



InnoRenew CoE Renewable Materials and Healthy Environments
Research and Innovation Centre of Excellence

**WP 6.7 Revitalisation of traditional industry: An open innovation framework
for Slovenia's furniture sector**

Report on the Survey on Innovation Activities in the Wood-Based Value Chain

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1 Introduction

Slovenia was identified as a region lagging in innovation, and this is particularly noticeable in the country's forest-based value chain. However, Slovenia's Smart Specialisation Strategy identified this industry as having a strong potential for growth. To leverage the innovation and growth potential of the chain, we need to gain a deeper understanding of existing innovation activities and the reasons for the lack of innovation activities. While there is a large body of literature on innovation activities of small (10-49), medium (50-249), and large enterprises (250+ employees), there is little known about micro-enterprises (i.e., less than 10 employees).

On the EU level, data on innovation activities are collected by the Community Innovation Survey (CIS), which has been carried out every two years since 2006. It is part of the European Union science and technology statistics and is carried out in several EU and ESS member countries, including Slovenia. However, CIS only includes enterprises with 10 or more employees. Since micro-enterprises represent more than 90 % of wood value chain enterprises in Slovenia, data on their innovation activities is needed to fully understand it. Thus, we carried out our own survey on innovation activities of Slovenian enterprises in the forest-based value chain based on the CIS instrument.

In this report, we present the methodology, data collection and descriptive statistics computed based on answers of participating enterprises. In addition, for selected items, we computed crosstabulations by enterprise sector and size. Finally, we summarise the findings and outline directions for future research.



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2 Methodology

The units of analysis are enterprises and the research method used was a survey interviewing their representatives about their innovation activities in the reference period from 2016 to 2018. In this section, we first present the questionnaire and then the characteristics of the sample.

2.1 Questionnaire

Data was collected using a structured paper questionnaire, but there was also an option to respond in an online format that was created using the LimeSurvey software tool. Most of the questions were single choice, but there were also a few multiple-choice and open-ended questions.

Almost all questions were based on the CIS questionnaire (1, 2, 3ab, 4ab, 5ab, 6ab, 7, 8abc, 9, 10ab, 11, 12, 13, 14, 16ab, 18, 20ab, 21 and 24), but they were adapted for the self-administered survey mode and some were ordered differently. In addition to CIS questions, there were also some additional ones developed by us (15ab, 17ab, 19ab, 22, 23, 25abc, 26ab and 27).

Questions 19a and 19b were tailored to the different sectors of the enterprises that we included. Forestry, wood, paper, and furniture manufacturing enterprises were asked about the use of by-products, while other manufacturing, construction and wholesale enterprises were asked about the use of wood products. Thus, four versions of both the paper and the online questionnaire were prepared. The master questionnaire is shown in Appendix A.

The mailing sent to enterprises contained one of the four versions of the printed questionnaire (with enclosed postage-paid return envelope), an information sheet with frequently asked questions (Appendix B) and the cover letter (Appendix C) that included a link to one of the four online versions of the questionnaire.

2.2 Sample

The population was active enterprises (in January 2019) in the forest-based value chain created before 1 January 2016. For this study, we used a working definition of the forest-based value chain that includes enterprises whose main activity according to the Standard Classification of Economic Activities in the European Community (NACE) is forestry (A02), wood manufacturing (C16), paper manufacturing (C17), furniture manufacturing (C31), other manufacturing (C32), construction (F41) or wholesale (G46).

The Bizi.si database, accessed through a paid account, was used as a sampling frame. A detailed breakdown with subcategories is presented in Table 1. The last column presents the expected number if the response rate is 10 %, which is low but matches available data on response rates in business surveys. Given the low expected response rate, we decided to carry out a full population study.



Table 1: Number of enterprises in Bizi.si for selected NACE codes

NACE code	English name	Number of enterprises*	Expected RR 10 %
A02.100	Silviculture and other forestry activities	28	3
A02.200	Logging	390	39
A02.400	Support services to forestry	322	32
C16.100	Sawmilling and planing of wood	644	64
C16.210	Manufacture of products of wood, cork, straw and plaiting materials	33	3
C16.220	Manufacture of assembled parquet floor	6	1
C16.230	Manufacture of other builders' carpentry and joinery	545	55
C16.240	Manufacture of wooden containers	138	14
C16.290	Manufacture of other products of wood, manufacture of articles of cork, straw and plaiting materials	381	38
C17.110	Manufacture of pulp	1	0
C17.120	Manufacture of paper and paperboard	9	1
C17.210	Manufacture of corrugated paper and paperboard and containers of paper and paperboard	68	7
C17.220	Manufacture of household and sanitary goods and toilet requisites	15	2
C17.230	Manufacture of paper stationery	10	1
C17.290	Manufacture of other articles of paper and paperboard	49	5
C31.010	Manufacture of office and shop furniture	353	35
C31.020	Manufacture of kitchen furniture	183	18
C31.090	Manufacture of other furniture	459	46
C32.120	Manufacture of jewellery and related articles	256	26
C32.130	Manufacture of imitation jewellery and related articles	11	1
C32.200	Manufacture of musical instruments	32	3
C32.300	Manufacture of sports goods	51	5
C32.400	Manufacture of games and toys	34	3
C32.910	Manufacture of brooms and brushes	6	1
F41.100	Development of building projects	560	56
F41.200	Construction of residential and non-residential buildings	2091	209
G46.73	Wholesale of wood, construction materials and sanitary equipment	448	45
Total		7123	712

*Note: We excluded nonactive enterprises, those created after the 31st of December 2015, those that are bankrupt or in the liquidation process, agrarian communities, associations, and interest groups.

The data we downloaded from the Bizi.si registry contained the following data fields: Name, Long name, E-mail, Address, Addressee, Post, Telephone, Date of registration, VAT ID, Legal form, NACE code and Number of employees. Below, we present the sample through some key statistics.



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Table 2: Sampled enterprises by year registered

Enterprise registered	Frequency	%
Before 1980	23	0.3
From 1980 to 1989	103	1.4
From 1990 to 1999	1979	27.8
From 2000 to 2009	2239	31.4
From 2010 to 2015	2779	39.0
Total	7123	100.0

Table 3: Sampled enterprises by size

Enterprise size	Frequency	%
Micro (0-9)	5427	89.9
Small (10-49)	521	8.6
Medium (50-249)	75	1.2
Large (250+)	14	0.2
Total known	6037	100.0
*No data about size	1086	
Total	7123	

Table 4: Sampled enterprises by legal form

Enterprise legal form	Frequency	%
Ltd.	3466	48.7
Solo trader	2900	40.7
Other	757	10.6
Total	7123	100.0

Table 5: Sampled enterprises by postal district

Postal district	Frequency	%
Ljubljana	2594	36.4
Maribor	1028	14.4
Celje	892	12.5
Kranj	763	10.7
Nova Gorica	525	7.4
Koper	561	7.9
Novo mesto	554	7.8
Murska Sobota	206	2.9
Total	7123	100.0

As seen in Table 2, 39 % of the enterprises in the sample were registered between 2010 and 2015, 31 % in the 2000s, 28 % in the 1990s, 1 % in the 1980s and just 23 enterprises before that year. In Table 3, enterprises are grouped according to the enterprise size, which is known for 6037 units (85 % of the total sample): almost 90 % of them have less than 10 employees, almost 9 % between 10 and 49 employees, 1 % between 50 and 249 employees, and there are just 14 enterprises with 2500 or more employees. Table 4 indicates the type of legal organisational form: 49 % of the sample are limited liability enterprises, 41 % are sole traders, and the rest have other legal organisational forms. Last, in Table 5, enterprises are grouped according to their postal address — more than 36 % of the enterprises are from the Ljubljana postal district.

While the postal address is available for all 7123 enterprises on the list, the phone number was available for only 70 % and the e-mail address for only 32 % of the enterprises; only 31 % of the enterprises had both a phone and e-mail, as can be observed in Table 6. Thus, we decided to carry out a postal survey.

Table 6: Availability of phone number and e-mail address in the sample

	Phone	No phone	Total
E-mail	2192 (30.8 %)	103 (1.5 %)	2295 (32.2 %)
No e-mail	2795 (39.2 %)	2033 (28.5 %)	4828 (67.8 %)
Total	4987 (70.0 %)	2136 (30.0 %)	7123 (100.0 %)



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3 Results

Data was collected between 15 February and 15 October 2019, and in total, we received a fully completed questionnaire (by mail or online) from 294 enterprises. First, we describe the course of data collection and how response rates were calculated. Second, we present univariate statistics for the total sample of respondents, and third, we compute selected statistics for different sectors to compare them. Last, results are compared for different enterprise sectors and sizes. Data¹ was analysed using statistical software IBM SPSS Statistics 27 – the syntax can be found in Appendix D.

3.1 Data collection

The first mailing was sent on 15 February 2019 to all 7123 addresses. Some enterprises returned the completed questionnaire in the enclosed envelope, while some replied online. Some enterprises used the contact information (mail, e-mail, and phone) to contact and inform us that they did not want to participate. In some cases, the reason for nonparticipation was that the enterprise is not eligible to participate.

For some enterprises, the postal delivery failed, and we were returned the mailing with a stamp indicating the reason why it could not be delivered (unknown address, gone away, insufficient address, refused, unclaimed or other). We coded some of them as ineligible, while for those with unknown eligibility and the remaining enterprises that did not reply by mid-March, we sent an e-mail and then another e-mail in April, both including a link to the survey. For some addresses, we received a bounced e-mail indicating the reason (unknown 'To' address, failed delivery, policy violation or system error, address rejected, not authorized for replay, full mailbox, or mailbox unavailable). Some enterprises replied to refuse participation; some provided information, based on which we labelled them as not eligible to participate.

Printing and sending a second letter and questionnaire to all units that did not reply and had not been found ineligible by the end of June (91 % of the initial sample) was a substantial cost that exceeded the budget. Thus, we decided to send a letter reminder only to enterprises with the main activity of either Manufacture of wood and products of wood and cork (C16) or Manufacture of furniture (C31), as these two were most central to the topic of the project. The letter was sent out to 2538 addresses on 15 July, and two e-mail reminders were sent in August (as well as in September, in some cases). The third and fourth e-mail reminders were also sent to enterprises that were not sent the second paper letter.

For units where the postal delivery failed and there was no e-mail address or the e-mail address bounced, we carried out a manual check of eligibility in the Bizi.si database, observing information for attributes of enterprises that are visible on the website (e.g., not in business, bankrupt, liquidated) but cannot be downloaded (even for paid accounts). Since the process took too much time, we could

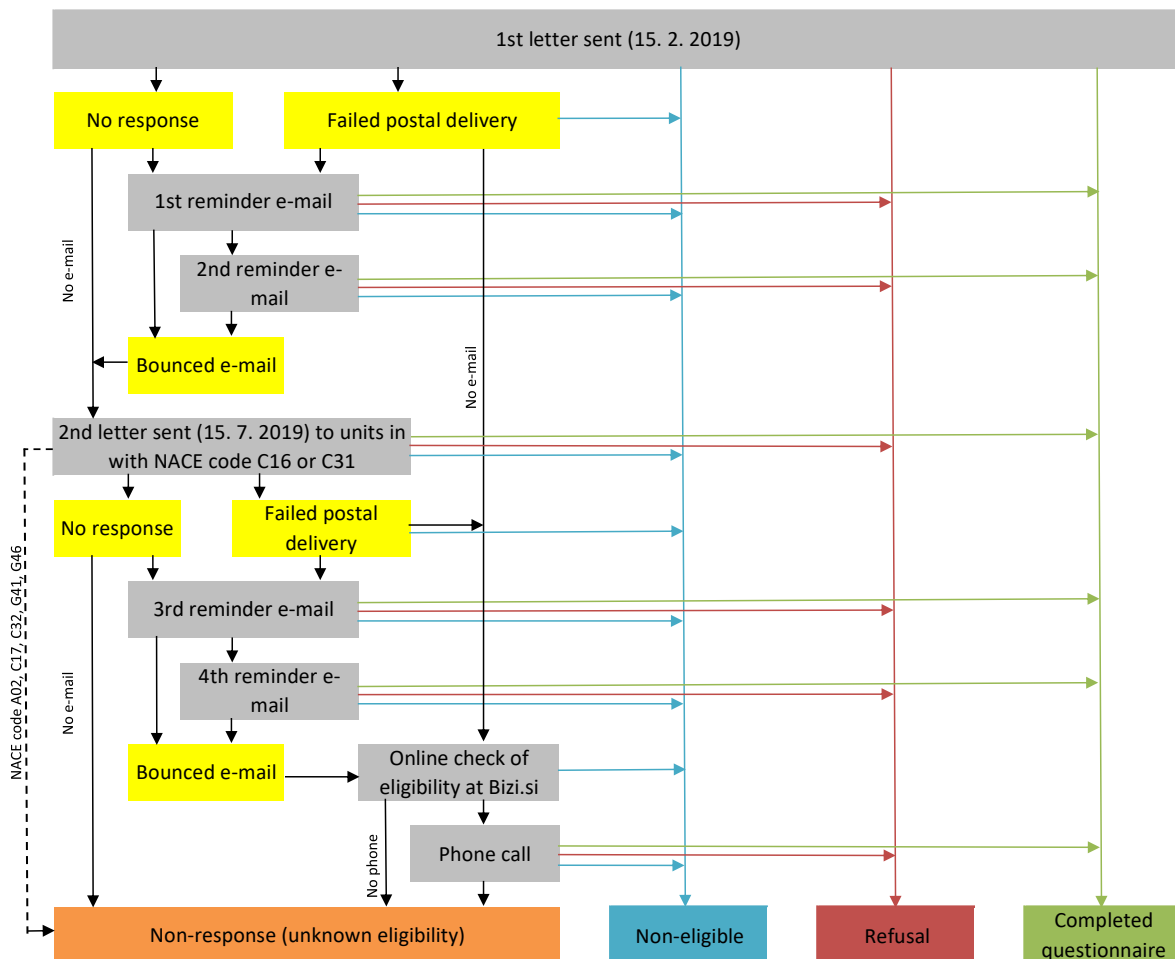
¹ Data is available via the Slovenian Social Science Data Archives: https://doi.org/10.17898/ADP_INDEP19_V1



not do it for all the units. Finally, we also called some enterprises by phone to try to establish their eligibility.

Figure 1 summarises the workflow that was established for contact and recontact procedures (mail, e-mail, and phone). We assigned each unit to one of the four final disposition codes based on the Standard Definitions of the American Association for Public Opinion Research (AAPOR)² that were developed for household surveys, but it is possible to adapt them also to business surveys. The four codes are: interviews (**completed questionnaires**), eligible cases that are not interviewed (mostly **refusals** but also uncompleted questionnaires), cases that are **not eligible** (removed), and cases that we were not able to contact and establish if they meet the criteria for participation (**unknown eligibility**). The disposition codes are important because they are used to compute response rates.

Figure 1: Overview of contact procedures



² AAPOR Standard Definitions. Final Dispositions of Case Codes and Outcome Rates for Surveys. Revised 2016. Available at: https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf



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By the end of data collection on 15 October 2019, we had 294 completed responses, 262 refusals, 336 ineligible units and 6233 units with no answer (6235 when counting the two with unknown ID). Table 7 shows the breakdown of categories by NACE code and response rates that were calculated following the AAPOR Standard Definitions. Specifically, the Response Rate 2 (RR2) formula that is the ratio of completed rates with the total sample without units that are not eligible was used to calculate the outcome. The response rate is the highest for wood (6.8 %) and paper (6 %) manufacturing and furniture (5.9 %), while it is the lowest for the construction sector (2.4 %).

Table 7: Overview of responses by NACE codes on the 15th of October 2019

NACE code	Sample	Unknown eligibility	Not eligible	Refusal	Completed	RR (%)
Forestry (A02)	740	687	12	15	26	3.6
Construction (G41)	2651	2310	198	84	59	2.4
Wholesale (G46)	448	372	31	30	15	3.6
Furniture (C31)	995	864	29	45	57	5.9
Wood (C16)	1747	1513	53	65	116	6.8
Paper (C17)	152	135	2	6	9	6.0
LT other (C32)	390	352	11	17	10	2.6
Unknown*	2	0	0	0	2	-
Total	7125	6233	336	262	294	4.3

*Note: Two units completed the online form without ID.

Table 8 is a more detailed breakdown of the final statuses:

- Among the 294 units that completed the questionnaire, there are 289 that completed it fully and 5 that did so only partially (but enough not to be excluded from the response database). In total, 219 (74 %) responded on paper and 75 (26 %) responded by filling the online form.
- Among the 262 units coded above as refusals, only 237 are actually refusals, while the others are units that are known to be eligible but did not respond (5 of them said they would participate but we did not receive their response by the end of data collection), 9 of them started to complete the questionnaire but did not finish, 10 were identified as eligible but did not refuse nor did they participate, while 1 unit said they sent a partially completed paper questionnaire but we never received it.
- Among the 336 ineligible units, 69 were removed as duplicates of other units in the sample, 215 were not in business, 33 were bankrupt, 5 were retired, in 2 cases the owner died, 5 were in the process of liquidation, 5 changed their activity to something outside of the wood-value chain and 2 were foreign enterprises.
- Among the 6233 units with unknown eligibility, there were 24 failed postal deliveries due to unknown addresses, 20 failed postal deliveries due to change of address, 292 bounced e-mails, 1504 units that did not reply after four e-mail reminders, 1486 units that did not reply after two letters and 2097 that did not reply after one letter.



Table 8: Detailed description of final status on the 15th of October 2019

	Detailed status	Count
Completed	1 - fully completed	289
	2 - partially completed	5
Refusal, i.e., eligible but did not participate	31 - refusal	237
	32 - eligible, wanted to participate but did not complete questionnaire	5
	33 - started responding but did not complete	9
	34 - eligible but no response after four e-mail reminders	10
	35 - partially completed (but lost)	1
Not eligible	41 - non-eligible (duplicate)	69
	42 - non-eligible (not in business)	215
	43 - non-eligible (bankrupt)	33
	44 - non-eligible (retired)	5
	45 - non-eligible (death)	2
	46 - non-eligible (liquidation)	5
	47 - non-eligible (changed activity)	5
	48 - non-eligible (foreign enterprise)	2
Unknown eligibility	91 - failed postal delivery (unknown address)	24
	92 - failed postal delivery (gone away)	20
	93 - bounced e-mail	292
	94 - no response after four e-mail reminders	1504
	95 - no response after two letters	1486
	96 - no response after one letter	2907
	Total	7125*

*Note: Two of the units with unknown eligibility completed the questionnaire without typing the ID, so we could not have identified them. Thus, the total sum is 7125 instead of 7123.

Completed paper questionnaires were manually inserted in the corresponding versions of the online survey and then downloaded in CSV format and merged into one database. In addition, a database about paradata (i.e., data about the response process) was prepared that also contains some of the background information about enterprises that was available through the Bizi.si register (main activity, legal form enterprise size, and district).

3.2 Descriptive statistics

In this section, we present the responses of 294 enterprises that participated in our survey; however, the totals are usually lower due to nonresponse and filtering out based on previous responses.

The first question was about geographic markets (Table 9). Almost all enterprises (98 %) are selling on a local or regional level within Slovenia, more than three-quarters (77 %) are selling on a national level and about half are selling in the EU and associated countries (53 %). Less than a third (29 %) is selling internationally outside of Europe.



Table 9: In which geographic markets did your enterprise sell goods and/or services in the three years 2016 to 2018?

Q1	Yes		No		Total	
	f	%	f	%	f	%
Local/regional within Slovenia	252	97.7	6	2.3	258	100
National (other regions of Slovenia)	163	77.3	48	22.7	211	100
Other countries in the European Union or associated countries	101	52.6	91	47.4	192	100
Other countries outside Europe	45	29.0	110	71.0	155	100

The most important strategy is improving existing products – almost half (47 %) give it high priority – followed by customer-specific solutions (39 %) while reaching new customer groups; low-price and introducing entirely new products are mostly given medium priority. The last two are not considered important by about 15 % of respondents (Table 10).

Table 10: During the three years 2016 to 2018, how important were each of the following strategies to your enterprise?

Q2	High		Medium		Low		Not important		Total	
	f	%	f	%	f	%	f	%	f	%
Improving your existing products	132	46.8	94	33.3	34	12.1	22	7.8	282	100
Introducing entirely new products	59	22.0	93	34.7	76	28.4	40	14.9	268	100
Reaching new customer groups	72	26.3	125	45.6	50	18.2	27	9.9	274	100
Customer-specific solutions	107	38.8	99	35.9	44	15.9	26	9.4	276	100
Low-price	45	16.8	109	40.7	73	27.2	41	15.3	268	100

During the period from 2016 to 2018, about 41 % of enterprises introduced goods, 40 % introduced production processes, 35 % introduced services, 28 % introduced supporting activities for processes and 23 % introduced distribution methods that are new or significantly improved (Table 11). Most goods (81 %) and services (74 %) were developed by the enterprise itself, while for processes, the most frequently checked option was an adaptation or modification of processes developed by other enterprises or organisations (Table 12).

Table 11: During the three years 2016 to 2018, did your enterprise introduce new or significantly improved goods/services? (tick all that apply)

Q3a, Q4a, Q6a	Yes		No		Total	
	f	%	f	%	f	%
Goods	115	40.8	157	59.2	282	100
Services	98	35.0	182	65.0	280	100
Production processes	107	39.5	164	60.5	271	100
Distribution methods	59	22.7	201	77.3	260	100
Supporting activities for processes	73	27.8	190	72.2	263	100



Table 12: Who developed goods/services/processes that the enterprise introduced during the three years 2016 to 2018?

Q3b, Q4b, Q6b	Goods (n = 115)		Services (n = 98)		Processes (n = 126)	
	f	%	f	%	f	%
Your enterprise by itself	86	81.1	65	73.9	90	71.4
Your enterprise together with other enterprises or organisations	33	53.2	32	57.1	46	53.5
Your enterprise by adapting or modifying processes originally developed by other enterprises or organisations	17	32.1	11	23.4	12	81.3
Other enterprises or organisations	15	28.8	15	30.0	26	64.4

Among enterprises that developed product innovations, about 54 % developed products that are new to their market and about 66 % developed products that were only new to their enterprise (Table 13). Those who responded affirmatively were asked to give a percent of the total turnover in 2018 from new or significantly improved products (5b). The turnover was below 25 % for 69 % of the enterprises with products only new to their market and 75 % of the enterprises with products only new to them.

Table 13: Were any of your product innovations (goods or services) during the three years 2016 to 2018 new to your market or only new to your enterprise?

Q5a	Yes		No		Total	
	f	%	f	%	f	%
New to your market	57	54.3	48	45.7	105	100
Only new to your enterprise	69	66.3	35	33.7	104	100

Only about 12 % of enterprises had innovation activities that did not result in a product or process innovation because the activities had been abandoned or suspended; this also held for about 17 % of enterprises because the activities were still ongoing (Table 14).

Table 14: During the three years 2016 to 2018, did your enterprise have any innovation activities that did not result in a product or process innovation because the activities were Abandoned or suspended/Still ongoing?

Q7	Yes		No		Total	
	f	%	f	%	f	%
Abandoned or suspended	29	11.6	220	88.4	249	100
Still ongoing	41	17.3	196	82.7	237	100

Enterprises that had any good, service or process innovations were also asked about the engagement in innovation activities (Table 15). Most engaged in the acquisition of machinery, equipment, software, and buildings (86 %), followed by in-house research and development (69 %), while external research and development were less popular (42 %). Of those that did in-house research, only 27 % did it continuously, while for 73 %, it was done only occasionally (Q8c). Almost half acquired existing knowledge from other enterprises or organisations (47 %) and about the same number engaged in design (47 %). A lesser number of enterprises did train for innovative activities (36 %), and the lowest was the percentage for market introduction of innovations (26 %). Most of the enterprises spent less than €5,000 on individual innovation activities.



Table 15: During the three years 2016 to 2018, did your enterprise engage in the following innovation activities? (tick all that apply)

Q8	a. Engaging in innovation activity		b. Spent €5,000 or more on innovation activity*	
	f	%	f	%
In-house research and development	59	69.4	21	47.7
External research and development	30	42.3	10	45.5
Acquisition of machinery, equipment, software and buildings	91	85.8	52	41.1
Acquisition of existing knowledge from other enterprises or organisations	34	47.2	7	36.8
Training for innovative activities	24	36.4	3	17.6
Market introduction of innovations	16	25.8	2	20.0
Design	30	46.9	6	27.3
Other	33	38.8	0	0.0

*Note: The percentage is calculated based on the number of respondents that wrote an answer to the question. The frequencies are low because a lot of them did not provide a response.

As presented in Table 16, the most important information sources are enterprises themselves (54 % high importance), followed by suppliers (42 %) and clients (32 %), while research institutes and universities are considered the least important (3 %) and are not used by most of the enterprises (62 % for institutes and 58 for % universities). More than half of the enterprises do not use consultants or commercial labs as an information source (52 %).

Table 16: During the three years 2016 to 2018, how important to your enterprise innovation activities were each of the following information sources?

Q9	High		Medium		Low		Not used		Total	
	F	%	f	%	f	%	f	%	f	%
Your enterprise (group)	66	54.1	39	32.0	8	6.6	9	7.4	122	100
Suppliers of equipment, materials, components, or software	53	41.7	52	40.9	14	11.0	8	6.3	127	100
Clients or customers from the private sector	40	32.3	50	40.3	18	14.5	16	12.9	124	100
Clients or customers from the public sector	13	11.6	24	21.4	33	29.5	42	37.5	112	100
Competitors or other enterprises in your sector	17	14.2	55	45.8	30	25.0	18	15.0	120	100
Consultants or commercial labs	7	6.2	16	14.2	31	27.4	59	52.2	113	100
Universities or other higher education institutes	4	3.5	15	13.3	28	24.8	66	58.4	113	100
Government, public, or private research institutes	3	2.7	9	8.0	31	27.7	69	61.6	112	100
Conferences, trade fairs, exhibitions	16	13.7	38	32.5	32	27.4	31	26.5	117	100
Scientific/technical journals or trade publications	8	7.0	30	26.1	36	31.3	41	35.7	115	100
Professional or industry associations	5	4.3	38	32.8	30	25.9	43	37.1	116	100



Table 17 shows that when engaging in innovation activities, most enterprises cooperated with suppliers (83 %), and they selected them as the innovation partner with the most impact (42 %). The second are clients in the private sector (54 % co-operate, 29 % selected it as) and other enterprises with the enterprise group (45 %). The least popular collaborators were research institutes (86 %).

Table 17: During the three years 2016 to 2018, did your enterprise cooperate on any of your innovation activities with other enterprises or organisations?

Q10a	Yes (Slovenia or outside)		No		Total		10b. Has most impact (n=90)	
	f	%	f	%	f	%	f	%
A. Other enterprises within your enterprise group	54	45.4	65	54.6	119	100	15	16.7
B. Suppliers of equipment, materials, components, or software	104	82.5	22	17.5	126	100	38	42.2
C. Clients or customers from the private sector	66	54.1	56	45.9	122	100	26	28.9
D. Clients or customers from the public sector	25	21.9	89	78.1	114	100	3	3.3
E. Competitors or other enterprises in your sector	31	26.5	86	73.5	117	100	3	3.3
F. Consultants or commercial labs	22	18.8	95	81.2	117	100	1	1.1
G. Universities or other higher education institutes	20	17.2	96	82.8	116	100	2	2.2
H. Government, public or private research institutes	16	13.9	99	86.1	115	100	2	2.2

Only 43 % of enterprises introduced at least one of the organizational and marketing innovations listed in Table 18. The most popular were business practices for organizing procedures (26 %) and methods of organizing work responsibilities and decision making (22 %), while methods for product placement or sales channels were the least often introduced innovations (8 %).

Table 18: During the three years 2016 to 2018, did your enterprise introduce new organisational or marketing innovations?

Q11	Yes		No		Total	
	f	%	f	%	f	%
Business practices for organising procedures	68	26.4	190	73.6	258	100
Methods of organising work responsibilities and decision making	57	22.4	197	77.6	254	100
Methods of organising external relations with other enterprises or public organisations	38	15.3	211	84.7	249	100
Aesthetic design or packaging of a good or service	45	17.7	209	82.3	254	100
Media or techniques for product promotion	39	15.5	213	84.5	252	100
Methods for product placement or sales channels	21	8.4	230	91.6	251	100
Methods of pricing goods or services	50	19.8	203	80.2	253	100



Then there were three questions for non-innovators. Out of the 294 enterprises that participated, there were 99 (34 %) that did not have any innovation activities, and we offered them options to describe the reason why (Q12). Among the 64 that responded, 81 % reported that they had no compelling reason to innovate, while the remaining 19 % selected the answer about factors preventing innovation were too large.

Next, we asked those who had no compelling reason to innovate how important the four listed reasons not to conduct innovation activities (Table 19) were. The importance is not high for any of the reasons, but the highest was given to low demand for innovations in the market, for which 12 % selected the option, while 29 % selected medium, 22 % selected low and only 37 % selected not important. For the other three, more than half (53 %) reported they were not important and about a quarter gave it low importance.

Table 19: How important were the following reasons for your enterprise not to conduct innovation activities during 2016 to 2018?

	High		Medium		Low		Not important		Total	
	f	%	f	%	f	%	f	%	f	%
Low demand for innovations in your market	7	11.9	17	28.8	13	22.0	22	37.3	59	100
No need to innovate due to previous innovations	3	5.5	8	14.5	15	27.3	29	52.7	55	100
No need to innovate due to very little competition in your enterprise's market	2	3.6	10	18.2	14	25.5	29	52.7	55	100
Lack of good ideas for innovations	5	9.1	6	10.9	15	27.3	29	52.7	55	100

We asked those who considered innovating, but felt factors preventing innovation were too large, how important the listed barriers to innovation (Q14) were; however, there were only 12 respondents, which is too low for data analysis.

The next set of questions was asked only to innovators, which were 195 respondents that carried out at least one innovation activity (Q1) or introduced at least one new product (Q3, Q4), process (Q6), organizational or marketing innovation (Q11).

First, we asked them about different kinds of innovations in business process digitalisation (Table 20). Most, but less than a third of innovators, introduced collaboration with IT or data experts (30 %), followed by Internet of Things (23 %), automation of production lines (22 %) and usage of collaborative platforms and social tools to involve customer input (20 %). Less than one in seven enterprises introduced digital simulation of products in the manufacturing process (14 %), personalized smart products and services (13 %) and preparation for Industry 4.0 (12 %), collection of data with sensors (10 %) and digitalization of logistics and sales systems (10 %). The least-often introduced innovations were 3D printing technology (7 %) and preparation of digital models for Building Information Modelling (9 %). When asked if they plan to introduce any of the business process digitalisation innovations, 65 % responded none of the above, and the most popular among the listed options was the automation of production lines, which was selected by 19 % of the respondents.



Table 20: During the three years 2016 to 2018, did your enterprise introduce any of the following innovations in business process digitalisation?

Q15a	Yes		No		Total		15b. Planning to introduce in future (n=97)	
	f	%	f	%	f	%	f	%
A. Collection of data with sensors	13	10.2	115	89.8	128	100	9	9.3
B. Collaboration with IT or data experts	39	30.2	90	69.8	129	100	8	8.2
C. Digital simulation of products or the manufacturing process	18	14.1	110	85.9	128	100	5	5.2
D. Augmented and virtual reality	11	8.8	114	91.2	125	100	7	7.2
E. Usage of collaborative platforms and social tools to involve customer input	25	20.2	99	79.8	124	100	7	7.2
F. Internet of Things (IoT)	28	22.6	96	77.4	124	100	8	8.2
G. Preparation for Industry 4.0	15	12.4	106	87.6	121	100	9	9.3
H. Preparation of digital models of your products for Building Information Modelling (BIM)	11	8.9	112	91.1	123	100	5	5.2
I. Personalized smart products and services	15	12.6	104	87.4	119	100	11	11.3
J. 3D printing technology	9	7.4	113	92.6	122	100	6	6.2
K. Automation of production lines	27	21.6	98	78.4	125	100	18	18.6
L. Digitalization of logistics and sales systems	12	9.8	111	90.2	123	100	12	12.4
None of the above	-	-	-	-	-	-	63	64.9

Second, we asked about innovations with environmental benefits (Table 21). Almost half of innovating enterprises that responded introduced innovations with reduced air, water, noise, or soil pollution (48 %), followed by reduced energy use or CO2 ‘footprint’ (47 %). Almost ten percentage points lower, it is followed by extended product life through longer-lasting products (38 %), recycled waste, water, or materials (37 %), and even lower, reduced material or water use per unit of output (33 %), replaced a share of materials with less polluting or hazardous substitutes (32 %) and facilitated recycling of product after use (31 %), while the least often introduced are innovations that replace a share of fossil energy with renewable energy sources (20 %).

Regarding plans for future use, 64 % responded they are not planning to introduce any innovation with the listed environmental benefits. Among those who do, most plan to introduce innovations with the reduced energy use of CO2 ‘footprint’ (17 %), followed by extended product life (14 %), reduced air, water, noise, or soil pollution (14 %), and recycled waste, water, or materials (14 %), while the least respondents plan to replace a share of materials with less polluting or hazardous substitutes (7 %) or introduce facilitated recycling of product after use (10 %).



Table 21: During the three years 2016 to 2018, did your enterprise introduce a product, process, organisational or marketing innovation with any of the following environmental benefits?

Q16a	Yes		No		Total		16b. Planning to introduce in future (n=104)	
	f	%	f	%	f	%	f	%
A. Reduced material or water use per unit of output	39	32.8	80	67.2	119	100	12	11.5
B. Reduced energy use or CO2 'footprint'	57	47.1	64	52.9	121	100	18	17.3
C. Reduced air, water, noise, or soil pollution	58	47.9	63	52.1	121	100	14	13.5
D. Replaced a share of materials with less polluting or hazardous substitutes	39	32.2	82	67.8	121	100	7	6.7
E. Replaced a share of fossil energy with renewable energy sources	24	20.0	96	80.0	120	100	13	12.5
F. Recycled waste, water, or materials for own use or sale	44	36.7	76	63.3	120	100	14	13.5
G. Facilitated recycling of product after use	37	31.4	81	68.6	118	100	10	9.6
H. Extended product life through longer-lasting, more durable products	46	38.3	74	61.7	120	100	15	14.4
None of the above	-	-	-	-	-	-	66	64 %

Third, we were interested in innovations with health benefits (Table 22). Half of the innovating enterprises introduced innovations in visual comfort (50 %), followed by product tests for safety and comfort of use (37 %) and use of materials free from volatile organic compounds (35 %), while fewer enterprises introduced ergonomically designed products (23 %), sound-absorbing materials (19 %), materials with health certificates (12 %), and last, innovations designed in collaboration with health experts (5 %). In the future, 74 % do not plan to introduce any of the listed innovations. Among those who plan to do so, the use of materials with health certificates (10 %) and VOC-free materials (9 %) are the most popular.

Table 22: During the three years 2016 to 2018, did your enterprise introduce a product, process, or organisational innovation with any of the following health benefits?

Q17a	Yes		No		Total		17b. Planning to introduce in future (n=112)	
	f	%	f	%	f	%	f	%
A. Ergonomically designed product	28	22.6	96	77.4	124	100	4	3.6
B. Attractive appearance (visual comfort)	65	50.4	64	49.6	129	100	7	6.3
C. Use of sound-absorbing materials	23	18.7	100	81.3	123	100	4	3.6
D. Use of materials with health certificates	15	12.2	108	87.8	123	100	11	9.8
E. Use of materials free from formaldehyde, benzene, and other VOC	44	35.2	81	64.8	125	100	10	8.9
F. Products tested for safe and comfortable use	46	37.1	78	62.9	124	100	8	7.1
G. Designed in collaboration with health experts	6	4.9	116	95.1	122	100	8	7.1
None of the above	-	-	-	-	-	-	83	74.1



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The last section of the questionnaire is for both innovators and non-innovators. We found that less than 8 % of the enterprises (20 out of 265 that responded) have procedures in place to regularly identify and reduce their environmental impacts, while most do not (92.5 %) (Q18).

As described in the methods section, questions Q19a and Q19b had different wording for different sectors. Forestry, wood, paper, and furniture manufacturing enterprises (n=191) were asked about the use of by-products and 47 % responded did utilize their by-products. Among those who did not, 13 % plan to use by-products in the future. Among construction enterprises (n=57), 60 % used wood products, but among those who did not, only 2 out of 23 plans to use them in the future. Other manufacturing enterprises were asked about the use of wood materials in production, and wholesale enterprises were asked if they sell any wood products, but the number that responded (9 for other manufacturing, 15 for wholesale) is too low for data analysis.

Next, we asked enterprises about intellectual property rights they introduced (Table 23) and found out most have not done this. The highest number is for the use of trade secrets that were introduced by 14 %, while for other types, it is below 5 %. The numbers are similar to before 2016: 88 % of the enterprises have not introduced any of the listed property rights.

Table 23: In the three years 2016 to 2018, did your enterprise introduce any of the listed intellectual property rights?

Q20a	Yes		No		Total		Q20b. Before 2016 (n=226)	
	f	%	f	%	f	%	f	%
A. Apply for a patent	11	4.1	259	95.9	270	100	9	4.0
B. Apply for a utility model	7	2.6	261	97.4	268	100	6	2.7
C. Register an industrial design right	5	1.9	262	98.1	267	100	1	0.4
D. Register a trademark	12	4.5	254	95.5	266	100	8	3.5
E. Use trade secrets	38	14.4	226	85.6	264	100	8	3.5
F. Claim copyright	5	1.9	258	98.1	263	100	1	0.4
None of the above	-	-	-	-	-	-	108	87.6

Finally, we asked enterprises about their turnover and employee statistics. About two-thirds of enterprises had a turnover of less than half a million Euros, three-quarters had less than a million Euros, and only 8 % had a turnover of over 5 million Euros (Table 24).

Table 24: What was your total turnover for 2018?

Q21	f	%
1 Less than 100,000 Euros	118	43.2
2 100,000 to less than 250,000 Euros	38	13.9
3 250,000 to less than 500,000 Euros	26	9.5
4 500,000 to less than 1 million Euros	23	8.4
5 1 million to less than 5 million Euros	46	16.8
6 Over 5 million Euros	22	8.1
Total	273	100



There were two open-ended numeric questions, one about turnover from sales to clients outside of the country and one about the RDI budget as a share of the overall income, that we recoded into seven classes (Table 25). As much as 82 % of the enterprises had a turnover of less than one percent; 86 % of the enterprises had an RDI budget of less than one percent.

Table 25: Percent of total turnover to clients outside your country and percent of RDI budget as a share of overall income

	Q22. Total turnover from sales to clients outside your country for 2018		Q23. RDI budget as a share of the overall income	
	f	%	f	%
0 % to less than 1 %	108	82.4	119	85.6
1 % to less than 5 %	2	1.5	8	5.8
5 % to less than 10 %	3	2.3	4	2.9
10 % to less than 25 %	7	5.3	3	2.2
25 % to less than 50 %	4	3.1	3	2.2
50 % to less than 75 %	3	2.3	2	1.4
75 % or more	4	3.1	0	0.0
Total	131	100.0	139	100.0

About 13 % of the participating enterprises did not have any employees, while 26 % had one employee and 38 % had between 2 and 9 employees. Together, these micro-enterprises represent more than three-quarters of respondents (77 %), which is lower than their size in the population (90 %). On the other hand, small enterprises (10-49 employees) account for 15 % of the sample, which is almost twice as much as in the population (9 %). The bias is even larger for medium (9 % in sample, 1 % in population) and large enterprises (1 % in sample, 0.2 % in population).

Table 26: Average number of employees in 2018 and their characteristics

	Q24. Average number of employees (2018)		Q25a. Had a tertiary degree		Q25b. Were in RDI positions		Q25c. Both RDI and management	
	f	%	f	%	f	%	f	%
0 employees	36	12.8	57	31.3	97	63.4	75	46.3
1 employee	74	26.2	58	31.9	28	18.3	64	39.5
2-9 employees	106	37.6	48	26.4	21	13.7	20	12.3
10 to less than 50	43	15.2	16	8.8	7	4.6	3	1.9
50 to less than 250	20	7.1	3	1.6	0	0.0	0	0.0
Over 250 employ.	3	1.1	0	0.0	0	0.0	0	0.0
Total	282	100	182	100	153	100	162	100

At the end, we also asked them if they had enough skilled employees, and about two-thirds (67 %) confirmed (Q26a) that they did. Those who responded negatively were asked what skills were needed, what skills were in demand (Q26b) and 52 enterprises provided a useful answer. Responses included carpenters, joiners, wood technicians, mechanical technicians, assemblers, operators of machines. Some listed needed personal characteristics (e.g., flexibility, innovation, self-initiative), skills (e.g., foreign languages, computer-skills) or knowledge (e.g., knowing the law) that they needed.



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3.3 Analysis of open-ended question

The last question was open-ended, and its purpose was to find out if there was anything else related to the topic that respondents considered important (Q27). In total, 72 entered a response, but more than half of the entries were in the sense that they did not have any comment (53 %), while 11 % provided comments about the survey, 31 % provided comments about the research topic and 6 % provided comments about both.

A selection was made to present the most relevant comments about the research topic. Some wrote about how they innovate and why innovating is important to them:

- "We innovate all the time; without innovation, we would not survive in the market."
- "A joiner is an innovator every time a customer comes with a wish and ideas. This is happening a little every day."
- "Manufacturing wooden furniture and wooden products based on the desires of the customer. The customer selects or chooses the material. The final appearance of the product is important, from modern to antique."
- "We are a micro-enterprise, that is why innovations are the air we breathe, but unfortunately ideas exceed our capabilities."

As evident from the second part, there are also some barriers that prevent innovation, which is a theme that was addressed in several comments. Some did not innovate because they had no compelling reason to innovate. They pointed out their business is too small or too simple:

- "I work as a side occupation, I have no successor, so the development of innovation due to these factors is economically meaningless."
- "We make pallets, and you don't need any science here."
- "I could not answer certain answers because I make cutters, and I don't have innovations."

Others blamed it on systemic factors:

- "Too much bureaucracy, overburdened benefits, too few incentives to work, especially for young people."
- "Foreign and domestic investors are not treated equally. Subsidies are directed to foreigners. Domestic investors are neglected also when it comes to the distribution of raw materials."
- "I would only comment on the fact that there is not enough attention for small and micro-enterprises, and too many bureaucratic matters to help and promote the growth of companies."

One enterprise complained about the lack of cooperation:

- "There is not enough cooperation between companies and designers. Due to all the costs, there is a lack of time and money for innovations."

Some enterprises provided suggestions on how to improve the environment to stimulate innovation:

- "Help lower the taxes and each company will employ more."



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- “There could be joint investments of all Slovenian wood enterprises, which would strengthen their good name on international markets.”
- “It is high time that innovation activities in Slovenia began to be encouraged. To begin with, I would suggest training management and organizing support for small entrepreneurs. [...] There are experienced mentors [...] that could advise a few hours a day have invaluable experience. Or associations to help sort out the basic bureaucracy in smaller businesses.”

One enterprise proposed an Idea for future research: “We suggest that you enter the question of how much funds were received for the development of non-refundable companies (EU, Rep. SLO) and determine the effect of these funds on the economy. Is there any effect at all, especially after these companies close down?”

3.4 Analysis by sector

In this section, we compare the two key sectors for which we achieved a higher response rate than for other categories, except for paper, which has a higher response rate than furniture, but the number of responses is too low (9) to be presented as a separate category. For selected questions, there are enough Yes responses for all indicators (Q1, Q3a, Q4a, Q6a and Q11 and Q16). Crosstabulation tables were computed and Chi-Square statistics and Contingency coefficients (C) were calculated to test if the differences between sectors can be generalised. Detailed numbers can be found in Appendix E.

First, we compare sectors according to geographic markets in which enterprises sold goods and/or services in the three years from 2016 to 2018 (Table 27). Almost all enterprises sold product at the local/regional level within Slovenia, and there are no differences between sectors. There are differences only on the national level where more than three-quarters sold products in total, but in wood (80 %) and furniture (88 %) manufacturing, that percentage is significantly higher. However, there are no significant differences on the international level, neither within the European Union or associated countries nor outside Europe.

Table 27: Comparison of wood and furniture manufacturing enterprises for percentage of enterprises that sold goods and/or services in different geographic markets

Q1	C16 - Wood		C31 - Furniture		Other sectors		Total survey	
	Yes	%	Yes	%	Yes	%	Yes	%
Local/regional within Slovenia	96	96.0	49	98.0	107	99.1	252	97.7
National (other regions)	65	80.2	38	88.4	60	69.0	163	77.3
Other countries in the European Union or associated countries	48	63.2	17	47.2	36	45.0	101	52.6
Other countries outside Europe	21	38.2	9	26.5	15	22.7	45	29.0

Second, we compare the extent of product (goods and services), process, organisational and marketing innovations in the three years from 2016 to 2018 (Table 28). The strongest association with the sector was found for product process innovations where there are significantly more innovators among wood (51 %) and furniture (42 %) manufacturers than in other sectors. In fact, there are significantly more goods innovators among wood (41 %), especially furniture (55 %) manufacturers. There are more service innovators, too, among furniture manufacturers (40 %), while the percentage



is lower for wood manufacturers (41 %) compared to other sectors and the survey total; however, the difference is only borderline significant. A borderline significant difference was also found for one of the marketing innovations, i.e., media or techniques for product promotion where there is only one innovator among furniture manufacturers (2 %), while the percentage among wood manufacturers (10 %) is only slightly higher than in other categories.

On the other hand, there are no significant differences between sectors, neither in process innovations such as distribution methods and supporting activities for processes nor in organisational and marketing innovations such as business practices for organising procedures, methods of organising work responsibilities and decision making, methods of organising external relations with other enterprises or public organisations, aesthetic design or packaging of a good or service, methods for product placement or sales channels and methods of pricing goods or services.

Table 28: Comparison of wood and furniture manufacturing enterprises for percentage of enterprises that have introduced new or significantly improved products, processes, organisational or marketing innovations

Q3a, Q4a, Q6a, Q11	C16 - Wood		C31 - Furniture		Other sectors		Total survey	
	Yes	%	Yes	%	Yes	%	Yes	%
Goods	46	41.1	31	55.4	38	33.3	115	40.8
Services	34	31.2	22	40.0	42	36.2	98	35.0
Production processes	53	51.0	24	42.1	30	27.3	107	39.5
Distribution methods	26	28.8	10	18.5	23	21.1	59	22.7
Supporting activities for processes	28	28.9	12	22.2	33	29.5	73	27.8
Business practices for organising procedures	29	28.7	16	30.8	23	21.9	68	26.4
Methods of organising work responsib. and decision making	21	21.6	13	25.5	23	21.7	57	22.4
Methods of org. external relations with other enterprises or pub. org.	12	12.5	10	19.6	16	15.7	38	15.3
Aesthetic design or packaging of a good or service	15	15.3	15	28.8	15	14.4	45	17.7
Media or techniques for product promotion	12	12.4	8	15.7	19	18.3	39	15.5
Methods for product placement or sales channels	10	10.4	1	2.0	10	9.6	21	8.4
Methods of pricing goods or services	18	18.6	15	30.0	17	16.0	50	19.8

Third, product, process, organisational and marketing innovations with environmental benefits during the three years from 2016 to 2018 were compared between sectors (Table 29). The only significant difference was found for recycled waste, water, or materials for own use or sale where there were more innovators among wood manufacturers (52 %) and fewer among furniture manufacturers (30 %) and other sectors (27 %) than in the survey total. However, no generalisable difference was found for other environmental benefits such as reduced material or water use per unit of output, reduced energy use or carbon dioxide footprint, reduced air, water, noise, or soil pollution, replaced share of materials with less polluting or hazardous substitutes, replaced share of fossil energy with renewable energy sources, and facilitated recycling of product after use.



Table 29: Comparison of wood and furniture manufacturing enterprises for percentage of enterprises that have introduced products, processes, organisational or marketing innovations with environmental benefits

Q16a	C16 - Wood		C31 - Furniture		Other sectors		Total survey	
	Yes	%	Yes	%	Yes	%	Yes	%
A. Reduced material or water use per unit of output	12	26.7	12	46.2	15	31.3	39	32.8
B. Reduced energy use or CO2 'footprint'	25	55.6	9	33.3	23	46.9	57	47.1
C. Reduced air, water, noise, or soil pollution	28	59.6	8	33.3	22	44.0	58	47.9
D. Replaced a share of materials with less polluting or hazard. subs.	12	27.3	9	33.3	18	36.0	39	32.2
E. Replaced a share of fossil energy with renewable energy s.	12	26.7	4	15.4	8	16.3	24	20.0
F. Recycled waste, water, or materials for own use or sale	23	52.3	8	29.6	13	26.5	44	36.7
G. Facilitated recycling of product after use	18	40.0	14	53.8	14	28.6	37	31.4

3.5 Analysis by enterprise size

Finally, we compare indicators by enterprise size recoded into three categories: micro-enterprises with 0-1 employees, micro-enterprises with 2-9 employees and enterprises with 10 or more employees. The comparison is done for the same selection of question items as in the previous section and using the same statistical approach. Detailed numbers are presented in Appendix E.

First, we compare enterprise sizes according to geographic markets in which enterprises sold goods and/or services in the three years from 2016 to 2018 (Table 30). While there are no differences on the local/regional level, there is an association between enterprise size and selling on the national and international level. The percentage of micro-enterprises selling on the national level is significantly lower than in larger enterprises (95 %), both for those with 2-9 employees (82 %) and those with 0-1 employees (60 %). Similarly, the percentage of larger enterprises (83 %) selling on the EU level is significantly larger than among enterprises with 2-9 employees (56 %) and those with 0-1 employees (23 %). The same is true for selling outside of Europe: enterprises with 10 or more employees (55 %) are significantly more present on the market than enterprises with 2-9 employees (29 %) and 0-1 employees (11 %).

Table 30: Comparison of wood and furniture manufacturing enterprises for percentage of enterprises that sold goods and/or services in different geographic markets

Q1	0-1 employees		2-9 employees		10 or more e.		Total survey	
	Yes	%	Yes	%	Yes	%	Yes	%
Local/regional within Slovenia	95	99.0	90	97.8	58	96.7	243	98.0
National (other regions)	43	59.7	60	82.2	55	94.8	158	77.8
Other countries in the European Union or associated countries	15	23.4	37	56.1	44	83.0	96	52.5
Other countries outside Europe	6	10.9	15	28.8	22	55.0	43	29.3



Second, we compare the extent of product, process, organisational and marketing innovations in the three years from 2016 to 2018 (Table 31). There is a similar percentage of goods innovators among micro-enterprises with 2-9 employees (48 %) and larger enterprises (47 %), while there are significantly fewer goods innovators among 0-1 employee enterprises (32 %). For services, the percentage of innovators among enterprises with 2-9 employees (47 %) is significantly higher than for both enterprises with 0-1 employees (31 %) and larger enterprises (27 %).

While there are no significant differences in production process innovations between enterprises of different sizes, there are two other types of process innovations. On the one hand, 0-1 employee (15 %) and 10+ employee (24 %) enterprises have significantly fewer innovations in distribution methods than 2-9 employee enterprises (30 %). On the other hand, innovations in supporting activities for processes are significantly more frequent among 10+ employee (49 %) than both 2-9 employee (30 %) and 0-1 employee (13 %) enterprises.

Among organisational and marketing innovations, an association with enterprise-size was found for two items. There are significantly fewer innovations in business practices for organising procedures among 0-1 employee (14 %) than among 2-9 employee (34 %) and, especially, 10+ employee (49 %) enterprises. Similarly, there are less than half the innovations in methods of organising work responsibilities among 0-1 employee (11 %) compared to both 2-9 employee (30 %) and 10+ employee (35 %) enterprises. No significant differences were found for organisational and marketing innovations such as methods of organising external relations with other enterprises or public organisations, aesthetic design, or packaging of a good or service, media or techniques for product promotion, methods for product placement or sales channels and methods of pricing goods or services.

Table 31: Comparison of wood and furniture manufacturing enterprises for percentage of enterprises that have introduced new or significantly improved products, processes, organisational or marketing innovations

Q3a, Q4a, Q6a, Q11	0-1 employees		2-9 employees		10 or more e.		Total survey	
	Yes	%	Yes	%	Yes	%	Yes	%
Goods	34	31.8	50	48.1	29	46.8	113	41.4
Services	32	30.5	49	47.1	16	26.7	97	36.1
Production processes	34	33.7	44	45.8	26	41.3	104	40.0
Distribution methods	15	15.2	28	30.4	14	23.7	57	22.8
Supporting activities for processes	13	13.1	28	30.1	30	49.2	71	28.1
Business practices for organising procedures	13	14.1	33	33.7	22	34.9	68	26.9
Methods of organising work responsib. and decision making	10	11.1	28	29.2	19	30.2	57	22.9
Methods of org. external relations with other enterprises or pub. org.	15	16.5	12	13.3	11	17.5	38	15.6
Aesthetic design or packaging of a good or service	12	13.0	16	17.0	17	27.0	45	18.1
Media or techniques for product promotion	13	14.3	15	15.0	11	17.7	39	15.8
Methods for product placement or sales channels	4	4.4	12	12.9	5	8.1	21	8.5
Methods of pricing goods or serv.	20	22.2	20	21.1	10	15.9	50	20.2



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Third, product, process, organisational and marketing innovations with environmental benefits in the three years from 2016 to 2018 were compared between enterprise sizes (Table 32). The association with enterprise-size was confirmed for two items. There are more innovations with reduced energy use or carbon dioxide footprint for enterprises with 10 or more employees (69 %) than for enterprises with 2-9 (45 %) and 0-1 (29 %) employees. However, for innovations with recycled waste, water, or materials, there are more innovators among 2-9 (52 %) than both 10 or more (35 %) and 0-1 (17 %) employees. On the contrary, there are no significant differences for environmental benefits such as reduced material or water use per unit of output, reduced air, water, noise, or soil pollution, replacing a share of materials with less polluting or hazardous substances, replacing a share of fossil energy with renewable energy sources and facilitated recycling of product after use.

Table 32: Comparison of wood and furniture manufacturing companies for percentage of enterprises that have introduced products, processes, organisational or marketing innovations with environmental benefits

Q16a	0-1 employees		2-9 employees		10 or more e.		Total survey	
	Yes	%	Yes	%	Yes	%	Yes	%
A. Reduced material or water use per unit of output	10	27.8	16	34.0	13	36.1	39	32.8
B. Reduced energy use or CO2 'footprint'	10	28.6	23	45.1	24	68.6	57	47.1
C. Reduced air, water, noise, or soil pollution	13	36.1	25	50.0	20	57.1	58	47.9
D. Replaced a share of materials with less polluting or hazardous substances	10	27.8	14	28.0	15	42.9	39	32.2
E. Replaced a share of fossil energy with renewable energy sources	4	10.8	11	22.4	9	26.5	24	20.0
F. Recycled waste, water, or materials for own use or sale	6	16.7	26	52.0	12	35.3	44	36.7
G. Facilitated recycling of product after use	11	30.6	13	27.1	13	38.2	37	31.4



4 Conclusions

In total, 294 enterprises participated in our mail survey about innovation activities in the forest-based value chain. Almost three-quarters did so by returning the paper questionnaire, while the remaining quarter filled out the online form. More than three-quarters of participating enterprises were micro-enterprises. Based on the analysis of their responses, we came to the following findings:

- More than a half of the enterprises are selling their products internationally but only a third outside of Europe. The wood and furniture manufacturing sectors are more present on the national level than other sectors, while there are no significant differences on the local/regional and international level. Larger enterprises are more active than micro-enterprises both on the national and international level.
- The most important strategy is improving existing products, while introducing entirely new products and lowering prices are the least important strategies.
- About four in ten enterprises introduced goods innovations, about the same number introduced process innovation, while service and other process innovations were less popular. There are more goods innovators among wood and furniture manufacturers than other sectors, and there are fewer goods innovators with enterprises with up to one employee. There are more service innovators among furniture manufacturers than for wood manufacturers and other sectors. There are also more service innovators among enterprises with 2-9 employees than larger and smaller enterprises. Enterprises with more than 10 employees had more innovations in supporting activities than micro-enterprises, while for innovations in distribution methods, the percentage is higher for 2-9 employees than for both larger and smaller enterprises.
- Most goods and services were developed by the enterprise itself, while for processes, it was usually an adaptation or modification of processes developed by others.
- For almost two-thirds of product innovators, the developed products were only new to their enterprises. More than half developed products that were new to their market.
- The innovation activities most enterprises engaged in were acquisition of machinery, equipment, software, buildings, and in-house research and development. In most cases, the latter was done occasionally and not continuously. Most enterprises spent less than €5,000 on individual innovation activities.
- The most important information sources are their enterprises, followed by suppliers and clients, while research institutes and universities are considered the least important and are not used by most enterprises. This is also reflected in cooperation behaviour as cooperation with suppliers is most popular and has the most impact, while research institutes are the least popular.
- About one in four enterprises is engaged in organisational and marketing innovations. The most popular were innovations in business practices for business procedures that were introduced by about a quarter; the percentage is higher for enterprises with 2-9 employees and, especially, 10 or more employees. The same is true for methods of organising work responsibilities and decision making, while for other types of innovations, there are no significant differences between enterprises of different sizes.



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- A third of participating enterprises did not have any innovation activities, and when asked why, they mostly reported they had no compelling reason to innovate. Only a fifth responded that factors preventing innovation were too large.
- The most frequent innovations in business process digitalisation were collaboration or data experts and the Internet of Things, which were implemented by more than a quarter of innovating enterprises, while 3D printing and Building Information Modelling were the least popular.
- Among innovations with environmental benefits, the most popular were reduced air, water, noise, or soil pollution and reduced energy use or carbon dioxide footprint, which were implemented by about half of the innovating enterprises, while the least frequent was replacing a share of fossil energy with renewable energy sources, which was done by only a fifth of enterprises. Recycled waste, water, or materials for own use or sale were introduced by a larger percentage of wood manufacturers than furniture manufacturers and other sectors and by a larger number of 2-9 employee enterprises than smaller and larger enterprises. Moreover, more innovations with the environmental benefit of reduced energy use or carbon dioxide footprint were made by small, medium, and large enterprises than micro-enterprises.
- About half of innovating enterprises introduced innovations in visual comfort, while the least popular innovations with health benefits were innovations designed in collaboration with health experts.
- Less than one in twelve enterprises have procedures in place to regularly identify and reduce its environmental impacts.
- About half of the manufacturing enterprises used by-products in their production. Among construction enterprises, wood products were used by more than six in ten.
- Most of the enterprises did not introduce any intellectual property rights, not between 2016 and 2018 nor before.

We are also planning to use the collected data in future studies. First, we obtained the data of the Community Innovations Survey for the period 2016–2018 from the Statistical Office of Slovenia, and based on that, we will make a thorough analysis of differences in different innovation indicators according to enterprise size. Second, we obtained funding from the Slovenian Research Agency to carry out a follow-up study about innovation activities and climate change mitigation/adaptation measures in collaboration with the Institute of Systems Sciences, Innovation and Sustainability Research at the University of Graz.



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Appendix

- A. Questionnaire translation
- B. Cover letter
- C. Frequently Asked Questions
- D. Code used to analyse data in SPSS
- E. Chi-Square tests



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Study on market and innovation activities
 Group 1

Company ID: [99999]

Dear respondent, before filling out the questionnaire please read the enclosed sheet with Frequently Asked Questions about the project and definitions of terms. Respond to questions by ticking one (circle) or more (boxes) options for each the question. For a few questions, we ask you to enter the answer with words or numbers. You do not need to respond all questions. Please read the instructions provided in italics which tell you which questions you should skip. Thank you!

1. In which geographic markets did your enterprise sell goods and/or services in the three years 2016 to 2018?

	Yes	No
Local/regional within Slovenia	<input type="radio"/>	<input type="radio"/>
National (other regions of Slovenia)	<input type="radio"/>	<input type="radio"/>
Other countries in the European Union or associated countries (Albania, Bosnia and Herzegovina, FYROM, Kosovo, Liechtenstein, Montenegro, Norway, Serbia, Switzerland, Turkey)	<input type="radio"/>	<input type="radio"/>
Other countries outside Europe	<input type="radio"/>	<input type="radio"/>

2. During the three years 2016 to 2018, how important were each of the following strategies to your enterprise?

Focus on:	Low	Medium	High	NI*
Improving your existing products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introducing entirely new products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reaching new customer groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer specific solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low-price	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*NI – Not important

3a. During the three years 2016 to 2018, did your enterprise introduce new or significantly improved goods?

Yes No

3b. Who developed these goods? (tick all that apply)

- Your enterprise by itself
- Your enterprise together with other enterprises or organisations
- Your enterprise by adapting or modifying processes originally developed by other enterprises or organisations
- Other enterprises or organisations

4a. During the three years 2016 to 2018, did your enterprise introduce new or significantly improved services?

Yes No

4b. Who developed these services? (tick all that apply)

- Your enterprise by itself
- Your enterprise together with other enterprises or organisations
- Your enterprise by adapting or modifying processes originally developed by other enterprises or organisations
- Other enterprises or organisations

→ If you introduced new products/processes ("Yes" in question 3a or 4a), continue with question 5a. If not, go to question 6a.

5a. Were any of your product innovations (goods or services) during the three years 2016 to 2018:

	Yes	No
<u>New to your market?</u> (it may have already been available in other markets)	<input type="radio"/>	<input type="radio"/>
<u>Only new to your enterprise?</u> (available from your competitors in your market)	<input type="radio"/>	<input type="radio"/>

5b. If yes, please give the percent of your total turnover in 2018 from new or significantly improved products (goods or services) introduced during the three years 2016 to 2018.

% of turnover for products only new to your market _____
 % of turnover for products only new to your enterprise _____

6a. During the three years 2016 to 2018, did your enterprise introduce new or significantly improved:

	Yes	No
<u>Production process</u> (methods of manufacturing for producing goods or services)	<input type="radio"/>	<input type="radio"/>
<u>Distribution methods</u> (logistics, delivery, or other) for your inputs, goods or services	<input type="radio"/>	<input type="radio"/>
<u>Supporting activities for your processes</u> , such as maintenance systems of operations for purchasing, accounting or computing	<input type="radio"/>	<input type="radio"/>

6b. Who developed these processes? (tick all that apply)

- Your enterprise by itself
- Your enterprise together with other enterprises/organisations
- Your enterprise by adapting or modifying processes originally developed by other enterprises or organisations
- Other enterprises or organisations

7. During the three years 2016 to 2018, did your enterprise have any innovation activities that did not result in a product or process innovation because the activities were:

	Yes	No
<u>Abandoned or suspended</u> before completion?	<input type="radio"/>	<input type="radio"/>
<u>Still ongoing</u> at the end of 2018?	<input type="radio"/>	<input type="radio"/>

→ If you responded "No" to all options in questions 3a, 4a, 6a and 7, go to question 11. Otherwise, continue with 8a.



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8a. During the three years 2016 to 2018, did your enterprise engage in the following innovation activities? 8b. How much did your spend on each of them?

- a. Please tick the boxes before corresponding categories. b. Amount in € (at least an estimate)
- In-house research and development _____
 - External research and development _____
 - Acquisition of machinery, equipment, software & buildings _____
 - Acquisition of existing knowledge from other enterprises or organisations _____
 - Training for innovative activities _____
 - Market introduction of innovations _____
 - Design _____
 - Other: _____
 - None → [Go to question 11.](#)

- 8c. If your enterprise performed in-house research and development during 2016 to 2018, did it do so:**
- Continuously (permanent research and development staff)
 - Occasionally (as needed only)

9. During the three years 2016 to 2018, how important to your enterprise's innovation activities were each of the following informaton sources?

	High	Med-ium	Low	Not used
Your enterprise (group)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suppliers of equipment, materials, components, or software	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clients or customers from the private sector	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clients or customers from the public sector	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitors or other enterprises in your sector	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consultants or commercial labs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Universities or other higher education institutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government, public or private research institutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conferences, trade fairs, exhibitions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scientific/technical journals or trade publications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional or industry associations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10a. During the three years 2016 to 2018, did your enterprise co-operate on any of your innovation activities with other enterprises or organisations?

	No	Yes, in Slovenia	Yes, outside Slovenia
A. Other enterprises within your enterprise group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Suppliers of equipment, materials, components, or software	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Clients or customers from the private sector	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Clients or customers from the public sector	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Competitors or other enterprises in your sector	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Consultants or commercial labs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G. Universities or other higher education institutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H. Government, public or private research institutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10b. Which type of innovation partner in question 10a has the most impact? (Please select one letter from A to I.)
 A. B. C. D. E. F. G. H. I.

11. During the three years 2016 to 2018, did your enterprise introduce new:

	Yes	No
Methods of organising work responsibilities and decision making (i.e. first time use of a new system of employee responsibilities, etc.)	<input type="radio"/>	<input type="radio"/>
Methods of organising external relations with other enterprises or public organisations (i.e. first time use of alliances, outsourcing, etc.)	<input type="radio"/>	<input type="radio"/>
Aesthetic design or packaging of a good or service (exclude changes that alter the product's functional or user characteristics)	<input type="radio"/>	<input type="radio"/>
Media or techniques for product promotion (i.e. first time use of a new advertising media, a new brand image, introduction of loyalty cards, etc.)	<input type="radio"/>	<input type="radio"/>
Methods for product placement or sales channels (i.e. first time use of franchising or distribution licenses, direct selling, etc.)	<input type="radio"/>	<input type="radio"/>
Methods of pricing goods or services (i.e. first time use of variable pricing by demand, etc.)	<input type="radio"/>	<input type="radio"/>

→ If your enterprise did not introduce any innovations (you responded "No" to all options in questions 3a, 4a, 6a, 7 and 11), continue with quesiton 12. Otherwise go to question 15a.



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12. Which of the following best describes why your enterprise had no innovation activities?

- No compelling reason to innovate. [→ Go to question 13.](#)
- Considered innovating, but factors preventing innovation were too large. [→ Go to question 14.](#)

13. How important were the following reasons for your enterprise not to conduct innovation activities during 2016 to 2018?

	High	Medium	Low	NI
Low demand for innovations in your market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No need to innovate due to previous innovations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No need to innovate due to very little competition in your enterprise's market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of good ideas for innovations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[→ Go to question 18.](#)

*NI – Not important

14. How important to your enterprise were the following barriers to innovation during 2016 to 2018?

	High	Medium	Low	NI*
Lack of internal finance for innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of credit or private equity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of skilled employees within your enterprise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in obtaining government grants or subsidies for innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of collaboration partners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uncertain market demand for your ideas for innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Too much competition in your market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Legislation/regulation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[→ Go to question 18.](#)

*NI – Not important

15a. During the three years 2016 to 2018, did your enterprise introduce any of the following innovations in business process digitalisation?

	Yes	No
A. Collection of data with sensors	<input type="radio"/>	<input type="radio"/>
B. Collaboration with IT or data experts	<input type="radio"/>	<input type="radio"/>
C. Digital simulation of products or the manufacturing process	<input type="radio"/>	<input type="radio"/>
D. Augmented and virtual reality	<input type="radio"/>	<input type="radio"/>
E. Usage of collaborative platforms and social tools to involve customer input	<input type="radio"/>	<input type="radio"/>
F. Internet of Things (IoT)	<input type="radio"/>	<input type="radio"/>
G. Preparation for Industry 4.0	<input type="radio"/>	<input type="radio"/>
H. Preparation of digital models of your products for Building Information Modeling (BIM)	<input type="radio"/>	<input type="radio"/>
I. Personalized smart products and services	<input type="radio"/>	<input type="radio"/>
J. 3D printing technology	<input type="radio"/>	<input type="radio"/>
K. Automation of production lines	<input type="radio"/>	<input type="radio"/>
L. Digitalization of logistics and sales systems	<input type="radio"/>	<input type="radio"/>

15b. Are you planning to introduce any of the innovations listed in 15a in future? (Please tick the boxes before corresponding letters. Multiple answers are possible.)

- A. B. C. D. E. F. G. H. I. J. K. L. None of the above

16a. During the three years 2016 to 2018, did your enterprise introduce product, process, organisational or marketing innovations with any of the following environmental benefits?

	Yes	No
A. Reduced material or water use per unit of output	<input type="radio"/>	<input type="radio"/>
B. Reduced energy use or CO ₂ 'footprint'	<input type="radio"/>	<input type="radio"/>
C. Reduced air, water, noise or soil pollution	<input type="radio"/>	<input type="radio"/>
D. Replaced a share of materials with less polluting or hazardous substitutes	<input type="radio"/>	<input type="radio"/>
E. Replaced a share of fossil energy with renewable energy sources	<input type="radio"/>	<input type="radio"/>
F. Recycled waste, water, or materials for own use or sale	<input type="radio"/>	<input type="radio"/>
G. Facilitated recycling of product after use	<input type="radio"/>	<input type="radio"/>
H. Extended product life through longer-lasting, more durable products	<input type="radio"/>	<input type="radio"/>

16b. Are you planning to introduce any of the innovations listed in 16a in future? (Please tick the boxes before corresponding letters. Multiple answers are possible.)

- A. B. C. D. E. F. G. H. None of the above



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17a. During the three years 2016 to 2018, did your enterprise introduce a product, process, or organisational innovation with any of the following health benefits?

	Yes	No
A. Ergonomically designed product	<input type="radio"/>	<input type="radio"/>
B. Attractive appearance (visual comfort)	<input type="radio"/>	<input type="radio"/>
C. Use of sound absorbing materials	<input type="radio"/>	<input type="radio"/>
D. Use of materials with health certificates	<input type="radio"/>	<input type="radio"/>
E. Use of materials free from formaldehyde, benzene and other volatile organic compounds	<input type="radio"/>	<input type="radio"/>
F. Products tested for safe and comfortable use	<input type="radio"/>	<input type="radio"/>
G. Designed in collaboration with health experts	<input type="radio"/>	<input type="radio"/>

17b. Are you planning to introduce any of the innovations listed in 17a in future? (Please tick the boxes before corresponding letters. Multiple answers are possible.)

A. B. C. D. E. F. G. None of the above

18. Does your enterprise have procedures in place to regularly identify and reduce your enterprise's environmental impacts? (For example preparing environmental audits, setting environmental performance goals, ISO 14001 certification, ISO 50001 certification, etc).

- Yes, some procedures were implemented before 2016
 Yes, some procedures were implemented or significantly changed between 2016 and 2018
 No

19a. In the three years 2016 to 2018, did your enterprise use any by-products of its production?

Yes No

19b. If not, do you plan to use by-products in future?

Yes No

20a. In the three years 2016 to 2018, did your enterprise:

	Yes	No
A. Apply for a patent	<input type="radio"/>	<input type="radio"/>
B. Apply for an utility model	<input type="radio"/>	<input type="radio"/>
C. Register an industrial design right	<input type="radio"/>	<input type="radio"/>
D. Register a trademark	<input type="radio"/>	<input type="radio"/>
E. Use trade secrets	<input type="radio"/>	<input type="radio"/>
F. Claim copyright	<input type="radio"/>	<input type="radio"/>

20b. Did your enterprise introduce any of the intellectual property rights listed in 20a before 2016? (Please tick the boxes before corresponding letters. Multiple answers are possible.)

A. B. C. D. E. F. None of the above

21. What was your enterprises's total turnover for 2018?

(Turnover is defined as the market sales of goods and services. Include all taxes except VAT.)

- Less than 100,000 Euros
 100,000 to less than 250,000 Euros
 250,000 to less than 500,000 Euros
 500,000 to less than 1 million Euros
 1 million to less than 5 million Euros
 Over 5 million Euros

22. What was the percent of your total turnover from sales to clients outside your country for 2018? _____

23. What is the percent of your enterprise's RDI budget as a share of the overall income? _____

24. What was your enterprise's average number of employees in 2018?

- 0 employees 10 to less than 50 employees
 1 employee 50 to less than 250 employees
 2-9 employees Over 250 employees

25. Approximately how many of your enterprise's employees in 2018

- a. had a tertiary degree (undegraduate degree or more)? _____
 b. were in RDI positions? _____
 c. were simultaneously in a RDI and management position? _____

26a. Do you have enough skilled employees?

Yes No

26b. If no, what are the skills that you would need more of, that are in demand?

27. Do you have any comment or is there anything we left out related to the topic that you consider important?

Thank you for your cooperation!

Please insert the completed questionnaire in the enclosed envelope with paid postage and submit it by post.



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Koper, 11. 2. 2019

Dear director of [name of company],

We are inviting you to participate in a scientific study on market and innovation activities of Slovenian companies in the wood value chain. It is being carried out by the InnoRenew CoE, a non-profit private research institute focused on wood modification and the use of renewable materials and sustainable buildings.

We found your contact information in the Bizisi business registry. Your company was selected to participate because its main activity is [A02.100] (Siviculture and other activities).

Please find enclosed a questionnaire that includes questions on innovation and managerial strategies and activities. Completing the questionnaire will take you between **about 10 minutes** (if you do not have innovation activities) or **about 15 minutes** (if you have innovation activities).

Please respond to the questionnaire **before the 28th of February 2019**. You can either fill out the enclosed paper questionnaire and mail it back using the return envelope or you may fill out the questionnaire online following this link: <https://innorenew.eu/shortlink>.

We are also enclosing an information sheet with a glossary of terms used in the questionnaire and Frequently Asked Questions about the project. If you have further questions you can send an e-mail to surveys@innorenew.eu or call us at **031 472 777 (contact person: Barbara Rovere)**.

Thank you very much for your participation.

Dr. Andreja Kutnar

Frequently asked questions

What is the purpose of the study?

The objectives of the study are to identify the state of innovation practices and to identify models to stimulate them.

What are the benefits and risks of participating?

There are no reasonably foreseeable risks, discomforts, or disadvantages connected to your participation. There will be no direct benefit or incentive to you, but your participation will help us design activities to stimulate innovation activities in your sector. Your participation is voluntary, and you might skip any questions you do not wish to answer.

What if I do not want to participate in the study?

If you do not fill out the questionnaire by the end of February, we will remind you by e-mail or telephone or by sending you another letter. If you do not wish to be contacted anymore, please inform us by e-mail (surveys@innorenew.eu) or phone 031 472 777 (contact person: Barbara Rovere).

Are my responses confidential?

The questionnaire contains the ID number of your company which we need to keep track of responses to avoid recontacting companies that have already responded. The database will contain only the ID numbers and not the name of your company or any other information based on which your company could be identified. Your identity will be kept confidential in all outputs and by the end of the study (in March 2022) we will permanently delete the connection between your ID number and the name.

How is the data going to be processed?

Your responses will be transcribed from paper to digital form or exported from the online database and stored for data analysis. We will add some auxiliary information provided by Bizi.si (company activity, number of employees, legal organization form, and region) but not anything that could reveal the identity of your company.

How are you going to use my responses?

Processed data will be used in research publications, for education purposes, and for future research. The published dataset will not be limited to the InnoRenew research group but also third parties will be able to access and processed anonymised data deposited on the Zenodo open research data platform. As a participant you can receive a summary of the results upon request.

Based on your responses our research group might contact you for follow-up studies on more detailed topics related to the study.

Glossary of terms

Innovation - An innovation is the introduction of a new or significantly improved product, process, organisational method, or marketing method by your enterprise. An innovation must have characteristics or intended uses that are new or which provide a significant improvement over what was previously used or sold by your enterprise. However, an innovation can fail or take time to prove itself. An innovation need only be new or significantly improved for your enterprise. It could have been originally developed or used by other enterprises or organisations.

Product innovation - the market introduction of a new or significantly improved good or service with respect to its capabilities, user friendliness, components or sub-systems. A **good** is usually a tangible object such as a smartphone, furniture, or packaged software, but downloadable software, music and film are also goods. A **service** is usually intangible, such as retailing, insurance, educational courses, air travel, consulting, etc. Product innovations (new or improved) must be new to your enterprise, but they do not need to be new to your market. Product innovations could have been originally developed by your enterprise or by other enterprises or organisations.

Process innovation - the implementation of a new or significantly improved production process, distribution method, or supporting activity. Process innovations must be new to your enterprise, but they do not need to be new to your market. The innovation could have been originally developed by your enterprise or by other enterprises or organisations.

Organisational innovation - a new organisational method in your enterprise's business practices (including knowledge management), workplace organisation or external relations that has not been previously used by your enterprise. It must be the result of strategic decisions taken by management. Exclude mergers or acquisitions, even if for the first time.

Marketing innovation - the implementation of a new marketing concept or strategy that differs significantly from your enterprise's existing marketing methods and which has not been used before. It requires significant changes in product design or packaging, product placement, product promotion or pricing. Exclude seasonal, regular and other routine changes in marketing methods.

Innovation activities - include the acquisition of machinery, equipment, buildings, software, and licenses; engineering and development work, feasibility studies, design, training, R&D and marketing when they are specifically undertaken to develop and/or implement a product or process innovation. This includes also all types of research and development consisting of research and development activities to create new knowledge or solve scientific or technical problems.

* Encoding: UTF-8.

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RECODE SKD (16000 thru 16999=1) (31000 thru 31999=2) (ELSE=0) INTO c16c31.

VARIABLE LABELS c16c31 'Categories C16 and C31'.

EXECUTE.

CROSSTABS

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RECODE Q24 (3=2) (1 thru 2=1) (4 thru 6=3) (ELSE=SYSMIS) INTO Q24_r3.

VARIABLE LABELS Q24_r3 'Enterprise size'.

EXECUTE.

DATASET ACTIVATE DataSet1.

RECODE Q24 (1 thru 3=1) (4 thru 6=0) (ELSE=SYSMIS) INTO Q24_r2.

VARIABLE LABELS Q24_r2 'Enterprise size (2 groups)'.

EXECUTE.

VAL LAB Q24_r3 1 'Mikropodjetja 0-1' 2 'Mikropodjetja 2-9' 3 'Mala, srednja in velika podjetja' .

VAL LAB Q24_r2 1 'Mikropodjetja' 0 'Mala, srednja in velika podjetja' .

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CROSSTABS

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Q11_2 Q11_3 Q11_4 Q11_5 Q11_6 Q11_7 Q16_A1 Q16_A2 Q16_A3 Q16_A4 Q16_A5 Q16_A6 Q16_A7 Q16_A8 BY
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CROSSTABS

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CROSSTABS

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Table 33: Chi-Square tests and contingency coefficients for comparisons by enterprise sector and size

Variable		By enterprise sector			By enterprise size		
		Chi-Square	Contingency coefficient	Sig.	Chi-Square	Contingency coefficient	Sig.
Q1	Local/regional within Slovenia	2.19	0.09	0.36	1.00	0.06	0.61
Q1	National (other regions of Slovenia)	6.84	0.18	0.03	24.2	0.35	<0.01
Q1	Other countries in the European Union or associated countries	5.67	0.17	0.06	41.80	0.43	<0.01
Q1	Other countries outside Europe	3.62	0.15	0.16	21.75	0.36	<0.01
Q3a	Goods	7.55	0.16	0.02	6.74	0.16	0.03
Q4a	Services	1.37	0.07	0.05	9.23	0.18	0.01
Q6a	Production process	12.76	0.21	<0.01	3.09	0.11	0.21
Q6a	Distribution methods	1.63	0.08	0.44	6.37	0.16	0.04
Q6a	Supporting activities for processes	1.05	0.06	0.59	24.60	0.30	<0.01
Q11	Business practices for organising procedures	1.88	0.08	0.39	11.98	0.21	<0.01
Q11	Methods of organising work responsibilities and decision making	0.34	0.03	0.84	11.10	0.21	<0.01
Q11	Methods of organising external relations with other enterprises or public organisations	1.32	0.07	0.51	0.57	0.05	0.75
Q11	Aesthetic design or packaging of a good or service	5.58	0.15	0.06	5.02	0.14	0.08
Q11	Media or techniques for product promotion	1.33	0.07	0.05	0.34	0.04	0.85
Q11	Methods for product placement or sales channels	3.47	0.12	0.18	4.29	0.13	0.12
Q11	Methods of pricing goods or services	4.32	0.13	0.12	1.00	0.06	0.61
Q16a	A. Reduced material or water use per unit of output	2.93	0.16	0.23	0.63	0.07	0.73
Q16a	B. Reduced energy use or CO2 'footprint'	3.35	0.17	0.19	11.38	0.29	<0.01
Q16a	C. Reduced air, water, noise, or soil pollution	4.91	0.2	0.09	3.29	0.16	0.19
Q16a	D. Replaced a share of materials with less polluting or hazardous substances	0.86	0.08	0.66	2.55	0.14	0.28
Q16a	E. Replaced a share of fossil energy with renewable energy sources	2.00	0.13	0.37	3.02	0.16	0.22
Q16a	F. Recycled waste, water, or materials for own use or sale	7.36	0.24	0.03	11.29	0.29	<0.01
Q16a	G. Facilitated recycling of product after use	4.68	0.19	0.10	1.17	0.10	0.56