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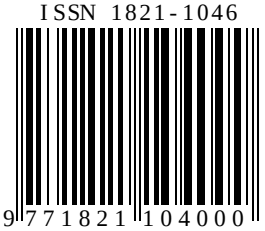

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IMPACT OF INNOVATIVENESS ON NEW TECHNOLOGY IMPLEMENTATION IN FORESTRY COMPANIES

Zoran PODUŠKA[1], Svetlana BILIBAJKIĆ, Renata GAGIĆ-SERDAR, Goran ČEŠLJAR, Ilija ĐORĐEVIĆ, Tomislav STEFANOVIĆ, Radovan NEVENIĆ

Abstract: *This paper presents examples of improvement in operations of the companies within the forestry sector achieved through implementation of new technologies. The improvements in operations are viewed by means of the concepts of innovation and innovativeness. Innovation is understood as a process of improving the existing products and technological and organizational procedures in a company. Innovativeness refers to the company's inclination to adopt and manage changes.*

The research was conducted in public forestry companies, privately owned wood processing companies and NGOs in charge of protected public property stewardship. The data were collected by means of interviews and from other available sources.

The results of the research thoroughly describe the adoption of new or improved products, technological procedures and services. State Forest enterprises mostly improve services such as education on forests and recreation and forestry based tourism. A significant progress has been made in nursery production, through technology and knowhow transfer. Privately owned wood processing companies are introducing new products such as briquettes and pellets. The processes of collecting, purchasing and processing non-wood products are the slowest in modernization.

Key words: innovation, innovativeness, new technologies, forestry companies

УТИЦАЈ ИНОВАТИВНОСТИ НА ПРИМЕНУ НОВИХ ТЕХНОЛОГИЈА У ШУМАРСКИМ ПРЕДУЗЕЋИМА

[1] Institute of Forestry, Kneza Višeslava 3, Belgrade, E-mail: *poduskaz@net022.net*
Translation: Galina Perišić

Извод: *У раду су приказани примери унапређења досадашњег пословања предузећа у шумарском сектору применом нових технологија. Унапређење пословања посматрано је кроз концепт иновација и иновативности. Иновацијом се подразумева процес унапређења постојећих производа и технолошких и организационих поступака у предузећа. Иновативност је склоност предузећа ка прихватању и управљању променама.*

Истраживање је обављено у јавним шумарским предузећима, приватним предузећима за прераду дрвета и невладиним организацијама која управљају заштићеним природним добрима. Подаци су прикупљани путем интервјуа и из других доступних извора података.

Резултати истраживања таксативно приказују примену нових или унапређених производа, технолошких поступака и услуга. Јавна шумарска предузећа углавном унапређују услуге као што су рекреација и едукација у шуми и излетнички туризам. Велики напредак начињен је у расадничкој производњи, кроз трансфер технологија и знања. Приватна предузећа за прераду дрвета уводе нове производе као што су брикети и пелети. Најспорије се модернизује сакупљање, откуп и прерада недрвних шумских производа.

Кључне речи: иновације, иновативност, нове технологије, шумарска предузећа

1. INTRODUCTION

As an industry, forestry has all the characteristics of a traditional branch of economy. It is traditional for it depends upon wood as a basic and most common product and often neglects other forest functions which can provide a basis for new products and services. Another important feature of forestry is its territoriality of both production and supply since they are both carried out in forests. The territoriality trait is associated with products as well as services, which are executed and offered at a given location at the same time (Ranković, 2008). From the viewpoint of innovation, traditional industries are slow in introduction of new technologies while the markets are slow in changing conditions (von Tunzelmann, 2005). Unlike the traditional ones, modern industries which depend on advanced technologies, particularly information and communication technologies. For the purpose of forestry advancement, it is necessary to adopt and implement new technologies, introduce new products, improve business organization and modernize relevant institutions by harmonizing legislation and work procedures. The aforesaid improvements correspond to the concepts of innovation and innovativeness supported by the Organization for Economic Co-operation and Development of the European Commission (OECD 2005) and the Ministry of Education and Science of the Republic of Serbia (2005).

In its broadest sense, innovation means successful implementation and exploitation of new ideas and technologies. Successful conversion of new ideas into commercial success in the market comprises a process of creating innovation. Such a process may be a feature of a company, industry or a country on the whole. This paper deals with the possible commercial implementation of new ideas and technological procedures in the forestry sector in Serbia.

Innovation is a specific phenomenon which is nowadays the subject of more and more scientific literature, yet there is no complete theory formulated about it up to date. The theory that defines the innovation process is still in progress.

Conceptually, innovation is understood as:

- news or novelty,
- innovation process or activity.

Understood as novelty, innovation contains a change which, in its character and manifestation, may be a replacement, addition or restoration within the existing status.

In Serbia, innovation is determined by the Law on innovative activity *("Official Gazette of RS," No. 110/05*). Pursuant to this law, innovation refers to a new product, process, technology or service with unique properties, achieved through application of one's own or other party's scientific research and its results, findings and discoveries, using one's own concept, idea or method for its creation, and placing it into the market at an adequate value.

According to Wagner and Hansen (2005), the term innovation may be used to denote a significant number of a company's activities, such as development of new products, improvement and enhancement of the existing range of products, improvements to the production processes and business operations and introduction and adoption of new production processes and business operations. All the aforesaid suggests that the innovations in businesses have different forms, although the emphasis is always on the products, so that improving the existing products and introducing new ones are still considered to be the most common definition of innovation.

Within forestry sector innovations and innovativeness are becoming crucial to the advancement of the business operations of companies, development of business companies and development of entrepreneurship in general. Development of business companies contributes to the overall development of forestry sector and decrease in poverty, particularly through development of rural areas.

In forestry, innovations are defined as discontinuous changes of products or production processes of a company planned in advance (Rametsteiner *et al*., 2005). This definition encompasses radical or gradual changes within a forestry company, novel to the company itself or to the market. These changes refer to the adoption of the existing innovations as well as those recently created within the given company (Weiss 2011).

For the purpose of the research of innovation and innovativeness in the forestry sector in Serbia, innovation is understood as novelty containing a change which, in its character and manifestation, may be a replacement, addition or restoration within the existing status. Innovativeness refers to the company's inclination to create and adopt changes and its receptiveness to change and successful change management (Stošić 2007).

In contemporary reference works, there are two major innovation categories (Table 1):

- product innovations and
- production process innovations:

Table 1. *Innovation categories*

Product innovations		Production process innovations	
tangible goods	**services**	**technological**	**organizational**

Source: Rametsteiner *et al.*, 2005

Product innovations are changes in what a company offers. They are defined as changes of company's tangible goods or services. Production process innovations are changes of the manner in which what the company produces or has at disposal is created or offered. Production process innovations may be technological and organizational. An innovation may occur through introduction of novelty into the already existing products or processes, changing the way they are perceived.

Since the subject matter of this research is innovation in the forestry sector based on the concept that views the innovation as a process of implementing ideas that create value, it is necessary to recognize where it is possible to adopt and implement one's own or other party's knowledge, skills and ideas through one's own concept or method in order to improve the business operations of a company.

2. METHODS

The research of the process of improving the business operations of forestry companies was carried out from 2004 to 2011. During this period, it was necessary to define successful and less successful attempts of improving business of forestry companies. That is why information on the following aspects needed to be collected:

- innovation process (idea, development, implementation);
- participants and their roles;
- the impact of innovation on the production organization;
- the role and strategy of the state;
- stimulating and limiting factors;
- expected and unexpected results.

For the purpose of primary and secondary data collection, a methodological approach was defined in relation to the subject matter. Primary data were collected by means of the case study method. A case study is specific, descriptive and reaches the depth of the problem. This scientific research method provides a subjective view of the problem, based on the collected information and individual interviews.

Expert and scientific reference works as well as relevant web pages were used as sources of secondary data. The collected data were processed by means of qualitative analysis, whereas the reference works data were analyzed using specific scientific methods (Mihajlović D., 2004):

- analysis-synthesis method,
- abstraction and concretization methods,
- generalization and specialization methods,
- classification methods,
- induction and deduction methods.

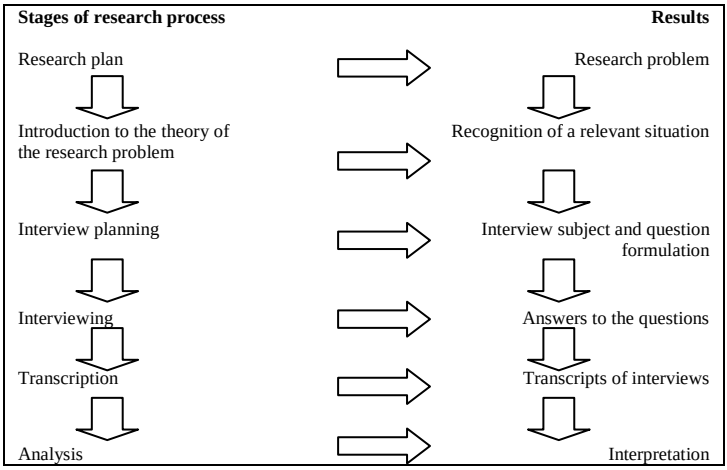
Collecting, processing and interpreting the data included the following stages:

1 Material identification – finding reference works on innovation and entrepreneurship,
2 Material analysis based on the criteria relevant for the research and
3 Data interpretation.

Picture 1 shows stages of the research process. The stages were thoroughly planned and each has a corresponding result. In the initial phases of the research, a plan of research was made to define the subject matter. The subject matter determined the collection of reference works. The result obtained in this stage was the recognition of the relevant situation in the forestry of Serbia. This was followed by planning the interviews, which resulted in designing a questionnaire as an instrument for primary data collection.

As a research instrument, interview is conducted personally. The questions are focused on the subject matter which is defined prior to the interview, and the respondents are informed on the subject matter and the time, venue and the duration of the interview are arranged well in advance. The questions asked aim at disclosing facts and personal opinions of the respondents on the subject matter.

Picture 1. *Stages of the research process*

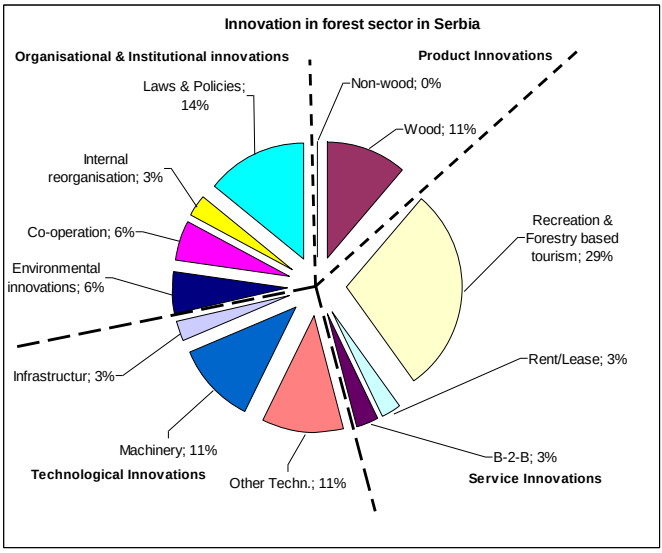


Source:Newman, L., 2006

3. RESULTS

Improvements to the business operations were identified in the public companies in charge of state-owned forest and national park stewardship, privately owned wood processing companies and NGOs in charge of protected property stewardship. Improvements to the forestry products and services were also defined as well as technological, organizational and institutional advancements. Improvements to the business operations in practice up to date are shown in Graph 1.

Graph 1. *Innovation in the forestry sector in Serbia*



Source: Author

Graph 1 presents innovative improvements in the forestry sector in Serbia. The most common improvements were achieved through innovative services, such as recreation and forestry-based tourism. Recreation is a value-added service mostly in protected forests and in devastated habitats as well (Cvejić M., 2008.). The examples of adapting the forest and forest land to a recreational tourism function are:

- Recreation in *Zabran Forest* near Obrenovac;
- Eco-tourism and ethno-tourism in *Golija Nature Park*;
- Educational and tourist trekking in the protected public property of *Obed Swamp,"Obed Tower"*;
- *Ada Ciganlija* Adventure Park;
- Educational trekking in *Bagremara Special Nature Reserve* near Bačka Palanka;
- Eco-tourism and ethno-tourism in *Zasavica Special Nature Reserve*;
- Cycling lanes and eco-tourism in *Djerdap National Park*;
- Hiking trails and eco-tourism in *Djerdap National Park*;
- Bird watching and eco-tourism *Djerdap National Park.*

New technologies:

- A harvester in Vojvodinašume State Enterprise;
- A video surveillance system in Deliblato Sand Reserve;
- New road construction technology in Vojvodinašume State Enterprise;
- A surveillance system in Fruška Gora National Park;
- Implementation of the GIS in the state companies Srbijašume and Vojvodinašume*;*
- New technologies for seed processing in seed product plants in Morović, Požega and Pirot.

New wood products include pellets and briquettes. The production was started in several privately owned companies since 2006. The following companies are successful in pellet and briquette production and marketing: *Bioenergy Point* in Boljevac, a member of the East Point Group from Belgrade with a pellet plant in Doljevac, Zelena Drina and O_3 in Bajina Bašta and Bio Brik in Titel.

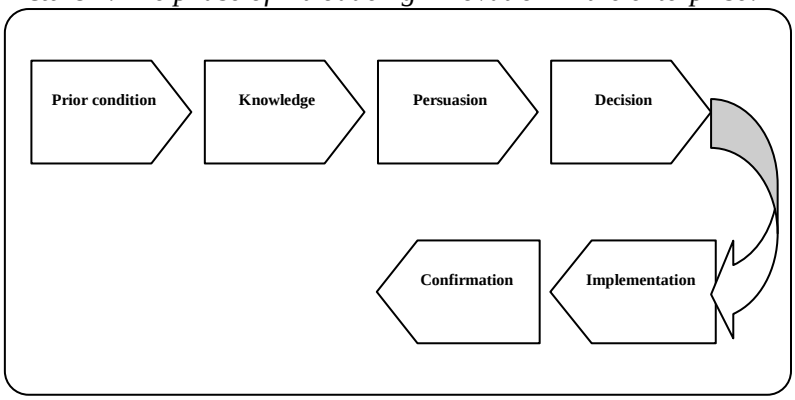
Organizational and institutional improvements in the forestry sector resulted *form* harmonizing a set of laws regulating the area of forestry. Harmonizing the laws and introducing new procedures such as certification decrease the conflict between forestry and nature preservation (Nevenić R., *et.al*. 2008; Nevenić R., *et.al*. 2009). The attempts to advance business operations by means of restructuring public companies have not yet been implemented and therefore exemplify unsuccessful effort toimprove the organization of business operations in Srbijašume State Enterprise. A new way of land usage was introduced through a land lease agreement between Vojvodinašume State Enterprise and Beška Farming Cooperative.

In addition to a detailed list of new products and technological procedures, which were more or less successfully implemented, a process of innovation adoption within a company was established. The process of improving the existing status consists of several stages. Those stages are:

- Prior condition;
- Knowledge;
- Persuasion;
- Decision;
- Implementation;
- Confirmation.

Picture 2 illustrates the stages which correspond to Roger's (Roger, M.E., 1983) phases of innovation diffusion within a business system.

Picture 2. *The phase of introducing innovation in the enterprise*.



Source: Roger, M.E., 1983.

All the observed companies shared the stages of the process of business decision making. They all had the same starting point, the original status, existing prior to improvement introduction. In this stage, the management seeks an opportunity to improve the status by scanning and searching the environment. Employees with their potentials of ideas and knowledge comprise a key factor to

the business success for ideas of improvement originate with the employees. The management needs to have a vision of positive changes and an affinity for introducing changes. It is necessary to convince a broad circle of decision makers that the future innovation will increase the value (of products, services, interpersonal relationships, environment etc). This is the phase of selecting the most promising options. The decision to introduce innovation is a process of expressing readiness to implement novelty and it depends on the company's management. Implementation involves introduction of innovation, from an idea to market implementation. During this phase experience from the preceding successes and failures are analyzed in order to obtain acquisition of new knowledge for improved management of the whole process. Acknowledgement of innovation justifiability is the final stage in the innovation introduction process, where it is acknowledged that the introduced innovation contributes to value increase.

As improving business operations is a dynamic process mostly influenced by company's management decision making, it is vital that the strategy of the company improvement be planned in advance. The strategy of the company improvement depends on human resources, business organization and the business environment of the company.

4. DISCUSSION

The most common innovations in business operations of the companies observed refer to new services on offer, particularly tourism and recreation services. New services in forestry are offered by public companies Srbijašume and Vojvodinašume and national parks Fruška Gora, Tara and Djerdap. New products are offered by privately owned wood processing companies. Some of the companies offer new products such as briquettes and pellets. Advancement in the nursery production has been achieved through application of new technologies in seed processing and preparation for planting.

Based on the analysis of the collected data on improvements in business operations of forestry companies, it may be concluded that innovativeness exists in public, private and non-government sectors. Business decision making in companies is aimed at profit maximization (Sabadi R. 1992), and the business improvement process depends on the company's management decision. This business decision making is an essential part of the process of adoption and market commercialization of new ideas.

In order to initiate improvement in business operations, it is necessary to stimulate employees to develop new ideas and actions. The employees are stimulated to think and behave innovatively by means of professional trainings, education, visits to expert meetings and exhibitions. Financial stimulation of the employees has not yet been observed, i.e. a system of rewarding the employees whose ideas become commercially profitable has not yet been established.

Innovation is not only the path to better business operations, but it also leads to better social relationships, wealthier companies and a wealthier society. Introduction of profitable or cost-effective innovation means a better life for each and every individual. Innovation is the driver of economic growth,

competitiveness, new job creation, particularly in rural areas, and positive changes to the environment and sustainable development.

State institutions' support and stimulation are essential to the development of innovative activities in business companies (Weiss, Rametsteiner, 2005). Most common problems in carrying out innovation projects in order to improve business operations of forestry companies stated during the research include lack of funds, poor technological equipment and computer literacy of the employees, long planning periods and organizational rigidity of the companies due to a centralized system of decision making, which is usually remote from the site of new product or service creation.

5. CONCLUSIONS

Analysis of the research results led to the following conclusions:

- New services such as forest-based tourism and recreation are most frequently improved services in forestry.
- The public sector has a greater and more varied range of new services on offer as well as technological improvements that affect the production process.
- Privately owned wood processing companies develop new products such as pellets and briquettes.
- Non-wood forest product production is by far the most traditional as there is not one example of improvement in collecting, purchasing or processing forest fruits and herbs.
- Large public forestry companies adopt and implement new procedures and standards such as requests for certification of forests on large areas.
- Improvement in business operations of forestry companies are becoming necessary because: they improve the quality of the existing products; create new products and services and enter new markets; reduce labour costs; increase the production volume; allow faster compliance with standards and regulation; reduce negative effects on the environment; reduce material and energy consumption.
- Factors hindering the improvement of forestry companies include: high prices and high risks; lack of information on markets; lack of qualified staff; organizational rigidity of the companies; partial non-compliance with the standards and regulations; lack of information on market demands; lack of information on technologies.

Research of improvement in business operations of forestry companies is a complex process which relies on numerous theories and research methods. For the purpose of result generalization, it is necessary to examine the ways and possibilities to improve public companies as the major factor of the forestry sector in Serbia. In addition to public companies, less successful privately owned companies also need to be analyzed in order to stimulate entrepreneurship. For further research of the process of improving public forestry companies' business operations, cost-benefit analysis ought to be conducted when implementing new technology. Possibilities for additional profit contribution to public companies from sales of non-wood products and services also need to be analyzed.

Development of new products and services such as forest-based tourism and recreation is in accordance with multifunctional character of forests and leads to production diversification and greater competitiveness of forestry companies. Forest-based tourism and recreation comprise the most common examples of business improvement and have a significant role in forestry. Therefore they need to be defined, researched and placed into a context of possible additional profit of forestry companies.

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