CHANGES OF INNOVATION BEHAVIOUR IN SLOVAKIAN FORESTRY

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Abstract:

The present study describes the situation in the Slovak forestry sector comparing innovation activity in two different periods (2002 and 2009). The ownership type appeared to be important for the innovation activity of forest holdings. Higher innovation activity was reported by state-owned enterprises, contradicting the hypothesis based on the theory of property rights, according to which the highest entrepreneurial and innovation activity could be observed in private holdings. Instead, innovation correlated positively with the holding size.

The results concerning fostering factors for forest holdings to introduce successful innovations indicate the necessity of cooperation, information exchange and the support of public and EU sources. The main obstacles for adoption and application of innovation are lack of finances, tax load and environmental legislation.

The comparison between the two periods shows that innovation activity has increased from technological innovation to products and services. Wood still remains the main product of forest holdings. In comparison with 2002, in present the importance of bio energy becomes visible.

Key words: innovation, product, service, forestry, product mix, market expectations

JEL Clasification: Q23

Introduction

Forestry sector is often considered as a mature, "low-tech" industry which invests comparatively little into research and development and is mainly an innovation user. However, developments in the sector have led to a widely shared perception that past practice might not necessarily bring future success. Interest by society in recreation or environmental, including biodiversity, protection has grown in the last decades (Rametsteiner et al., 2010). This opens up opportunities for innovations in the forest sector.

Innovation is vital to economic growth and development. Through innovation, new products are introduced to the market, new production processes are developed and introduced, and organizational changes are made. Forestry is an important source of income for forest owners and for employees in rural areas. The future of the people, who make a living in rural areas from forestry, will considerably depend on how individuals and institutions react in view of the changes, how forest owners and managers obtain new knowledge and put it into practice in forestry, and how institutions, especially forest administration, extension services, forest research or other institutions best deal with emerging changes. The restructuring of forestry and the development of wood prices tend to have a negative impact on employment. To compensate for the negative impacts, product and service innovations based on the multifunctional use of forest and the efficient use of the growing stock of wood can provide new opportunities for rural employment (Rametsteiner and Weiss, 2004).

The objective of the presented study is to compare the effects of innovation activity and entrepreneurship behaviour in the Slovak forestry sector in the years 2002 and 2009 with the accent on the successfulness of the innovation, product mix and market expectations of forest owners. The study also seeks to identify fostering and impeding factors to innovation.

THEORETICAL FRAMEWORK

Entrepreneurship is widely defied as a process by which individuals pursue opportunities without the regard to the alienable resources they currently control (Hart et al., 1995). Irrespectively of its opportunity-based or necessity-driven nature, the main features of the entrepreneurship include an autonomous behaviour of enterprises, creativity, target- orientation, initiative, novel approaches in nonstandard situations, ability to make decisions in uncertain situations, and the will to take and carry a risk (Šálka et al., 2006).

The OECD (2005) defines innovation in its Oslo Manual as "[...] the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations."

The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new to the firm (or significantly improved). A common feature of an innovation is that it must have been implemented on the market or when it is taken into use by customers. New processes, marketing methods or organisational methods are implemented when they are brought into actual use in the firm's operations (OECD 2005). The Oslo Manual distinguishes four main types of innovation – product, process, marketing and organisational innovations – which are further sub-divided. Institutional innovation as a separate category was added by Weiss et al. (2010).

A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.

A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. 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.

An organisational innovation is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations. An organisational innovation is the result of strategic decisions taken by management. Business model innovations would be included under this category.

Besides the above classified types of innovation that refer to innovations on a firm level, the concept of institutional innovations is of increasing relevance when analysing policies and institutions. Institutions are understood here to denote "the rules of the game". Institutional innovations refer to innovations in the public/policy sphere. Institutional innovations may include new or adaptation of existing organizations, new or significantly modified rules as laid down in laws, decrees or policies as well as new or significantly modified procedures in developing and implementing policies (Weiss et al., 2010).

There is a growing consensus in the innovation system literature that innovation is an institutional process (Lundvall et al. 2002, Edquist, 2001,) and that it is not only the entrepreneur that is responsible for the innovativeness of the firm. They have to be embedded in a system of institutions that can support them. A system of innovation has, usually in the context of national innovation system research, been defined by the leading researchers in the field with different areas of emphasis. Some common characteristics of systems of innovation approaches are their emphasis on innovations and learning, interdependence and non-linearity, differences between systems and non-optimality as well as holistic and interdisciplinary approach. Innovation system approaches are considered a conceptual framework rather than a formal theory. Specific analyses in national innovation system research are directed to deepening the understanding of certain types of flows or structures and processes in innovation systems, especially human resource flows, institutional linkages, industrial clusters and innovative firm behaviour. For researching innovation and innovation policies in forestry, the approaches of sectoral innovation systems and regional

innovation systems are of particular importance, putting emphasis on the sectoral institutional system in the former or regional networks in the latter (Rametsteiner and Weiss, 2004).

Basic functions of an innovation system are (Edquist and Johnson, 1997): (a) reduction of uncertainty by means of information, (b) cooperation and conflict management, (c) provision of pecuniary and nonpecuniary incentives.

The theory of property rights (Notrh and Thomas, 1997; Leiphold, 1980) links the performance of an economic system with the correspondence between competences and responsibilities in decision-making regarding economic activities. A large divergence between the competences and responsibility should reduce motivation to the economic outputs and weaken thus the functionality of an economic system. This divergence is large in a state property, the medium one in a common property, and the lowest one in a private property. The state enterprises are supposed to be the least output-motivated according to this theory, which might influence negatively their entrepreneurial and innovative activity. The output motivation in collectively held enterprises depends on the number of co-owners and transaction costs of their cooperation. The private enterprises are expected to be the most output-motivated thanks to the lowest divergence of competencies and responsibilities. The above mentioned anticipates a hypothesis that innovation activities according to the ownership categories are in the following descending order: individually owned holdings, common properties, state enterprises (Šálka et al., 2006).

MATERIAL AND METHODS

For the analysis of the situation of innovation and entrepreneurship in forestry in Slovakia, following materials were used: modified questionnaire RPC EFI INNOFORCE from 2002 on the Survey on innovations and entrepreneurship of forest holdings (Lacko and Vinca, 2002).

Respondents were chosen by random from the database of forest holdings. The non-state forest holdings and branches of state forest enterprise represented the basic population of the survey. Their owners and managers who are responsible for the management and product or process-related decisions, were the target information sources. Questionnaires were sent by regular mail and email surveys in state and non-state forest holdings during the year 2009. Data collected in 2009 were analyzed by descriptive statistic method. Results from the year 2002 (Lacko and Vinca, 2002) and 2009 were further analysed, compared and evaluated (figure nr. 1).

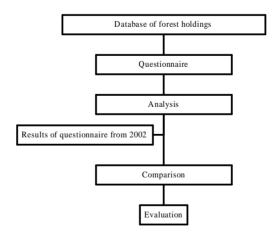


Figure no. 1. Methodological framework

The questionnaire in 2002 was sent out by mail in the random sample of 1072 forest owners and managers. The response rate was 25% (in total 268 respondents). In 2009 questionnaires were sent out by mail: random sample of 500 forest owners and managers and e- mail: 193 email-

available forest owners and managers. The response rate was 37% (in total 257 respondents). Respondents' structure is shown in the figures (nr. 2 and 3).

The questionnaire was broadly focused on innovation but for the purposes of this study we chose following areas: innovation activity, successfulness of innovation, product mix and market expectation of forest owners and managers for the future (medium-term period -5 years and long-term period -30 years).

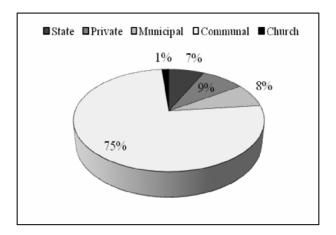


Figure no. 2. Respondents' structure according to the form of forest ownership in 2002

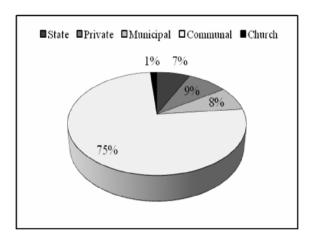


Figure no. 3. Respondents' structure according to the form of forest ownership in 2009

RESULTS

The ownership type appeared to be important for the innovation activity of forest holdings. The empirical observations contradict the hypothesis on the highest entrepreneurial activity and innovation in private forests, medium in forests owned by municipalities and land associations, and low innovation in the state owned holdings, however. The highest overall innovation activity was revealed in the state-owned enterprises, intermediary in the municipal forests, and lowest in the holdings owned by land associations and individuals (compare with Šálka et al., 2006). This can be explained by the lack of disposable financial resources for the non-state forest owners. As we can see, the innovation activity has slightly increased in 2009. We can state, that there has been a positive shift towards innovation in forest enterprises (figures nr. 4 and 5).

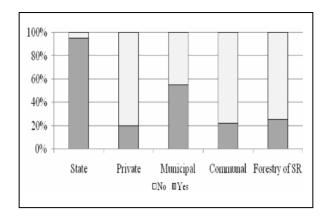


Figure no. 4. Innovation activities in 2002

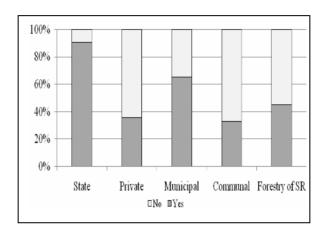


Figure no. 5. Innovation activities in 2009

The types of innovations which were successful can be divided into three categories: products, services and technological or organizational innovations (tables 4 and 5). Technological and organizational innovations have the biggest share on the successful innovations in the year 2002. The higher intensity of technological innovations in 2002 can be explained by the continuing transition to a market economy, where technological innovations are undertaken continuously as new technological means or principles become available (Šálka et al. 2006). As the transformation process in Slovakia continues, innovations become more product oriented (figure nr. 6). Product innovations have doubled from 17% in 2002 to 34% in 2009.

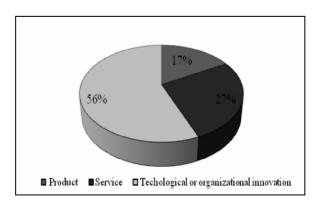


Figure no. 6. Successful innovations in 2002

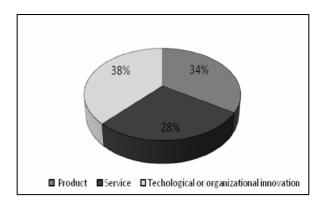


Figure no. 7. Successful innovations in 2002

Round wood remains the most preferred product in both periods regardless of the managed area (figures 6 and 7). In enterprises managing a larger area the product mix shows a greater variety than smaller enterprises. They offer a larger scale of offered products and services.

Small enterprises (less than 500 ha) prefer round wood and rental to other products. Some of them stated that they do not offer any products because they manage the forest for self-consumption (17 in 2002 and 21 in 2009).

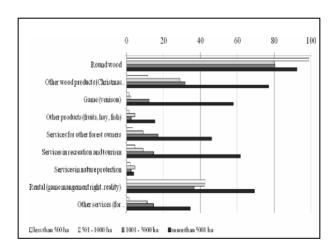


Figure no. 8. Product mix in forest holdings in 2002

In 2009 small and medium sized enterprises are more engaged in innovation and offering new products (figure 8). Other wood product, game, non-wood products and services have a bigger share in the product mix. Recreation and tourism also gained a more important role. The positive shift towards non-wood products offer is a result of adopted strategic documents (such as NFP, RDP) which emphasise sustainable forest management and the importance of the forestry sector in rural development (figure 9).

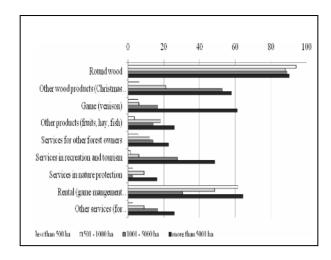


Figure no. 9. Product mix in forest holdings in 2009

Regarding the market expectations of forest owners in 2002 wood and drinking water were considered as the main gains that forests can provide. In long term period recreation, environmental services and carbon sequestration was identified (figure 10).

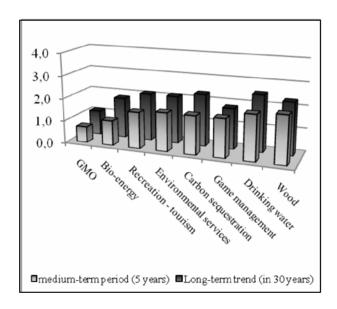


Figure no. 10. Market expectations for forestry in 2002

In the year 2009 (figure 11) bio energy gained a significant role in the market expectations. This is in accordance with the aspirations on the utilization of alternative energy resources. On a global level, the forest biomass resource potentially available for energy is vast. Forests are the main source of energy globally for domestic use & many industries. This opportunity was also recognized by the Slovak forest owners. Wood still remains the main product but other gain a more important role.

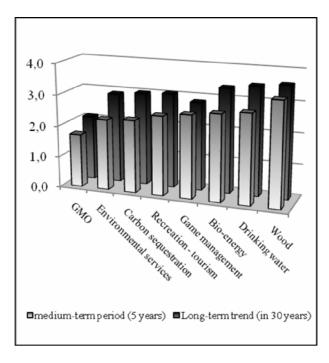


Figure no. 11. Market expectations for forestry in 2009

From the evaluation of both surveys following fostering and impeding factor could be identified (table 1 and 2). Cooperation remains one of the most important fostering factors in the innovation process in both periods. In 2002 the lack of information was identified as one of the impeding factors but changed into fostering factor in 2009.

Table no. 1. Fostering factors in both years

Fostering factors in 2002	Fostering factors in 2009
Cooperation with customers, suppliers	Organizational changes
2. Supply of technological and organizational services	2. Cooperation
3. Support from public sources	3. Information
4. Opportunities for further education	4. Support from public and EU sources

Lack of financial resources is a permanent issue in the innovation process. EU funding mechanisms became an important financial tool for innovation implementation. In recent years the environmental legislation became larger and presents one of the most visible impeding factors for innovation in forestry.

Table no. 2. Impeding factors in both years

Im	peding factors in 2002	Im	peding factors in 2009
1.	Lack of own finances	1.	Lack of financial sources
2.	Lack of finances from other subjects	2.	Tax load
3.	High capital costs	3.	High investments and operating costs
4.	Lack of information about possible new products and services	4.	Laws on nature and environmental conservation
5.	High operating costs	5.	Risk of sales and marketing

DISCUSSION

Generally, the innovations were more common and usually more sophisticated in the state forest enterprises branches in Slovakia. Their high innovation activity does not correspond with the theory of property rights and can be explained by a positive effect of an enterprise size allowing accumulation of financial resources. The innovation activity of forest holdings in Slovakia and other Central European countries appeared comparable in general as well as according to the product, technological and organizational innovations.

There is a limited innovation activity in forest holdings, especially in small ones. Innovations are often incremental and not new for the sector. Another research on this subject in Central Europe undertaken by PC INNOFORCE shows that the most important fostering factors as seen by innovative forest holdings in Central Europe were cooperation, availability of information on innovations and forestry subsidies (Rametsteiner et al., 2005). Cooperation within the sector is also important for Slovak forest holdings but information is seen as a fostering factor only in the 2009 being amongst the impediments in 2002.

The most significant impediments for innovative holdings were sale ability risks, lack of information on sales markets, lack of own funding, high costs and tax load. For non-innovative forest holdings the main impediments were lack of own funds, high costs and lack of information (Rametsteiner et al., 2005). The barriers to innovation are similar in Slovakia and other Central European countries.

CONCLUSION

The ownership type is important for the innovation activity of forest holdings. Large forest holdings were more engaged in innovation process than smaller holdings.

Innovation correlated positively with the holding size, when forest larger holdings innovated more than smaller ones. Therefore there is a need for the smaller forest holdings to cooperate between each other.

Technological – organizational innovations have dominated in 2002 but were overrun by products and services.

In the future, it is assumed by the forest holdings that an increase of importance of drinking water and bio energy will be present which was visible from the 2009 results.

Fostering factors for innovations are interactions within and between enterprises and institutions and the main obstacles for adoption and application of innovations are based on financial aspects.

There has been a shift towards innovation from 2002 in 2009 which is visible in the successful innovation cases. Forest holdings in accordance with the strategic objective 4 of the

National forest programme of the Slovak republic: Increasing long-term competitiveness and priorities strive for increased competitiveness and economic viability of multifunctional forestry by the means of innovating, offering more non-wood forest products, supporting the use of forest biomass to produce energy and cooperation with other forest land owners.

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