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CONTEMPORARY ORGANIZATIONS IN THE CONTEXT OF GLOBALIZATION

Innovation Strategies in Diverse Institutional Settings: Conceptual Linkages and Interactions

Inga Stankevice and Giedrius Jucevicius

Kaunas University of Technology
Donelaicio 73, LT-44029 Kaunas, Lithuania

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Abstract

For decades, scholars have advocated different and sometimes contrasting understandings of what innovation strategy (and innovation in general) is or should be. This resulted in the increasing amount of fragmented research, often based on one-dimensional typologies of innovation strategies. Today, we can see a growing need for sorting out the overlapping concepts and exploring their interactions in this fast developing field of research.

Hence, the paper aims to establish the conceptual linkages between the different innovation modes and strategies, as well as the diverse institutional settings for innovation-based activities. First, the presentation is based on an exploratory research, which is then supplemented by comparative qualitative analysis with other, previously distinguished, types of innovation and innovation strategy. This allows for refinement of the results of the exploratory research and purification of the types of innovation strategy. Finally, the indicated types of innovation strategy are analyzed in light of major theoretical approaches, which provide with some clues to drivers of either type of innovation strategy of a firm.

Nevertheless, the internecine complementarities between the different conceptual angles, as well as some characteristics of the distinguished types of innovation strategy, lead to an assumption that the innovation strategies might be complementary as well. Therefore, the indicated types of innovation strategies of firms call for empirical validation in future research.

Keywords: **drivers of innovation, types of innovation strategy, institutional setting.**

Introduction

An emerging approach towards identifying an integrated concept of innovation strategy of an organisation deserves significant scholarly contribution. At academic level, there are a number of scholars who advocate different and sometimes contrasting understandings of what innovation strategy (and innovation in general) is or should be (Frenz and Lambert, 2010; Stankevice and Jucevicius, 2010).

The lack of scrutiny in using the concept and the kaleidoscopic comprehension of innovation have resulted in the increasing amount of fragmented research based on often one-dimensional typologies of innovation strategies. In most of the cases, the explored scientific literature revealed the descriptions and definitions of innovation strategies to be only partly consistent with the conceptual integrated framework of innovation strategy (Stankevice and Jucevicius, 2010), and some of the definitions reflect dichotomic innovation characteristics more than innovation strategies as a whole. However, the dichotomies are not sufficient enough to be referred to as innovation strategies. Unfortunately, they often are, and the research has mainly endured fragmented as sensitive to current external circumstances as well (Tvaronaviciene, Grybaite and Tvaronaviciene, 2009).

Nonetheless, innovation plays an important role in shaping the growth and competitiveness of firms, industries and regions. The recent findings (Battisti and Stoneman, 2010; Frenz and Lambert, 2010) suggest that a synergy of technological and non-technological innovation activities is concomitant with firm performance. Moreover, firms which introduce both product and process innovation and, at the same time, engage into organisational and marketing changes outperform firms that concentrate on a sole innovation activity (Battisti and Stoneman, 2010). Hence, the integrated approach towards typology of innovation strategies is needed.

In this paper, innovation strategy of a firm is understood as an integrated, overarching concept of how the firm will achieve its objectives of innovation activity, (Stankevice and Jucevicius, 2010). Frenz and Lambert (2010) rely on the concept of innovation modes rather than innovation strategies, yet provide a similar definition of the concept. According to them, mixed modes of innovation

explicitly refer to a set or bundle of activities which are carried out together by a firm to create and market a new good or service, or improve on production, delivery and business processes.

Innovation strategies include both the varieties of possibilities about what to innovate (e.g. product, process, organization, marketing, etc. (Battisti and Stoneman, 2010)), how to enable innovation, (e.g., networks (Fagerberg, Mowery and Verspagen, 2009), partners (Radziszewska-Zielina, 2010), level of openness (Srivastava, 2006; Visser and Atzema, 2007)), speed (e.g., incremental, radical, revolutionary (Rossi, 2002)) and scope (e.g., novelty, modification, imitation (Fagerberg, 2005)) of innovation, and how to bring innovation to target customers (e.g., traditional vs. innovative marketing, low-end vs. high-end users (Stankevice and Jucevicius, 2010)). The named characteristics of innovation activities are interactive, thus forming a fully-fledged innovation strategy. Frenz and Lambert (2010) argue that innovation strategies (i.e., mixed modes of innovation) include aspects of both user and open innovation: the former highlights the importance of external linkages and resource inputs to the innovating firm, and the latter singles out internally focused developments.

Besides, the linkages between the innovation strategies and the different institutional methodologies remain underexplored. There are quite a few research methodologies that attempt to link the innovation types with the aspects of institutional environment (e.g. Hall and Soskice, 2001; Lundvall, 1992; Frenz and Lambert, 2010; Whitley, 2000), however, in most cases they tend to rely on dichotomies that oversimplify the complex innovation context. In this paper, we try to integrate the concepts provided by the methodologies, such as varieties of capitalism, national innovation systems, social systems of production, and to relate them with the distinguished types of innovation strategies. The absence of clear conceptual linkages in this fast growing field of research constitutes the research problem of this paper.

Thus, the paper aims to establish conceptual linkages between the different innovation modes and strategies, as well as the diverse institutional settings for innovation-based activities. The baseline of the analysis is the recent Frenz and Lambert's research (2010), where the authors have distinguished five modes of innovations, based on the exploratory research of the existence and extent of certain qualities of innovation activities in firms across 17 countries and three sectors – vehicle manufacturing, wholesale, and knowledge intensive business services. The modes are described, and comparative analysis with other typologies of innovation strategies is used in order to re-confirm and/or refine the baseline types of innovation strategy. Finally, the links of the distinguished types of innovation strategy with a number of the related theoretical approaches are revealed.

Mixed modes of innovation

Frenz and Lambert (2010) have distinguished five core modes of innovation. The modes are computed using weighted averages of factor loadings across the 17 countries.

The first mode, i.e. intellectual property (IP, specifically patents and design rights)/technology innovating mode, contains at its core intellectual properties rights and in many countries is complemented by in-house R&D and new-to-market activities.

The second mode, entitled marketing based innovating, includes forms of product innovation, leaning towards new-to-firm imitating with marketing expenditures for the introduction of innovations. In many countries, it is coupled with marketing strategy changes. Marketing based innovating is in its core also a strategy that leans towards sourcing information from other businesses. Differences across countries with respect to this mode can be summarized by the extent to which this mode leans towards market leading or market following. This is indicated by differences in the relevance of new-to-market and new-to-firm innovating.

The third mode is concerned predominantly with process modernising. This mode typically links process innovations with spending on equipment. On average, process modernizing is driven by external development. Similarly to the mode of marketing based innovating, this mode is also twofold. One variant is external process modernizing pointing towards consultancy of processes, and another one – networked or joint process modernizing, which adds loading to sourcing (bought-in R&D or other knowledge), information from markets, as well as the research base.

The fourth mode is entitled wider innovating and shows strong combinations of types of management and business strategy changes, including new sales and distribution methods. It represents what might have been seen as classic non-technological innovation, or organisational innovation (Battisti and Stoneman, 2010).

Finally, the fifth mode is defined as networked innovating. It involves external knowledge sourcing in the form of bought-in R&D or licenses and formal collaboration. It also leans towards accessing information from the knowledge base – universities and research organisations, pointing towards the relevance of the national infrastructure supporting innovation in a national system. The mode is highly heterogeneous across countries, though two major patterns can be distinguished. the most frequent 'networked innovating' mode is one that has high loadings for cooperation, information from businesses and the research base and/or sourcing (bought in technology) together with in-house R&D. The second variant of networked innovating relates to searching markets through information sources – market based – and producing products, which are new to firm only (i.e., imitation).

Table 1 summarizes the features of the distinguished modes and sub-modes of innovation, thus leading to a conceptual combination of some of the types, as indicated in the last column of the table.

Table 1 demonstrates that some of the distinguished modes and their subtypes can be merged. Thus, marketing-based innovating (subtype 2) and networked innovating (subtype 2) are characterized by almost identical

Table 1

Characteristics of mixed modes and sub-modes of innovation (Frenz and Lambert, 2010), and their combination

Innovation modes	Major characteristics	Countries where mostly observed	Combination code
IP/technology innovating	• New technology • Firms apply for patents • Firms apply for design rights • Firms apply for copyright • New-to-market innovations • In-house R&D	Estonia Netherlands Spain UK	1
Marketing-based innovating, subtype 1	• Product innovation • New-to-market innovation • Mostly modification • Firms source information from other businesses • Changes to design or packaging • New sales or distribution methods	Belgium Netherlands Luxembourg	2
Marketing-based innovating, subtype 2	• Product innovation • New-to-firm innovation • Mostly imitation • Firms source information from other businesses • Changes to design or packaging • New sales or distribution methods	Austria Iceland	3
Process modernising, subtype 1	• Process innovation • Acquisition of new machinery and equipment • Modification • Innovations originally developed by others • Consultancy	Austria Denmark Germany Iceland Spain	4
Process modernising, subtype 2	• Process innovation • Acquisition of new machinery and equipment • Modification • Innovations originally developed by others • Bought-in R&D or other knowledge • Information from markets or research base • Networked or joint process of value creation	Korea South Africa UK	5
Wider innovating	• Types of management and business strategy changes • New sales or distribution methods	Not country-specific	6
Networked innovating, subtype 1	• Bought-in technology • In-house R&D • Information from businesses and research base	Iceland Korea	5
Networked innovating, subtype 2	• Product innovation • New-to-firm innovation • Imitation • Searching new markets through information sources	Austria Luxembourg	3

innovation activities and characteristics of innovation: both produce mainly products, which are new to firm only (i.e. imitation). The subtype 2 of the mode of networked innovating is defined by the search of new markets through information sources, whereas the subtype 2 of the mode of marketing based innovating is characterized by sourcing information from other businesses. However, other businesses can definitely become one of the information sources of the previous subtype. Then, the mode of networked innovating (subtype 2) is associated with new markets, whilst the mode of networked innovating (subtype 2) typically involves the introduction of new methods of sales or distribution, which is also associated with new markets or, at least, target groups. Finally, changes to design or packaging, which are incident to marketing-based innovating (subtype 2), represent, to some extent, a means to mitigate imitation, which is typical of both subtypes. Hence, the comparison leads to a conclusion that the subtypes can definitely be merged under the name of Leftover imitations.

In accordance with the same logics, subtype 2 of the mode of process modernising and subtype 1 of the mode of networked innovating can be collated. First, bought-in technology of the subtype of networked innovating can easily be associated with acquisition of new machinery and equipment of the subtype of process modernising. Second, in-house R&D of networked innovating (subtype 1) is based on information from businesses and research base, which is close to recognition that R&D or other knowledge is partly bought-in and innovations, originally developed by others, are literally transformed due to in-house activities – this is precisely the case of process modernising (subtype 2). Hence, the two subtypes of the modes of innovation can be unified under the name of Networking.

As to the remaining types and subtypes of modes of innovation, distinguished by Frenz and Lambert (2010), they are unique and specific, and could hardly be coupled with each other. Actually, the only innovation mode which can fully be incorporated into the other modes is that of networked innovating. This could be explained by an assumption that networks, in facet of innovation, are formed for a certain purpose and are mutually rewarding (Vinding, 2002; Lewin and Volberda, 2005), and

networking for fairly networking would hardly be imaginable and explicable (Fowles and Clark, 2005).

Nonetheless, not only can the modes and their subtypes be compared with each other, but with other typologies of innovations and innovation strategies as well. This allows for refinement of the types of innovation strategies of firms.

Types of innovation strategy: refined mixed modes of innovation

Table 2 summarizes the distinguished types of innovation strategy, including their major characteristics, supporting innovation strategies and types of innovation, which are found in the respective scholarly literature, and countries where the types of innovation strategy are typically observed, which are drawn from Frenz and Lambert's (2010) empirical research.

The characteristics of IP/technology innovating mode of innovation admit of the existence of a parallel with product technology (Schmookler, 1966) or, to put it in other words, technological innovative activities (Battisti and Stoneman, 2010). These are defined as new machinery, equipment and computer hardware or software to produce new or significantly improved goods, services, production processes or delivery methods. Because the technological component and in-house innovation activities are firmly embodied within this mode, the corresponding innovation strategy is named *secretive technology*. Markard and Truffer (2006) define innovation strategies of this type as leading, as they best contribute to creation and diffusion of new knowledge, guidance of the direction of search, supply of resources, creation of positive external economies, and formation of market(s).

The *secretive technology* strategy can be collated with Srivastava's (2006) secretive innovation strategy, which is defined by single relationship, integrated value chain, and *build and develop* principles in R&D. Similarly, Visser and Atzema (2007) refer to this type of innovation strategy as stand-alone innovation strategy, which, in respect of level of openness, is characterized by internal sources of knowledge for innovation. The two strategies are precisely the examples of one-dimensional typologies of innovation strategies, which are now considered insular (Frenz and Lambert, 2010).

Relative to the above ones are complex, risky innovation strategies (Whitley, 2000), which are based on multi-dimensional analysis. The strategies involve developing new product qualities that have a wide range of uses and may lead to market restructuring as previous products become obsolete. Firms developing these strategies seek to dominate markets by introducing new products; a wide variety of sources is often required. Additionally, these innovation strategies involve changes in established organizational structures and routines (Whitley, 2000). Hence, the attribute of radical innovations (as opposed to incremental) can enrich the list of major characteristics of the type of innovation strategy entitled *secretive technology*.

The characteristics of *marketing-based leadership* innovation strategy are defined by predominantly product innovations (Edquist, Hommen and McKelvey, 2001; Battisti and Stoneman, 2010) that are coupled with marketing innovation, which means implementation of changed marketing concepts or strategies (Battisti and Stoneman, 2010). According to Jakubavicius et al. (2008), this kind of innovation strategies is offensive and typical of the companies which create a new product and are the first which appear with it in the market. Markard and Truffer (2006) regard innovation strategies of this type to as leading as well.

Marketing-based leadership is close to craft-based responsive innovation strategy (Whitley, 2000). They are aimed at developing new product qualities, focusing on improving technologies for meeting the specific needs of particular user groups. Firms and individuals here pursue innovations continuously and compete to a considerable extent on the basis of their reputations (Whitley, 2000). Innovation and flexibility strategy (Kohler, 2008) needs to be mentioned here as well. It consists in designing products that respond to emerging expectations or demands, and to mass produce them immediately if demand corresponds to expectations, or, if demand does not materialise, to abandon production rapidly and at the least cost. Last but not least, the firm should have an easily convertible production set-up and labour force that allows it to be innovative with regard to both product and production process.

Next, the innovation strategy of *leftover imitators* follows. Analogously to marketing-based leadership, it enables a synergy of product (Edquist, Hommen and McKelvey, 2001; Battisti and Stoneman, 2010) and marketing (Battisti and Stoneman, 2010) innovations. However, the strategy leans towards imitation more than modification (Huang, Chou and Lee, 2010) and is typical of the companies which imitate products already existing in the markets of the interest (Jakubavicius et al., 2008). Hence, Markard and Truffer (2006) define this kind of strategy as a shaping profile innovation strategy, and Whitley (2000) names it dependent innovation strategy, which organizes relatively well-known product qualities within widely understood frameworks. The products rarely involve the development of radically new elements, and goods and services from current and closely related components are combined and targeted to specific user groups.

Thus, one can draw a parallel with Kohler's (2008) volume and diversity strategy. It is aimed at answering how one can obtain economies of scale by increasing the variety of models offered. The author (Kohler, 2008) demonstrates that the innovative capabilities of this strategy are centred in design and marketing, whereas the productive organisation follows traditional mass production patterns. After all, not every firm would survive due to *imitation* and seizing *leftover markets*.

Then, *process modernisation* includes such attributes of innovation as production technology (Schmookler, 1966) and process innovation (Battisti and Stoneman, 2010), which, when combined, represent technological process innovations (Edquist, Hommen and McKelvey, 2001). Since the modifications are aimed at maintaining the company's existing positions, the innovation strategy is

Table 2

Types of innovation strategy and their major characteristics

Innovation strategies	Major characteristics	Countries where mostly observed	Supporting innovation strategies and types of innovation
Secretive technology	• New products • Firms apply for patents • Firms apply for design rights • Firms apply for copyright • New-to-market innovations • In-house R&D • Radical innovations	Chile The Czech Republic Estonia Germany Netherlands Spain UK	• Product technology (Schmookler, 1966) • Technological innovative activities (Battisti and Stoneman, 2010) • Complex, risky innovation strategies (Whitley, 2000) • Radical innovation (Amable, 2000) • Secretive innovation strategy (Srivastava, 2006) • Stand-alone innovation strategy (Visser and Atzema, 2007) • Leading innovation strategy (Markard and Truffer, 2006)
Marketing-based leadership	• Product innovation • New-to-market innovation • Changes to design or packaging • New sales or distribution methods • Mostly modification • Firms source information from other businesses • Incremental and radical innovations	Belgium Netherlands Luxembourg	• Product innovation (Edquist, Hommen and McKelvey, 2001; Battisti and Stoneman, 2010) • Marketing innovation (Battisti and Stoneman, 2010) • Craft-based responsive innovation strategies (Whitley, 2000) • Innovation and flexibility strategy (Köhler, 2008) • Offensive innovation strategy (Jakubavičius et al., 2008) • Leading innovation strategy (Markard and Truffer, 2006)
Leftover imitators	• Product innovation • New-to-firm innovation • Imitation • Changes to design or packaging • New-to-firm sales or distribution methods • Searching new markets through other businesses • Incremental and radical innovations	Austria Luxembourg Iceland	• Product innovation (Edquist, Hommen and McKelvey, 2001; Battisti and Stoneman, 2010) • Marketing innovation (Battisti and Stoneman, 2010) • Imitative innovation (Huang, Chou and Lee, 2010) • Dependent innovation strategy (Whitley, 2000) • Shaping profile innovation strategy (Markard and Truffer, 2006) • Imitative innovation strategy (Jakubavicius et al., 2008) • Volume and diversity strategy (Köhler, 2008)
Process modernisation	• Process innovation • Acquisition of new machinery and equipment • Modification • Innovations originally developed by others • Consultancy • Incremental innovations	Austria Denmark Germany Iceland Spain	• Production technology (Schmookler, 1966) • Technological process innovations (Edquist, Hommen and McKelvey, 2001) • Process innovation (Battisti and Stoneman, 2010) • Incremental innovation (Amable, 2000) • Generic innovation strategies (Whitley, 2000) • Cautious innovation strategy (Srivastava, 2006) • Defensive innovation strategy (Jakubavicius et al., 2008)
Networking	• Process innovation • Acquisition of new machinery and equipment • Modification • Innovations originally developed by others • Bought-in or in-house R&D, technology or other knowledge • Information from markets or research base • Networked or joint process of value creation • Incremental innovations	Iceland Korea South Africa UK	• Production technology (Schmookler, 1966) • Technological process innovations (Edquist, Hommen and McKelvey, 2001) • Process innovation (Battisti and Stoneman, 2010) • Incremental innovation (Amable, 2000) • Sharing innovation strategy (Srivastava, 2006) • Learning innovation strategy (Markard and Truffer, 2006) • Diversity and flexibility strategy (Köhler, 2008)
Organisational support	• New or significantly changed corporate strategy • Advanced management techniques • Major changes to the organisational structure • Radical innovations	Not country-specific	• Organizational process innovations (Edquist, Hommen and McKelvey, 2001) • Organisational innovative activities (Battisti and Stoneman, 2010) • Transformative innovation strategies (Whitley, 2000) • Radical innovation (Amable, 2000)

defensive (Jakubavicius et al., 2008) and cautious (Srivastava, 2006). Whitley's (2000) generic innovation strategy is defined by similar characteristics. It focuses on incremental improvements of the components of technologies, developing standardized products and services for largely anonymous users, and reducing costs by routinizing process improvements; innovation-related knowledge is highly codified.

Similarly to process modernisation, *networking* innovation strategy is concerned with production

technology (Schmookler, 1966), process innovation (Battisti and Stoneman, 2010) and technological process innovation (Edquist, Hommen and McKelvey, 2001) as well. However, the latter innovation strategy is much more oriented at collaboration and networking. Hence, the level of openness is high, and the innovation strategy can be regarded to as sharing (Srivastava, 2006). It reflects global partnerships and R&D hubs, converging value chain within the industry, competitive market, and partnerships and outsourcing in R&D. Consequently, the interchange of innovation-related knowledge brings Networking to a learning innovation strategy (Markard and Truffer, 2006). Based on Kohler's (2008) typology, Networking corresponds to diversity and flexibility strategy. It responds to a market characterized by highly differentiated customers (economically and socially) with pronounced identity demands.

Finally, the characteristics of *organisational support* enable to collate this kind of innovation strategy with organizational process innovations (Edquist, Hommen and McKelvey, 2001) or, literally, organisational innovative activities (Battisti and Stoneman, 2010). They are defined as implementation of major changes to the organization structure. Whitley (2000), by invoking the concept of transformative innovation strategies, provides a more extensive description of this type of innovation strategy. It is competence destroying and often involves establishment of new industries. The major organizational competence is cognitive and organizational dynamics, and the capacity to appropriate and integrate new knowledge. A further necessity for this strategy to succeed is to educate potential user groups and create shared understandings.

The types of innovation strategy from different conceptual angles

The qualities of the distinguished innovation strategies let associate them with different theoretical approaches which include the analysis of relationship between innovation strategies and factors contributing to their formation and implementation. First, the approaches are briefly presented, and then the innovation strategies are discussed in the context of their external drivers, primarily institutions in a broad sense.

The conceptual angles

For the proponents of the approach of varieties of capitalism (VoC), institutions are comprised of financial, industrial relations, education and training, and intercompany systems, which form either type of economy – liberal market economy or coordinated market economy. The former enables short-term relations and market-based coordination, so it is conducive to radical innovations, whereas the latter promotes long-term relations and coordination, based on non-market mechanisms, therefore, coordinated market economy fosters incremental innovations (Hall and Soskice, 2001). However, the dichotomy does not explain innovativeness of a great variety of intermediate economies. Moreover, there is evidence that Germany, which was considered a typical coordinated economy, is characterized by heterogeneous institutions, which tolerate strategic leeway of firms (Lange, 2009); and in the United States, which stood for a model liberal market economy, many radically innovative sectors have become such due to precisely public investment (Lane, 2008).

Another related approach is that of national systems of innovations (NSI) (Lundvall, 1992). Here, a spectrum of understandings of institutions is distinguished: from the narrow one, which includes science, research, technology, and sometimes education, to the broad one, which encompasses all institutions that affect production and innovation (Amable, 2000). There are several weaknesses of the approach: first, differently from the varieties of capitalism, it does not imply institutional complementarity; second, most of the studies concern one country at a time; third, when international comparisons are made, they are limited to a small number of sectors. Thus, it is difficult to identify any rigid patterns of institutional or sectoral embeddedness of innovation strategies of firms within this approach, as the fragmented research lead to fragmented results. What unites the proponents of the approach is the recognition of the importance of science, research, technology and education to innovativeness and a choice of innovation strategy.

Whitley (2000) attempted to integrate the two approaches (one under- (VoC), and the other over- (NSI) fragmented) by introducing five types of innovation strategy, which are also indicated in Tables 2 and 3. While the approach of national systems of innovation is too fragmented, that of social systems of production is criticized for its overall comprehension of institutions, which disarms empirical research. This might be the reason for why Kohler (2008) failed to define the relationship of one of his proposed innovation strategies (i.e., volume and diversity) with external factors inducing them. Still, the other two innovation strategies are discussed in more detail. Finally, Amable (2000) pursued to overcome the drawbacks of the presented approaches as well. He distinguished four types of social systems of innovation and production (SSIP) in accordance with the interplay of six sub-systems: science, technology, industry, labour force, education and training, and finance. Each of the four types imposes certain consequences for products, innovations and industrial specialization.

Now, let us turn to the question of how the distinguished types of innovation strategy relate to the theoretical approaches presented above.

Drivers of the innovations strategies

Table 3 summarizes the distinguished types of innovation strategy in consonance with their drivers (mostly external) along the major approaches, discussed above (Appendix 1). The conformity between the distinguished strategies, which are the object of this paper, and the related strategies, which are discussed in other sources, was revealed above (Table 2). Precisely those related strategies serve as connectors between the major innovation strategies of this paper and their drivers, as the original sources (Amable, 2000; Whitley, 2000; Kohler, 2008) reveal the relationship between certain innovation

strategies and sets of their stimuli. Hence, below the reasoning behind the attribution of each innovation strategy to a certain set of its drivers is provided.

According to Whitley (2000), complex, risky innovation strategies (=*secretive technology*) involve developing new product qualities that have a wide range of uses and may lead to market restructuring as previous products become obsolete. Firms developing these strategies seek to dominate markets by introducing new products, a wide variety of sources are usually necessary. Hence, the firms are often encouraged to cooperate by local associations, unions, colleges, etc., and innovation strategies of this type are most likely to survive in environments with considerable state coordination, pretty strong labour unions, and credit-based financial systems.

On the other hand, *secretive technology* innovation strategy is also likely to appear in market-based SSIP (Amable, 2000). This type of SSIP is characterized by highly segmented labour force and high individual competition. Such aspects as knowledge and rapidity are essential in gaining competitive advantage. Therefore, market-based SSIP fosters radical innovations, where patents and individual rewards to innovation are highly important, which lets associate this type of SSIP with *secretive technology*.

Similarly, Whitley (2000) describes the relationship between craft-based responsive innovation strategy (=*marketing-based leadership*) and conditions conducive to it. Responsiveness is often achieved by limiting formalisation of procedures and decentralisation of control over economic activities, therefore, small firms dominate. However, firms are encouraged to cooperate at local level. Labour turnover and high rates of start-ups facilitate the diffusion of new information, and state science and technology policies concentrate typically on transferring new technologies and practices to SME's at a local level. Firms in these coordinated industrial districts focus on the continuous improvement (modification) rather than on novelty, as the limited absorptive capacity limits their ability to integrate diverse knowledge through collective routines.

Kohler (2008) enriches the description of the external environment which is conducive to *marketing-based leadership* (=innovation and flexibility). This type of innovation strategy requires national income growth and distribution modes. It also requires that the firm adopting this strategy is financially independent and ready to assume the necessary risks. In addition, the firm should not be bound to its suppliers, so that it could easily adapt to changing demands.

Dependent innovation strategies (=*leftover imitators*), according to Whitley (2000), organize relatively well-known product qualities within widely understood frameworks, they rarely involve the development of radically new elements, and goods and services from current and closely related components are combined and targeted to specific user groups. The strategies are typical of firms that do not need to develop long-term organisational capabilities, therefore, strategies of leftover imitators tend to appear in countries with low state coordination, weak intermediary associations and unions, and limited trust in formal institutions. Volume and diversity strategy (Kohler, 2008) should also be mentioned here (based on Table 2), however, the author does not define its relationship with external factors inducing it.

Firms that develop generic innovations (=*Process modernisation*) limits the novelty to products which can be mass-produced within standardized routines. Here, coordination of resources is more important than rapid change and flexibility. Rather than being required to integrate diverse types of information from varied sources, the coordination is aimed at reducing uncertainty and costs through specialised, organisation-specific knowledge, and if external help is needed, consultancy is the first choice. Firms which pursue process modernization through new machinery are typically isolated from business partners, and risk sharing with investors, suppliers and customers is limited. Hence, these kinds of innovation strategies are usually followed by isolated hierarchies in compartmentalized business systems which become established in arms' length institutional contexts. Nonetheless, societies, where state encourages large, diversified firms to invest in the development of technologies and products for mass markets, are also conducive to these innovation strategies (Whitley, 2000).

The external environment typical of *process modernisation* can be collated with meso-corporatist SSIP (Amable, 2000). This type of production is based on principles of solidarity and mobility within a large size economic unit with diversified production. Here, research is predominantly in-house, tacit knowledge is important, homogenized general education is needed, while specific skills are developed within the corporation; in finance, strong long-term relationships are required, as well as strong involvement of public authorities. Therefore, in meso-corporatist SSIP, sectors, where coordination is necessary and where competence is localized and cumulative, progress: automobile, electronics, robotics. Hence, *process modernisation* is linked to meso-corporatist SSIP as well.

In a similar way, social-democratic SSIP (Amable, 2000), which is characterized by bargaining between social partners, importance of social needs in the definition of research objectives, egalitarian ideals, centralization of wage bargaining under the external competitiveness constraint, etc., induces innovations that are linked to solutions to social and economic problems. Therefore, the prevailing industrial specialization in this type of SSIP is health, security, etc., which, actually, necessitates a great variety of partners. Hence, a reference to networking can be made.

Diversity and flexibility strategy (Kohler, 2008) broadens the understanding of the functioning of *Networking*. Diversity and flexibility strategy requires permanent innovation in the organisation of processes of production, and therefore a highly qualified work force, fluent supplier relations and a participative governance model. In this case, flexibility refers to the rapid adjustment to quantitative and qualitative changes in demand from different customers. This innovation strategy is typical of smaller firms in highly competitive and

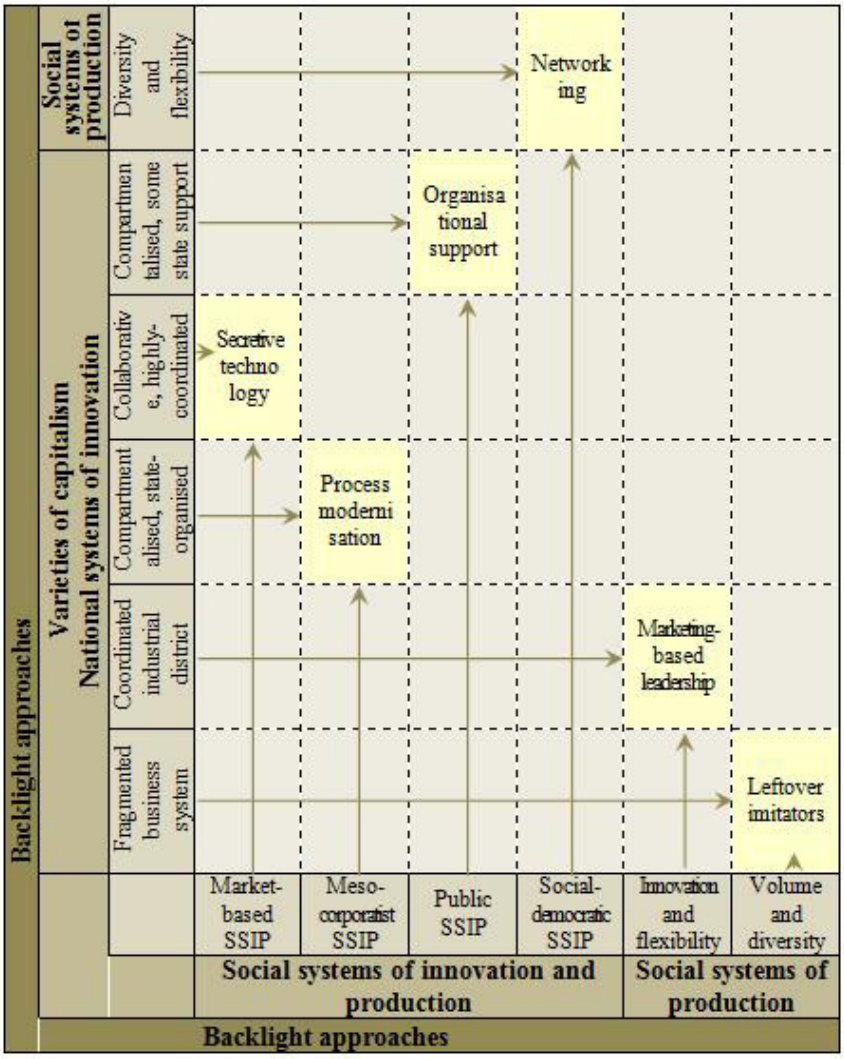

Figure 1. Types of innovation strategy within the backlight approaches

segmented markets, but, at the same time, aimed at cooperation and synergy of different competences. Finally, transformative innovations (=*organisational support*), according to Whitley (2000), usually draw upon knowledge from a wide variety of sources from different sectors. They are therefore more likely to be developed in business systems which institutionalise rapid flows of information. Availability of venture capital for innovative firms may also encourage *organisational support*, provided they do not require the long-term build of organisational competences and risk sharing. However, the high level of uncertainty involved in developing knowledge for innovation strategies of this type means that state support and multi-disciplinary and interactive research system are critical.

The remaining type of SSIP is also of interest to organisational support. This SSIP is the public one (Amable, 2000), and it finely demonstrates the importance of state support mentioned above. Within public SSIP, strong institutionalization of employment rules and social protection, importance of banks are acknowledged. Under the conditions of public SSIP, sectors are linked to public infrastructures and skilled labour force: aerospace, mechanics, automobile. Before any changes take place, organisational innovations are required, so that the inflexible support would match flexible needs of firms.

Figure 1 illustrates graphically the analysed innovation strategies within the theoretical approaches, which reveal external contributors to the emergence of either innovation strategy.

As Figure 1 demonstrates, there is no innovation strategy among the distinguished ones that falls under the influence of a sole conceptual viewpoint. This conveys that, despite some differences, the theoretical approaches – varieties of capitalism, national systems of innovation, social systems of innovation, and social systems of innovation and production – come into contact in the shape of innovation strategies of firms. Hence, different aspects of a number of approaches might be relevant to either of the innovation strategies, thus implying the need for more complex and comprehensive empirical studies in the future than those which sustain single-sided theoretical viewpoint.

Concluding remarks

Today, innovation strategy of a firm is understood as an integrated, overarching concept of how the firm will

achieve its objectives of innovation activities. To put it differently, it is a set or bundle of activities which are done together by a firm to bring about and market a new good or service, or improve on production, delivery and business processes. This fully-fledged comprehension of innovation strategy includes aspects of both user and open innovation. Thus, innovation strategy of a firm is a combination of interactive types (i.e., characteristics) of innovation.

Within the frames of this emerging approach towards innovation strategy, six types of innovation strategy have been distinguished. Their characteristics were described and paralleled with numerous previously indicated types of innovation and innovation strategy, thus bringing together previous, often one-dimensional and fragmented, research into one whole. Moreover, the distinguished types of innovation strategy of firms demonstrate clear links with a number of competing theoretical approaches, thus convincing of the reliability of the typology.

Nonetheless, accordingly with the analysis, there is no one innovation strategy amongst the distinguished ones that falls under the influence of a sole conceptual viewpoint. Moreover, some characteristics of the types of innovation strategy recur within the other distinguished types of innovation strategy, and different types of innovation strategy are typical to the same countries, i.e., the same drivers of interactive types of innovation. This calls for an assumption that the innovation strategies are complementary, and the call leads to future empirical research, aimed at validation of the typology and drivers of the types of innovation strategy.

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I. Stankevičė, G. Jucevičius

Inovacijų strategijos skirtingose institucinėse aplinkose: konceptualūs ryšiai ir sąveikos

Santrauka

Šiuo metu yra nemažai mokslininkų, propaguojančių skirtingą ir kartais prieštaringą organizacijos inovacijų strategijos suvokimą. Gausėja fragmentiškų tyrimų, pagrįstų dažnai viendimensėmis įmonių inovacijų strategijų tipologijomis (Tvaronavičienė et al., 2009; Frenz, Lambert, 2010). Esama tyrimo metodologijų, kuriomis siekiama susieti inovacijų strategijų tipus su institucinės aplinkos aspektais (e.g. Hall, Soskice, 2001; Lundvall, 1992; Frenz, Lambert, 2010; Whitley, 2000), tačiau

dažniausiai jos grindžiamos dichotomijomis, kurios supaprastina sudėtingą inovacijų kontekstą. Ši mokslinė problema savo ruožtu sukuria iš dalies sutampančių konceptų klasifikavimo ir tyrimo poreikį šioje greitai besivystančioje mokslo srityje. Todėl straipsnis koncentruojasi į konceptualių ryšių tarp skirtingų inovacijų režimų ir strategijų bei skirtingų institucinių aplinkų nustatymą.

Kita vertus, vis labiau ryškėja ir įsitvirtina kompleksinis požiūris į organizacijų inovacijų strategijas. Tyrimų (Battisti, Stoneman, 2010; Frenz, Lambert, 2010) rezultatai atskleidė, kad technologinių ir vertės inovacijų sinergija lydi įmonės veiklos efektyvumą, o įmonės, kurios sujungia produkto ir proceso inovacijas ne tik tarp savęs, bet ir įsitraukia į tikslingus organizacinius bei marketinginius pokyčius, yra konkurencingesnės nei tos, kurios koncentruojasi į vienos rūšies inovacijas (Battisti, Stoneman, 2010). Todėl vis aiškiau įmonės inovacijų strategija suvokiama kaip integruotas, visaapimantis konceptas, nurodantis, kaip organizacija pasieks savo inovacinės veiklos tikslų (Stankevičė, Jucevičius, 2010). Tai yra rinkinys veiklų, kurios įmonės įgyvendinamos kartu, siekiant pateikti rinkai naują prekę ar paslaugą arba pagerinti gamybos, tiekimo ar verslo procesus (Frenz, Lambert, 2010). Tokiu būdu įmonės inovacijų strategija apima įvairius sprendimus apie tai, ką inovuoti (pavyzdžiui, produktą, procesą, technologiją ir t.t. (Battisti, Stoneman, 2010)), kaip įgalinti inovacinę veiklą (tinklai, partneriai, atvirumo laipsnis ir pan. (Fagerberg, Mowery ir Verspagen, 2009; Radziszewska-Zielina, 2010; Srivastava, 2006; Visser, Atzema, 2007), koks turėtų būti inovacijų greitis (inkrementinės, radikalios (Rossi, 2002) ir apimtis (naujovė, modifikacija, imitacija (Fagerberg, 2005), taip pat – kaip inovacija turėtų pasiekti tikslinį vartotoją (Battisti, Stoneman, 2010; Stankevičė, Jucevičius, 2010). Taigi skirtingos įmonių inovacijų strategijos reprezentuoja skirtingas sąveikaujančių, tai yra, interaktyvių inovacijų charakteristikų kombinacijas ir savybes.

Remdamiesi šiuo nauju požiūriu į įmonės inovacinę strategiją, Frenz ir Lambert (2010) atliko tyrimą 17-oje valstybių, siekdami nustatyti įmonių inovacijų strategijų tipus. Būtent ši tipologija ir tapo straipsnio atskaitos tašku, siekiant straipsnio tikslo. Detalizavus mokslininkų (Frenz, Lambert, 2010) išskirtas kiekvienos rūšies inovacijų strategijos charakteristikas, nustatyta, kad kai kurie subtipai gali būti sujungti tarp savęs, remiantis charakteristikų pasikartojimu skirtinguose subtipuose. Tokiu būdu sudaryta patobulinta tipologija, apimanti šešias įmonių inovacijų strategijas. Įslaptintosios technologijos strategija apibūdinama visų pirma technologinėmis inovacijomis, kurios vystomos uždarai, dažnai įmonės viduje. Marketingu grįstą lyderystę charakterizuoja rinkai nauji produktai ir paskirstymo kanalai. Likutinės imitacijos inovacijų strategija padeda išgyventi įmonėms, kurios sugeba laiku ir vietoje imituoti produktus ir procesus, kurie yra nauji tik pačioms įmonėms. Procesų modernizavimas yra inovacijų strategija, kuri pasižymi naujos įrangos įsigijimu, siekiant modifikuoti gamybos, paskirstymo arba verslo procesus. Tinklaveikos inovacijų strategija taikoma įmonėse, kurios tiki mokymosi iš gerosios patirties ir bendradarbiavimo vertės grandinėje nauda inovacinei veiklai. Galiausiai organizacinės paramos inovacijų strategijos nukreiptos į radikalius organizacinės struktūros ir vadybos pokyčius.

Be abejo, kiekviena iš išskirtų inovacijų strategijų apima platesnį charakteristikų spektrą, negu nurodyta santraukoje. Atlikus šių charakteristikų lyginamąja analizę su ankstesniais tyrimais, nustatytos sąsajos tarp sudarytos tipologijos ir vadinamųjų viendimensių inovacijų bei inovacijų strategijų tipologijų. Pavyzdžiui, įslaptintosios technologijos inovacijų strategija pasižymi bruožais, kurie būdingi produkto technologijoms (Schmookler, 1966), lyderiaujančioms inovacijų strategijoms (Markard ir Truffer, 2006) ir t.t. Atskleisti įmonių inovacijų strategijų tipai taip pat buvo sugretinti ir su esminiais teoriniais požiūriais, analizuojančiais inovacijas instituciniame kontekste – kapitalizmo įvairovių (Hall, Soskice, 2001), nacionalinių inovacijų sistemų (Lundvall, 1992), socialinių gamybos sistemų bei socialinių gamybos ir inovacijų sistemų požiūriais (Amable, 2000).

Tokiu būdu nustatyta, kad įslaptintosios technologijos inovacijų strategijos būdingos rinka grįstai socialinei gamybos ir inovacijų sistemai (Amable, 2000) bei bendradarbiaujančiai, labai koordinuojamai verslo sistemai (Whitley, 2000). Marketingu grįsta lyderystė reprezentuoja koordinuojamos industrinės srities (Whitley, 2000) bei inovacijų ir lankstumo (Kohler, 2008) sankirtą. Likutinės imitacijos inovacijų strategija yra fragmentuotos verslo sistemos (Whitley, 2000) su aiškiu apimties ir įvairovės siekiu (Kohler, 2008) rezultatas. Procesų modernizavimas yra inovacijų strategija, būdinga mezokorporacinei socialinei gamybos ir inovacijų sistemai (Amable, 2000) su suskaidyta, valstybės organizuojama verslo sistema (Whitley, 2000), o tinklaveikos strategija aiškiausiai reiškiasi socialdemokratinėje socialinėje gamybos ir inovacijų sistemoje (Amable, 2000), orientuotoje į įvairovę ir lankstumą (Kohler, 2008). Galiausiai organizacinės paramos inovacijų strategija būdinga suskaidytoms verslo sistemoms, kurioms svarbi valstybės parama (Whitley, 2000), bei viešosioms socialinėms gamybos ir inovacijų sistemoms (Amable, 2000). Apibendrinant galima teigti, kad išskirtų inovacijų strategijų tipų charakteristikų atitikimas konkrečioms verslo ir institucinės aplinkos sistemoms paremia sudarytą tipologiją, aiškiau apibrėžiant takoskyras tarp įmonių inovacijų strategijų tipų.

Vis dėlto pažymėtina, kad nė viena iš nustatytų inovacijų strategijų neturi sąsajų su tik vienu teoriniu požiūriu. Be to, kai kurios vienų inovacijų strategijų charakteristikos taip pat yra būdingos ir kitoms inovacijų strategijoms, nors ir savitame derinyje, o skirtingos inovacijų strategijos yra būdingos keletui valstybių, tai yra keletui skirtingų institucinių ir galimai verslo kontekstų. Tai leidžia daryti prielaidą, kad dalis išskirtų inovacijų strategijų yra komplementarios, todėl sukurtą įmonių inovacijų strategijų tipologiją būtina validuoti empiriškai, o tai yra gairės ateities mokslo tyrimams.

Reikšminiai žodžiai: inovacijų strategijų tipai, inovacijų veiksniai, institucinė aplinka.

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Appendix 1

Table 3

Innovation strategies and factors inducing them from different conceptual angles

	(Kohler, 2008): SSP	**Whitley (2000): BS, yet links to NSI and VoC**	**Amable (2000): SSIP**
Secretive technology		***Collaborative, highly-coordinated BS:*** • considerable state coordination • strength of intermediary associations is considerable • state science and technology policy is diffusionist • financial system – credit-based • considerable union strength • considerable trust in formal institutions	***Market-based SSIP:*** • research system based on competition between researchers and between research institutions • importance of IPR protection, patents and copyrights as incentives to and protection of innovation • highly segmented labour force, innovation and skills on one side, low skills and production on the other • limits to concentration by legal action, constant evolution of oligopolistic competition • market-based finance and sophistication of financial services, strong influence of shareholders • public intervention fragmented in a series of agencies and monitoring institutions, strong limits to public intervention • importance of large public research programmes which supplements private research
Marketing-based leadership	***Innovation and flexibility:*** •national income growth •new social categories that are economically and socially distinct from others emerge within the general population •high degree of absorptive capacity	***BS type – coordinated industrial district:*** • medium state coordination • strength of intermediary associations is locally high • state science and technology policy is diffusionist • financial system is locally credit-based • considerable strength of collaborative public training system • considerable union strength • medium trust in formal institutions	
Leftover imitations	***Volume and diversity:*** •no description of institutional profile or business system	***Fragmented BS:*** • low state coordination • low strength of intermediary associations • state science and technology policy is inconsistent, contradictory • low strength of collaborative public training system • low union strength • limited trust in formal institutions	
Process modernisation		***Compartmentalized, state-organized BS:*** • limited state coordination • strength of intermediary associations is limited • state science and technology policy is mission-oriented • financial system – capital market • low strength of collaborative public training system • low union strength • high trust in formal institutions	***Meso-corporatist SSIP:*** • important in-house research largely disconnected from the academic world • importance of tacit knowledge and in-house innovation • homogenised general education, specific skills developed within the corporation, but labour market is dual • wage compromise within the large corporation but synchronising of wage rises • strong competition on internal product markets between large firms • stable long-term relationships between the main bank and large corporations, strong involvement of public authorities in private banking • public intervention furnishes collective services and acts as a coordinator

Networking	***Diversity and flexibility:*** •'balkanized' market •highly differentiated customers (economically and socially) with pronounced identity demands •highly qualified work force •fluent supplier relations •highly competitive and segmented markets •participative governance model		***Social-democratic SSIP:*** • importance of social needs in the definition of research objectives • gradual evolution towards advanced technologies and new sectors: from natural resources exploitation to information technology • egalitarian ideals in education and wage setting, limits to the adverse consequences of technical progress through public action • centralisation of wage bargaining under the external competitiveness constraint • small number of large internationalised firms • bank-based financial system, no sophistication of financial services • many forms of public intervention with financial transfers and extensive regulation • largely open economies
Organisational support		***Compartmentalized BS with some state support:*** •considerable state coordination •strength of intermediary associations is limited or medium •state science and technology policy is mission-oriented •financial system: capital market with knowledgeable investors •limited strength of collaborative public training system •low union strength •considerable trust in formal institutions	***Public SSIP:*** • public basic research disconnected from new products development • importance of public impetus for private research • external rather than internal mobility of the labour force • strong institutionalisation of employment rules, working hours and social protection • once moderate competition because of public intervention or business associations has intensified within the single market, concentration of capital • importance of banks, relatively low sophistication of financial services • important public intervention: firms, regulation, public spending, social security