

Analysis of Cooperation Between Furniture Industry and Designers in Product Development Process

Analiza suradnje proizvođača namještaja i dizajnera u procesu razvoja proizvoda

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ABSTRACT • *The aim of our research was to analyze the cooperation of furniture industry and designers in product development process. The results indicate the difficulties of and impediments to such cooperation. SWOT analysis was used for analyzing the strengths and opportunities as well threats and weaknesses of cooperation of furniture industry with designers in product development process. The leading management of furniture companies and designers identified greater creativity (more innovative solutions), better design and more fresh ideas as the highest strength and opportunity of cooperation.*

Key words: furniture industry, product development, design, SWOT analysis

SAŽETAK • *U istraživanju je analizirana suradnja industrije namještaja i dizajnera u procesu razvoja proizvoda. Rezultati upućuju na teškoće i suzdržanost pri takvoj suradnji. Primjenom SWOT analize istražene su prednosti i mogućnosti te opasnosti i nedostaci suradnje industrije namještaja s dizajnerima pri razvoju proizvoda. Najvećom korišću od te suradnje vodeći menadžment proizvođača namještaja i dizajneri ocjenjuju veću kreativnost (više inovativnih rješenja), bolji dizajn i više svježih ideja.*

Gljučne riječi: industrija namještaja, razvoj proizvoda, dizajn, SWOT analiza

1 INTRODUCTION

1. UVOD

In recent decades the furniture industry has gone through major changes. The life cycles of products are becoming increasingly shorter, leading to an increasing need for intensified development of new products or

updating the existing ones, and at the same time it is necessary to continually update the technology and equipment as well as to include developmental and research activities, education and the search for financial resources for the development and business operation of companies. Furniture industry needs to recognize that while developing and investing in the organization, computeri-

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zation, automation and equipment, it must also invest in product development. This is certainly a major undertaking, but it is feasible with appropriate strategies of work, business operation and education.

The problem of (non)competitiveness of Slovenian furniture industry is, among other things, also reflected in the lack of innovation and improper or lack of intensive investment in product development. The issue of innovation covers all stages of development from concept, prototyping, through laboratory studies of material and structures, market research as well as research of technological abilities of the company to the selection of concepts and product manufacture. Qualitative development of innovative products of the company is much more difficult to derive by companies themselves due to various socio technological factors (company size, level of education, environment, company strategy, etc.) so it is desirable to develop cooperation with external experts (designers, ergonomists, ecologists, etc.). In many Slovenian furniture companies developing innovative products does not fall between the main strategies of the company's business activities. Companies too often decide to indiscriminately copy and transfer practices from abroad, but this rarely has a long-term positive effect on company performance (Feltrin, 2010).

Our research was carried out to demonstrate the problems of (non)cooperation between the companies and designers as well as external experts for product development and furniture industry. We wished to identify the areas that, due to the current situation, cause negative impacts on product development in furniture industry and the most influencing factors on the development of own products according to the opinion of designers and furniture companies. The literature dealing with the above-mentioned areas (Green and Bonollo, 2002; Hubka, 1987; Perne, 1999; Wainwright, 1995; Hague *et al.*, 2003; LU and Wood, 2006; Howard and Lewis, 2002; Mital, 1994; Blanchard, 1996; Prekrat and Španič, 2009; Jošt and Šernek, 2009; Mughal and Osborne, 1995; Driscoll, 2001; Fabricius, 1994; Kuo *et al.*, 2001; Grošelj *et al.*, 2011; Prekrat *et al.*, 2004), the industry design on the one hand and the area of furniture industry companies on the other hand, can indicate the characteristics of developmental activities of the two poles.

2 MATERIALS AND METHODS

2. MATERIJALI I METODE

Our research includes furniture companies classified as follows:

- manufacture of office and shop furniture;
- manufacture of kitchen furniture;
- manufacture of other furniture.

1325 companies have been classified in accordance with the above classification. Among these companies, manufacturers of wood furniture that employ less than 10 workers were eliminated as well as those that failed to cooperate with external designers in developmental projects. In this way, we selected 147 com-

panies suitable for carrying out the said research. We conducted telephone interviews with each company, in which we presented the problem and determined the adequacy of the company itself. The interviews showed that some companies could develop products, some companies did not cooperate with designers and even had their own development, and some companies simply did not wish to participate. So, we finally received 138 responses and processed their results.

A separate questionnaire was also developed to obtain the opinions of designers involved in product development in the Slovenian furniture companies. We obtained 111 completed questionnaires of active furniture designers.

The interview was used as a research method, and the questionnaire as a research tool. In the research, the measurement of phenomena was done by using different approaches. For some questions in this study we used a nominal scale, which involves a simple form of measurement, when a specific number is used only to identify the object of study or any of the characteristics (gender, demographic area, etc.) We also used calculating operations, where we counted individual phenomena, and among different scales of measurement, we used the ordinal scale, which was very useful and of great assistance in classifying objects of research according to certain characteristics (excellent, very good, good, satisfactory, unsatisfactory, etc.).

Our questionnaire mainly consisted of closed type questions, which were answered by respondents so that they chose between pre-prepared answers. The answers were mutually exclusive and we have tried to formulate them in such a way that they covered a greater range of plausible answers. Such system was mainly used because it is much easier to explain and to classify answers to closed type questions. Some questions were dichotomous, i.e. they were offered just two completely opposite possibilities, and most of the questions were provided with multiple-choice answers. We also used Likert scale, where respondents expressed their degree of agreement / disagreement with a given position, and some questions were designed so that the respondents evaluated the answers based on a scale according to the characteristics of the specific items. In addition, we also used evaluation scale and sorting by relevance.

We carried out a SWOT analysis of cooperation of furniture industry companies with designers in the development of products. Designers and the leading managers in the furniture industry companies have evaluated factors that represent strengths and opportunities for product development with the assistance of external experts, as well as threats and weaknesses that may arise in such cooperation.

3 RESULTS AND DISCUSSION

3. REZULTATI I DISKUSIJA

At the beginning of our research, we asked the leading managers in the furniture companies and designers whether they believed that the Slovenian furniture industry companies should invest more resources in

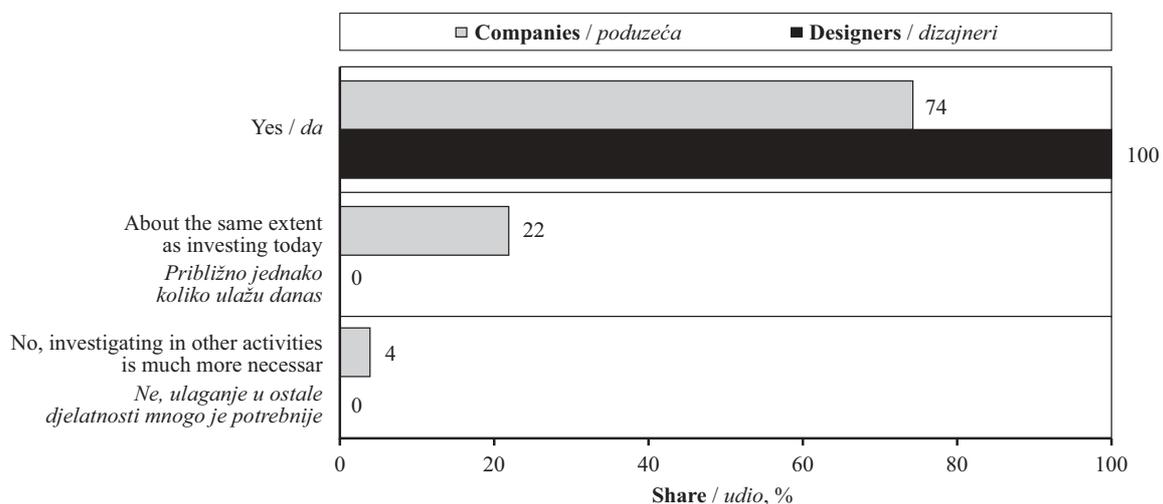


Figure 1 The need for greater investment in product development as compared with investment in other activities. (Number of companies (N) = 158, number of designers (N) = 111)

Slika 1. Potreba za većim ulaganjima u razvoj proizvoda nego u druge djelatnosti. (Broj poduzeća (N) = 158, broj dizajnera (N) = 111)

the development of their own products as compared to investing in other activities. The answers are shown in Figure 1.

Figure 1 indicates the same views of companies and designers, and namely that they should invest more in developing their own products than in other activities within the company. Experts are completely convinced of that, one fifth of companies would invest the same amount of resources into product development as done so far, while a few companies interestingly believe that investing in other activities is much more important.

To learn further about the availability of designers 'on the market', we asked the leading management in companies and designers whether they believed that Slovenia had enough designers, professionals or organizations that furniture companies could engage for product development. The answers are shown in Figure 2.

Almost two third of the companies believe that experts are available, but companies make no use of that (50%) or are unable to afford that (13%), while more than one third of responsible managers in the companies (38%) believe that there are not enough such professionals. It is very important for our study to note that companies are aware of the presence of these

experts, and however they do not engage them, which suggests a missed opportunity.

To better understand the lack of quality of cooperation of companies and designers in product development, we wanted to establish by a questionnaire to whom and to what extent an individual's "prejudices" affect the interest in cooperation. The question was: "Evaluate factors that affect the disinterestedness of furniture industry companies to cooperate with designers and other external experts. «Evaluations in this case meant: 5 – I agree with the statement, 3 – it applies in certain cases, and in certain cases it does not apply, 1 – I disagree with the statement. The answers are shown in Figure 3.

The most problematic factor in our study proved to be »very few examples of good practice, bad experience from the past«, which was confirmed by more than one third of the companies. Since there are only few examples of good practice, the companies rather choose other ways of operation, because they do not recognize opportunities and strengths in cooperation.

Through SWOT analysis, we examined the factors that, in the opinion of the leading management of the furniture companies, represent the strengths and opportunities in product development with designers. In doing so, evaluation 5 meant that the factor repre-

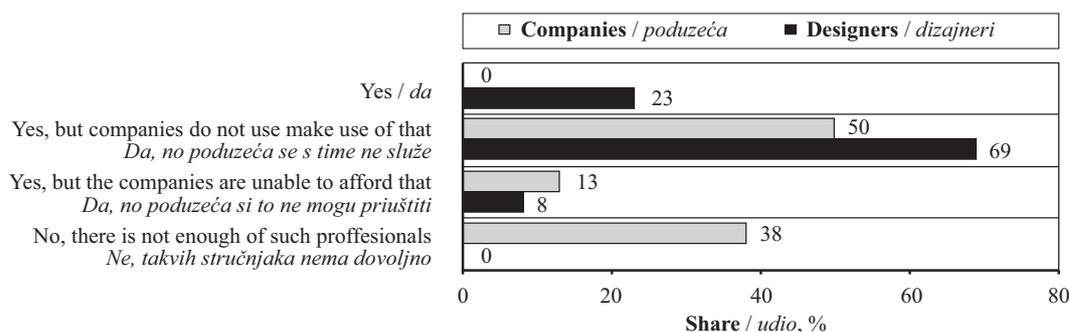


Figure 2 Opinion on the availability of appropriate designers for product development. (Number of companies (N) = 158, number of designers (N) = 111)

Slika 2. Dostupnost odgovarajućih dizajnera za razvoj proizvoda. (Broj poduzeća (N) = 158, broj dizajnera (N) = 111)

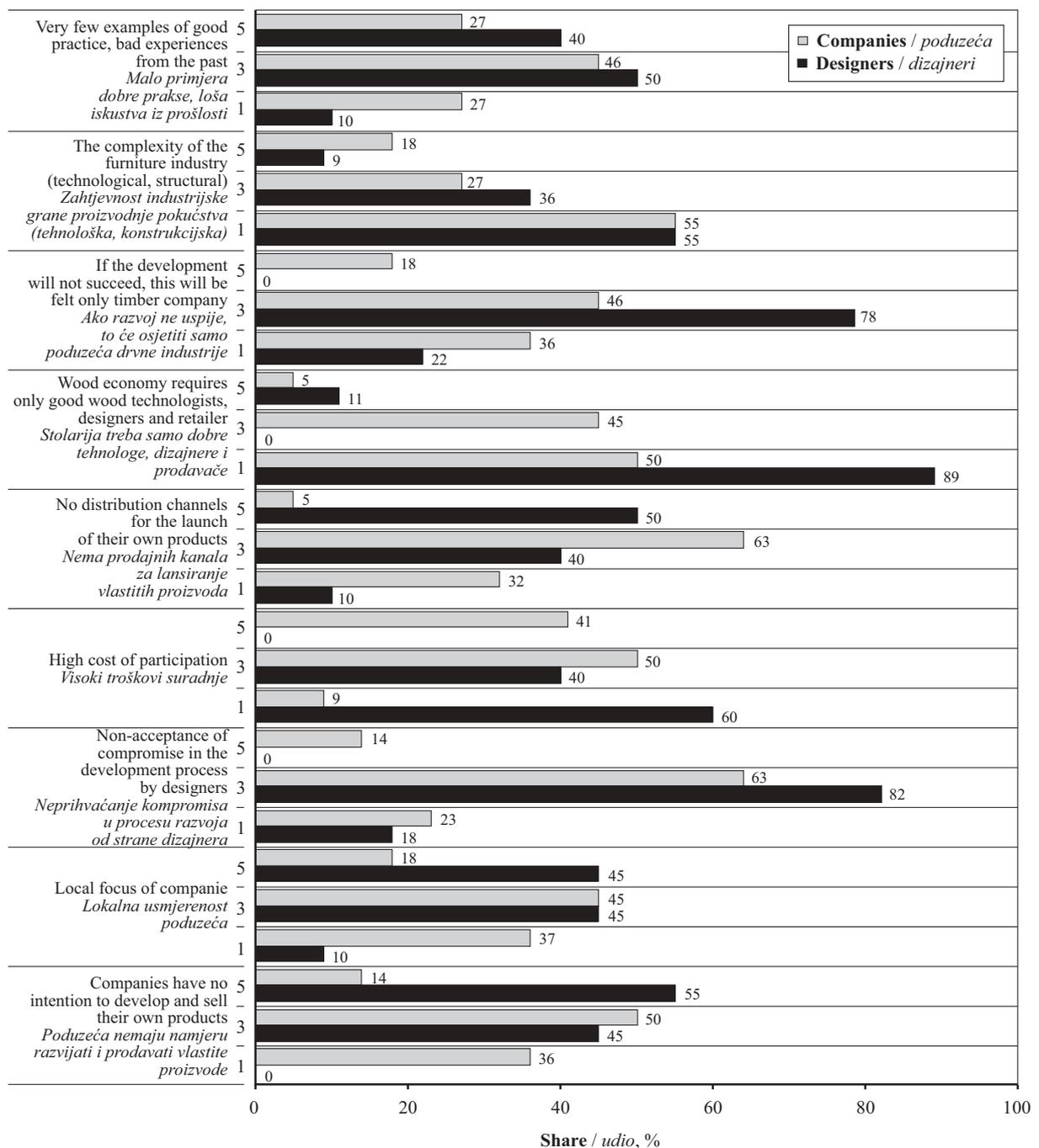


Figure 3 Impact factors on non-desirability of companies to work with designers. (Number of companies (N) = 158, number of designers (N) = 111)

Slika 3. Utjecajni čimbenici nepoželjnosti tvrtki za rad s dizajnerima. (Broj poduzeća (N) = 158, broj dizajnera (N) = 111)

sents an important priority, 3 that the factor is partly important and 1 that the factor is not important at all. Figure 4 shows the first part of the SWOT analysis.

Both designers and leading management of the companies evaluated “the greater creativity (more innovative solutions), better design and more fresh ideas” as the highest strength and opportunity among the selected factors. The next best evaluated strength and opportunity in the product development with designers represented “building your own brand through an image of an external expert”. Nearly 80% of designers and more than one half of the companies made such assessment. The results are expected and stress the advisability of their cooperation with external experts.

Figure 5 shows the second part of the SWOT analysis of cooperation of companies with designers. Respondents evaluated the factors that may affect the threats and weaknesses of product development with the help of designers who are not employees of the company by evaluations: 5 - very critical, 3 - medium critical, 1 - non-critical.

According to nearly half of the designers and half of the companies that participated in the research, ignorance of the market and customer in the products development process is very problematic. Market and customer research is actually one of the basic phases in the project of product development. Conducting a thorough market research can provide an easier and sim-

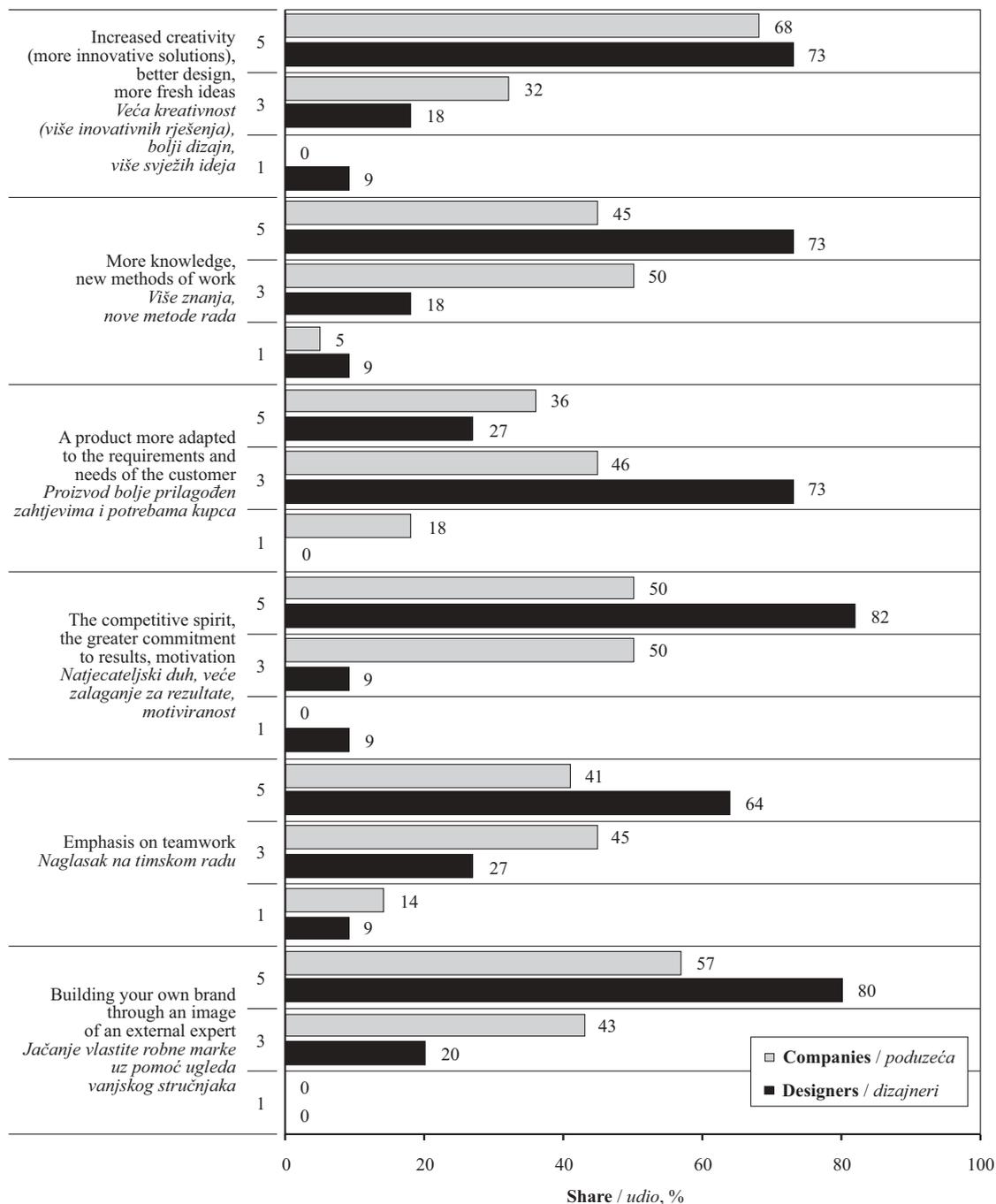


Figure 4 Strengths and opportunities of product development by designers who are not employees of the company. (Number of companies (N) = 158, number of designers (N) = 111)

Slika 4. Prednosti i mogućnosti razvoja proizvoda od dizajnera koji nisu zaposleni u poduzeću. (Broj poduzeća (N) = 158, broj dizajnera (N) = 111)

pler process and more qualitative results of development. Lack of confidence in the skills of designers has also proved to be very critical – both by companies and designers. Nearly one half of the companies evaluated very critically the non-familiarity with the methods of work in the company. This factor was evaluated as very critical by only one fourth of designers.

We also wanted to know which information was considered relevant and important in the product development by the company leading management and designers. Table 1 shows the answers classified according to the percentages from the most important ones to the least important ones.

Table 1 clearly indicates comparable evaluations made by designers and companies in all cases, with the exception of the evaluation of reasonableness of information on organization of the company, knowledge and human resources in it, on company activities (basic, additional, future ones, cooperation) and economic indicators of the company. In the above-mentioned cases more than one half of the designers identified information as necessary, while the companies identified them as partially necessary for the development of products.

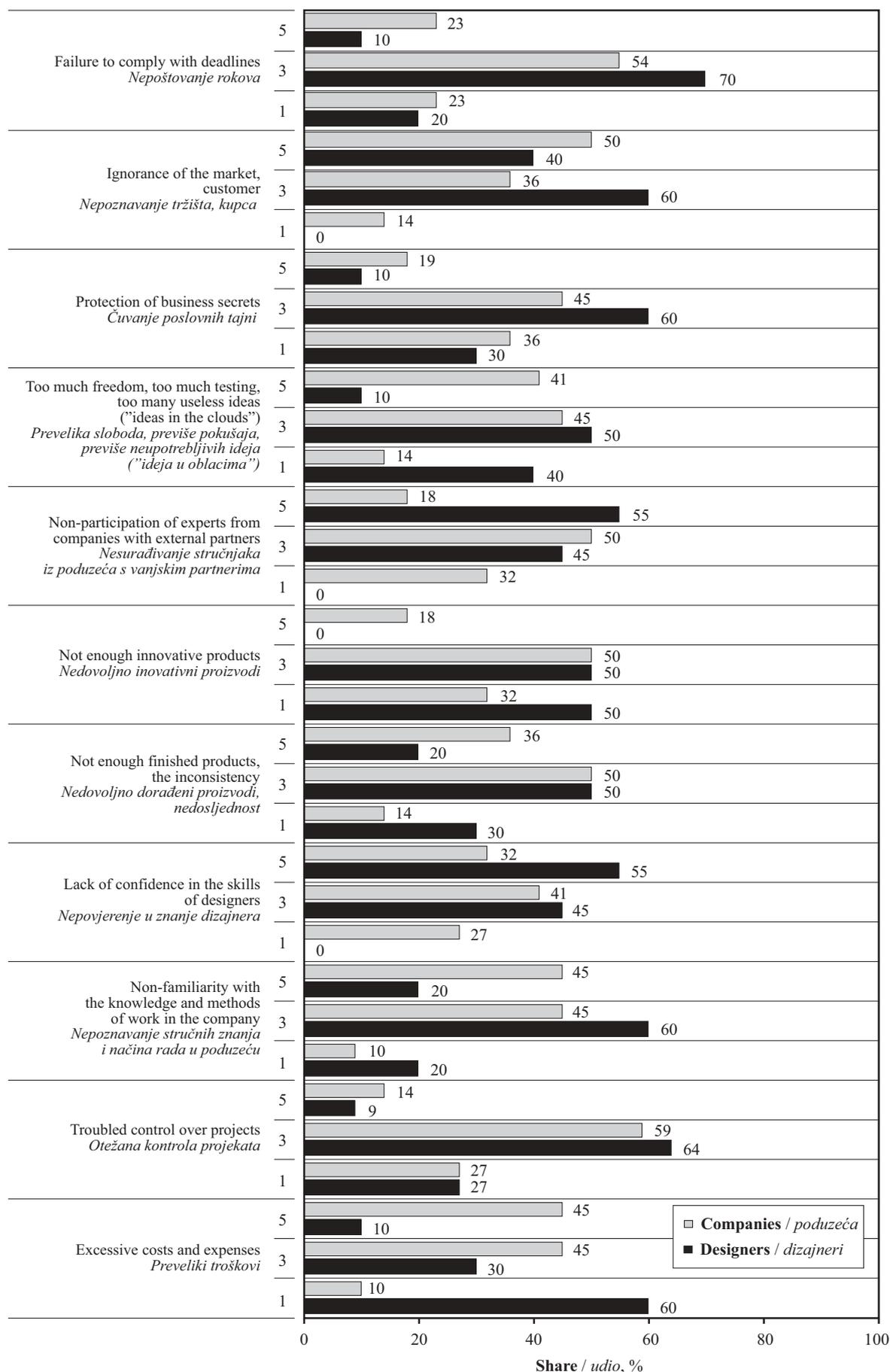


Figure 5 Threats and disadvantages of product development by designers who are not employees of the company. (Number of companies (N) = 158, number of designers (N) = 111)

Slika 5. Prijetnje i nedostaci razvoja proizvoda od dizajnera koji nisu zaposleni u poduzeću. (Broj poduzeća (N) = 158, broj dizajnera (N) = 111)

Table 1 Key information about the company in product development process

Tablica 1. Ključne informacije o poduzeću u procesu razvoja proizvoda

Very important information <i>Vrlo važna informacija</i>	Companies <i>Poduzeća</i> %	Designers <i>Dekorateri</i> %
Strengths and opportunities of a company / <i>prednosti i mogućnosti poduzeća</i>	95	91
Characteristics of products that will be the most desired ones among potential buyers in future <i>svojstva proizvoda koja će u budućnosti biti najpoželjnija za potencijalne kupce</i>	91	91
Company markets (niches, competition, etc.), buyer, price ranger, etc. <i>tržišta poduzeća (niše, konkurencija...), kupac, cjenovni razred, ...</i>	90	82
Trademarks of the company, classification, objectives, vision <i>Robne marke poduzeća, uvrštavanje, ciljevi, vizija</i>	77	91
Characteristics of the actual products (materials, technology, etc.) <i>značajke postojećih proizvoda (materijali, tehnologija, ...)</i>	64	64
The current situation (technology, marketing, advertising, competition, etc.) <i>postojeće stanje (tehnologija, komercijalizacija, promidžba, konkurencija, ...)</i>	59	64
Expected investments (technology, human resources, development, etc.) <i>Predviđene investicije (tehnologija, kadrovi, razvoj,...)</i>	50	64
Company deficiencies / <i>nedostaci poduzeća</i>	50	45
Company organization, knowledge, human resources / <i>organizacija poduzeća, znanje, kadrovi</i>	41	55
Basic, additional and future activities, cooperation <i>osnovne, dodatne i buduće djelatnosti, kooperacija</i>	36	55
Economic indicators of the company (sales, profit, development resources, etc.) <i>ekonomski pokazatelji poduzeća (prodaja, dobit, sredstva za razvoj, ...)</i>	32	55
Less important information / <i>manje važna informacija</i>		

4 CONCLUSION

4. ZAKLJUČAK

The survey showed the unity of designers and companies who believe that in the past there were more innovative and designed products in the furniture industry and that industry should improve the ratio of investment in development, compared to investing in other activities. According to the interviewed companies and designers, in the development of innovative products it is most difficult to provide and ensure resources for the development and low costs of the complete process (development, production, sales, etc.) with regard to the achieved outcome. Companies believe that it is difficult to ensure the implementation in due time, designers are of the opinion that it is difficult to ensure a high degree of innovation, concentration skills and / or the professionals or teamwork.

There is only a small level of cooperation between the companies and designers and other professionals. In order to achieve a better cooperation, it is firstly necessary to overcome the myths and formal barriers of high costs of participation, to be aware of the importance of project work, innovation, cooperation at all levels and of poor negative experiences. As confirmed by our research, it is necessary to consolidate and strengthen the awareness that an individual does not have all the necessary skills and practical ability to handle the scale, which is required today by high-quality product development.

5 REFERENCES

5. LITERATURA

1. Blanchard, D., 1996: Design for Manufacturability. Printed circuit design, 13 (9): 14–21.

2. Driscoll, M. O., 2001: Design for manufacture. Journal of Materials Processing Technology, 122: 318–321. doi:10.1016/S0924-0136(01)01132-3

3. Fabricius, F., 1994: A seven step procedure for Design for Manufacture. World Class Design to Manufacture, 1 (2): 23–30. doi:10.1108/09642369210054243

4. Feltrin, M., 2010: Perspektive in pogoji za usmerjen razvoj konkurenčnih, inovativnih izdelkov v slovenski pohištveni industriji. Magistrsko delo, Ljubljana, Biotehniška fakulteta, 148 p.

5. Green, L.N.; Bonollo, E., 2002: The development of a suite of design methods appropriate for teaching product design. Global Journal of engineering education, 6 (1): 45–51.

6. Grošelj, P.; Pezdevšek Malovrh, Š.; Zadnik Stirn, L., 2011: Methods based on data envelopment analysis for deriving group priorities in analytic hierarchy process. Central European Journal of Operations Research, DOI: 10.1007/s10100-011-0191-x

7. Hague, R.; Mansour, S.; Saleh, N., 2003: Design opportunities with rapid manufacturing. Assembly Automation, 23 (4): 346–356. doi:10.1108/01445150310698643

8. Howard, L.; Lewis, H., 2002: The development of a database system to optimise manufacturing process during design. Journal of Materials Processing Technology, 134: 374–382. doi:10.1016/S0924-0136(02)01127-5

9. Hubka, V., 1987: Principles of engineering design. Berlin, Heurista: 118 p.

10. Jošt, M.; Šernek, M., 2009: Shear strength development of the phenol-formaldehyde adhesive bond during cure. Wood science and technology, 43 (1-2): 153-166. doi:10.1007/s00226-008-0217-2

11. Kuo, T.C.; Huang, S.H.; Zhang, H.C., 2001: Design for manufacture and design for »X«: concepts, applications and perspectives. Computers and Industrial Engineering, 41 (3): 241–260. doi:10.1016/S0360-8352(01)00045-6

12. LU, Q.; Wood, L., 2006: The refinement of design for manufacture: inclusion of process design. International Journal of Operations & Production Management, 26 (10): 1123–1145. doi:10.1108/01443570610691102

13. Mital, A., 1994: The role of ergonomics in design for manufacturability and human in advanced manufacturing technology: Preparing the American workforce for global competition beyond the year 2000. *International Journal of Industrial Ergonomics*, 15: 129–135. doi:10.1016/0169-8141(94)00073-C
14. Mughal, H.; Osborne, R., 1995: Design for profit. *World Class Design to Manufacture*, 2 (5): 16–26. doi:10.1108/09642369310095184
15. Perne, T., 1999: Razvoj novega izdelka. *Podjetnik*, 15 (8): 28–33.
16. Prekrat, S.; Jazbec, A.; Pervan, S., 2004: Analysis of the bending moment of innovative corner joints during static testing, *Wood Research* 49 (1): 21-32.
17. Prekrat, S.; Španič, N., 2009: Znanstvene metode određivanja drvnih konstrukcija kutnih sastava, *Drvena industrija*, 60 (4): 245-251.
18. Wainwright, C., 1995: Design: a missing link in manufacturing strategy. *World Class Design to Manufacture*, 2 (3): 25–32. doi:10.1108/09642369310087075

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