedures, new quality of steel and increase in utility characteristics of current products with regard to the impact on the environment. They solve 25 research projects a year in the company.

Research and development problematic includes all the areas of production cycle. Research projects have solution from the area of coke-chemical production and preparations of a batch, production of pig iron, steel and its rolling including subsequent technologies e.g. heat treatment, drawing. An important one is the issue of material characteristics of steel products. According to the final semi-finished products it is possible to define the basic groups based on supporting programs of the company.

The individual employees' innovative activities. Improvement proposals don't reach the technical level of the solutions created within research and development activity, but their core and purpose is to contribute to smaller technical problems solution. Employees' innovative activities are a demonstration of involvement of employees mainly in matters of production but also occupational safety and working conditions, greening of production process and other areas.

Problematical area which includes a range of random and dynamic factors is the sales and price fluctuations of final products. This also applies regarding too high costs with principal innovative projects as well.

5. CONCLUSION

It is possible to state, on the basis of carried out probe and other supporting sources, that there are various attitudes to innovations in entrepreneurial sphere. Not always the innovations are connected with actual implementation and use of given product or service. The experimental probe has indicated a weakness between the technical aspect of innovation and the process of innovation management, manifesting itself in relatively weaker level of innovative infrastructure of industrial companies. Within the monitored sample only 2-5% of companies will probably comply with the harder Kiernan's conditions for innovative business. It signals the need in the company management to engage more effectively and fully in the question of innovative structure improvement, interconnect deeply the technical and economic points of view during solving of innovations, pay attention to the creation of new entrepreneurial models close connected to company strategy, permanently compare itself with the world top within its field. For metallurgical companies the innovative attention is mainly aimed at technical and technological parameters of production and manufactured products. At the same time the market pressure leads the companies also to realize some nontechnical innovations (organization and management, marketing).

One of the most serious and difficult things is the problem of uncovering and exploitation of hidden value potential - both inside and outside the company. Its solution doesn't get by with a large extent of creativity and innovativeness, a big intellectual effort and top view. The huge problem there often is routine traditional way of acting and thinking.

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