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BI-AT/20-21-006 Innovation activities of Austrian and Slovenian companies in
the wood-value chain

Report on the survey on attitudes towards climate change and innovation activities of Slovenian and Austrian companies in the forest-wood sector

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1 Introduction

In the last three decades, innovation has been identified and embraced as one of the key elements of economic prosperity. During this time, policy makers have shown growing interest in methods to induce and support innovation at various levels. The role of innovation has been reinforced at the European Union level with the Horizon 2020 program and the economic strategy “Europe 2020 – A European strategy for smart, sustainable and inclusive growth” (European Commission 2010). In preparation for the coming decades, the latter strategy has identified three major drivers for growth: economy based on knowledge and innovation, sustainable and low-carbon economy, and policy that delivers social and territorial cohesion. Several joint EU-level initiatives (e.g., COST, EIP-AGRI, ENRD, ForestValue) have been implemented at national, regional, and local levels to enable work on these drivers. One initiative has focused on improving the framework for forestry innovations and transforming innovations into products and services on the market.

Innovation is paramount to keeping up with the growing international competition. However, its relevance goes beyond individual profit in businesses, as forest-based products have a strong potential to contribute to the sustainability goals of European and international strategies, particularly those that encompass bio-economy and circular economy principles. This sector is expected to significantly contribute to highly innovative markets such as sustainable construction, bio-based products, and renewable energies. Furthermore, the forest sector should continue to provide income and employment opportunities in rural communities, to consolidate its important role in the sustainable future of Europe. In addition to this, innovations in forestry and forest-based industries are expected to assist in efforts to adapt to climate change and mitigate its impact.

Within the bilateral project “Innovation activities of Austrian and Slovenian companies in the wood-value chain” we conducted a cross-sectional survey on factors influencing innovation activities of companies towards climate change mitigation and adaptation. The aim of the research was to understand the impact of climate change on companies in the forest-wood sector in Austria and Slovenia, their attitudes towards climate change and their motivation for action on climate change, and how climate change encourages them to develop new strategies, processes, or products. The survey was conducted in summer 2021 on a sample of 123 Austrian and 170 Slovenian companies.



2 Methodology

The units of analysis are companies and the research method used was a survey interviewing their representatives about their innovation activities in the period from 2016 to 2018 (or 2018 to 2020 if the company was established after 2016). In this section, we first present the questionnaire (2.1) and then the characteristics of the sample (2.2).

2.1 Questionnaire

Data was collected using a self-administered online survey questionnaire developed using the LimeSurvey tool. It started with a screening question about the year when the company was established, followed by three sections of questions on attitudes and behaviours at the individual, company, and system level. The fourth section was mainly based on the Community Innovation survey questionnaire (Eurostat, 2016; Eurostat, 2018) from which we took questions on strategies, product, and process innovation, and engagement in innovation activities. The questions were related to the period between 2016 and 2018 (for enterprises established before 2016) or between 2018 and 2020 (for enterprises established between 2016 and 2018), while enterprises established after 2018 skipped this part of the fourth section. The section ended with three questions about innovations related to climate change. The fifth section was about enterprise characteristics and the last section was about the characteristics of respondents.

The questionnaire was prepared in English (Slavec et. al. 2021) and then translated to German (Moreno Torres and Stern 2021) and Slovenian (Slavec 2021). In total, the questionnaire consisted of 30 questions and the median response time was about 10 minutes.

2.2 Sample

The population was comprised of the active enterprises in the forest-based sector in the two countries, and the list and e-mail addresses were obtained from the firmeninfo.at registry for Austria and from the bizi.si registry for Slovenia. According to the Statistical Classification of Economic Activities in the EU (NACE) (European Commission, 2008), the main activity of the enterprises on the lists were: Forestry and logging (A2); Manufacture of wood and of products of wood and cork (C16); Manufacture of paper and paper products (C17); Manufacture of furniture (C31), Construction (F41, F43); and Trade (G46, G47) but there we also a few in other categories (B8, C20, C22, C25, C32, E38, H49, I56, M70, M71 and M73).

Expecting a low response rate, we decided to e-mail the survey invitation to all enterprises on the list. In total, e-mail invitations were sent to 5342 enterprises, 3048 Austrian and 2294 Slovenian. No incentive was offered for participation but up to four reminders were sent to improve the response rate.



3 Results

In Slovenia the survey was active from June to September and in Austria from August to the end of September. In this time frame, responses from 123 Austrian and 170 Slovenian companies were received. Data was analysed using the statistical software IBM SPSS Statistics 28 and Microsoft Excel.

In the following we present the response distributions for all items in the questionnaire. Each subsection presents a different questionnaire section, which will be described in more detail in sections 3.1 to 3.7.

3.1 Screening question

In section A respondents were asked to enter the 4-digit code they received in their email and when their company was established. Majority of the participating enterprises (93%) were established before 2016 but 20 were established in 2016 or later (Table 1). The 13 that were established in 2018 or after were not eligible to answer certain questions in section E of the questionnaire. The differences between the two countries are not statistically significant.

Table 1: “When was your company established?”

A2	Austria		Slovenia		Total	
1 Before 2016	112	91.1%	161	94.7%	273	93.2%
2 In 2016 or 2017	3	2.4%	4	2.4%	7	2.4%
3 In 2018 or after	8	6.5%	5	2.9%	13	4.4%
Total	123	100.0%	170	100.0%	293	100.0%

3.2 Climate change attitudes and behaviours at the individual level

Section B has 17 items that cover behavioural intentions, attitudes, norms, perceived behavioural control, and opportunity and threat perceptions at the individual level. A third of the respondents (33%) is very concerned about climate change and an additional 46% is fairly concerned (almost 80% are at least fairly concerned), while 18% were not too concerned, and 2% not at all (Table 2). Slovenian respondents had the highest percentage of those who are at least fairly concerned (84%), compared to Austrian respondents (73%) ($\chi^2 = 8.86, p = 0.03$).

Table 2: “How concerned are you personally, if at all, about climate change?”

B1	Austria		Slovenia		Total	
1 Very concerned	44	35.8%	54	31.8%	98	33.4%
2 Fairly concerned	46	37.4%	89	52.4%	135	46.1%
3 Not too concerned	28	22.8%	25	14.7%	53	18.1%
4 Not at all concerned	5	4.1%	2	1.2%	7	2.4%
Total	123	100.0%	170	100.0%	293	100.0%

In question B2 respondents were presented with a series of ten statements that they rated on a scale from 1 (Strongly disagree) to 5 (Strongly agree). Of the respondents, 77% agree or strongly agreed to



support climate change mitigation/adaptation measures throughout their company's operations, while 13% neither agree nor disagree, 5% disagree, and 3% strongly disagree (Table 3). Among Slovenians, a higher percentage agree to support climate change mitigation/adaptation measures throughout their company's operations (47%), compared to Austrians (29%) ($\chi^2 = 12.50$, $p = 0.01$).

Table 3: "From my position in the company, I intend to support climate change mitigation/adaptation measures throughout the company's operations."

B2_1	Austria		Slovenia		Total	
1 Strongly disagree	6	4.9%	4	2.4%	10	3.4%
2 Disagree	5	4.1%	11	6.5%	16	5.5%
3 Neither agree nor disagree	18	14.6%	21	12.4%	39	13.3%
4 Agree	36	29.3%	80	47.1%	116	39.6%
5 Strongly agree	58	47.2%	54	31.8%	112	38.2%
Total	123	100.0%	170	100.0%	293	100.0%

Two-fifths of the respondents (39%) agree on wanting to explore opportunities to implement climate change mitigation/adaptation measures in their company, and 28% strongly agree. One in eight respondents (12%) disagree or strongly disagree, while one fifth of respondents (21%) neither agree nor disagree with the statement (Table 4). The differences between the two countries are not statistically significant.

Table 4: "I want to explore opportunities to implement climate change mitigation/adaptation measures in my company."

B2_2	Austria		Slovenia		Total	
1 Strongly disagree	10	8.1%	8	4.7%	18	6.1%
2 Disagree	8	6.5%	10	5.9%	18	6.1%
3 Neither agree nor disagree	22	17.9%	40	23.5%	62	21.2%
4 Agree	42	34.1%	72	42.4%	114	38.9%
5 Strongly agree	41	33.3%	40	23.5%	81	27.6%
Total	123	100.0%	170	100.0%	293	100.0%

Four-thirds of the respondents (75%) feel positive about participating in the company's climate change mitigation and/or adaptation measures (strongly agree and agree), while 15% neither agree nor disagree, and 11% strongly disagree or disagree with the feeling. The differences between the two countries are not statistically significant.

Table 5: "I feel positive about participating in the company's climate change mitigation and/or adaptation measures."

B2_3	Austria		Slovenia		Total	
1 Strongly disagree	9	7.3%	7	4.1%	16	5.5%
2 Disagree	8	6.5%	7	4.1%	15	5.1%
3 Neither agree nor disagree	16	13.0%	25	14.7%	41	14.0%
4 Agree	37	30.1%	73	42.9%	110	37.5%
5 Strongly agree	53	43.1%	58	34.1%	111	37.9%
Total	123	100.0%	170	100.0%	293	100.0%



More than a third of the respondents neither agree nor disagree (35%) about sensing that their colleagues want the company to support innovations to address climate change adaptation/mitigation in its operations, while another third agrees (34%). About 13% of respondents strongly agree, while 17% strongly disagree or disagree (Table 6). Among Slovenian respondents a higher percentage agree about sensing that their colleagues want the company to support innovations to address climate change adaptation/mitigation in its operations (38%), compared to the Austrian respondents (28%) ($\chi^2 = 10.09, p = 0.03$).

Table 6: “I sense that colleagues want our company to support innovations to address climate change adaptation/mitigation in its operations.”

B2_4	Austria		Slovenia		Total	
1 Strongly disagree	13	10.6%	8	4.7%	21	7.2%
2 Disagree	17	13.8%	13	7.6%	30	10.2%
3 Neither agree nor disagree	46	37.4%	58	34.1%	104	35.5%
4 Agree	35	28.5%	64	37.6%	99	33.8%
5 Strongly agree	12	9.8%	27	15.9%	39	13.3%
Total	123	100.0%	170	100.0%	293	100.0%

Among respondents, 36% agree that what their colleagues think should be done in relation to climate change matters to them, and 29% neither agree nor disagree. Almost 20% strongly agree, while 15% strongly disagree or disagree about the influence of how their colleagues think (Table 7). The differences between the two countries are not statistically significant.

Table 7: “What colleagues think we should do in relation to climate change do matters to me.”

B2_5	Austria		Slovenia		Total	
1 Strongly disagree	9	7.3%	11	6.5%	20	6.8%
2 Disagree	15	12.2%	9	5.3%	24	8.2%
3 Neither agree nor disagree	40	32.5%	46	27.1%	86	29.4%
4 Agree	37	30.1%	70	41.2%	107	36.5%
5 Strongly agree	22	17.9%	34	20.0%	56	19.1%
Total	123	100.0%	170	100.0%	293	100.0%

Almost half (45%) agree or strongly agree that what customers think should be done in relation to climate change matters, while about 35% neither agree nor disagree and one fifth (20%) disagree or strongly disagree (Table 8). Inter-country differences are not statistically significant.

Table 8: “What customers think we should do in relation to climate change do matters to me.”

B2_6	Austria		Slovenia		Total	
1 Strongly disagree	8	6.5%	12	7.1%	20	6.8%
2 Disagree	17	13.8%	22	12.9%	39	13.3%
3 Neither agree nor disagree	41	33.3%	61	35.9%	102	34.8%
4 Agree	37	30.1%	55	32.4%	92	31.4%
5 Strongly agree	20	16.3%	20	11.8%	40	13.7%
Total	123	100.0%	170	100.0%	293	100.0%



Most respondents (62%) want to explore opportunities to implement climate change mitigation/adaptation measures in their respective companies (agree or strongly agree), while 12% do not want to explore (disagree or strongly disagree), and 27% neither agree nor disagree with this statement (Table 9). The differences between the two countries are not statistically significant.

Table 9: “I want to explore opportunities to implement climate change mitigation/adaptation measures in my company.”

B2_7	Austria		Slovenia		Total	
1 Strongly disagree	6	4.9%	3	1.8%	9	3.1%
2 Disagree	13	10.6%	12	7.1%	25	8.5%
3 Neither agree nor disagree	26	21.1%	52	30.6%	78	26.6%
4 Agree	48	39.0%	74	43.5%	122	41.6%
5 Strongly agree	30	24.4%	29	17.1%	59	20.1%
Total	123	100.0%	170	100.0%	293	100.0%

Almost two-thirds of the respondents (66%) are confident that it is possible to implement climate change adaptation/mitigation measures in their company (agree or strongly agree), and only 11% are not that confident that this is possible (disagree or strongly disagree), while 24% neither agree nor disagree (Table 10). Among Austrian respondents, a higher percentage disagree or strongly disagree (14%), compared to Slovenian respondents (8%) ($\chi^2 = 11.20, p = 0.02$).

Table 10: “I am confident it is possible to implement climate change adaptation/mitigation measures in our company.”

B2_8	Austria		Slovenia		Total	
1 Strongly disagree	11	8.9%	6	3.5%	17	5.8%
2 Disagree	7	5.7%	7	4.1%	14	4.8%
3 Neither agree nor disagree	21	17.1%	49	28.8%	70	23.9%
4 Agree	46	37.4%	72	42.4%	118	40.3%
5 Strongly agree	38	30.9%	36	21.2%	74	25.3%
Total	123	100.0%	170	100.0%	293	100.0%

Forty percent agree or strongly agree that they have the necessary resources to implement climate change related adaptation/mitigation measures, 27% disagree or strongly disagree, while 33% neither agree nor disagree (Table 11). In Slovenia, a lower percentage strongly agree about having access to the necessary resources (6%), compared to Austrian respondents (21%) ($\chi^2 = 15.56, p < 0.01$).

Table 11: “I have access to the necessary resources to implement climate change related adaptation/mitigation measures.”

B2_9	Austria		Slovenia		Total	
1 Strongly disagree	13	10.6%	17	10.0%	30	10.2%
2 Disagree	20	16.3%	29	17.1%	49	16.7%
3 Neither agree nor disagree	32	26.0%	65	38.2%	97	33.1%
4 Agree	32	26.0%	48	28.2%	80	27.3%
5 Strongly agree	26	21.1%	11	6.5%	37	12.6%
Total	123	100.0%	170	100.0%	293	100.0%



Majority of respondents (73%) agree or strongly agree that having access to resources is necessary to implement climate change related measures, while almost 10% disagree or strongly disagree and about 17% respondents neither agree nor disagree (Table 12). The differences between the two countries are not statistically significant.

Table 12: "I think that having access to resources is necessary to implement climate change related measures"

B2_10	Austria		Slovenia		Total	
1 Strongly disagree	6	4.9%	6	3.5%	12	4.1%
2 Disagree	5	4.1%	11	6.5%	16	5.5%
3 Neither agree nor disagree	22	17.9%	29	17.1%	51	17.4%
4 Agree	43	35.0%	71	41.8%	114	38.9%
5 Strongly agree	47	38.2%	53	31.2%	100	34.1%
Total	123	100.0%	170	100.0%	293	100.0%

In question B3 respondents were asked to evaluate to what extent they perceive climate change as an opportunity on a scale from 1 (Strongly disagree) to 5 (Strongly agree) at four different levels. Forty-three percent of respondents mostly agree or strongly agree that they personally perceive climate change as an opportunity, while 37% neither agree nor disagree and 20% strongly disagree or disagree (Table 13). Among Slovenian respondents, a higher percentage personally perceive climate change as an opportunity (35%), compared to Austrian respondents (19%) ($\chi^2 = 20.59, p < 0.01$).

Table 13: "I perceive climate change as an opportunity to me personally."

B3_1	Austria		Slovenia		Total	
1 Strongly disagree	23	18.7%	10	5.9%	33	11.3%
2 Disagree	6	4.9%	19	11.2%	25	8.5%
3 Neither agree nor disagree	50	40.7%	58	34.1%	108	36.9%
4 Agree	24	19.5%	59	34.7%	83	28.3%
5 Strongly agree	20	16.3%	24	14.1%	44	15.0%
Total	123	100.0%	170	100.0%	293	100.0%

More than half (53%) agree or strongly agree that they perceive climate change as an opportunity for their company, 16% disagree or strongly disagree, and 33% neither agree nor disagree with this statement (Table 14). The differences between the two countries are not statistically significant.

Table 14: "I perceive climate change as an opportunity to my company."

B3_2	Austria		Slovenia		Total	
1 Strongly disagree	14	11.4%	7	4.1%	21	7.2%
2 Disagree	9	7.3%	16	9.4%	25	8.5%
3 Neither agree nor disagree	37	30.1%	54	31.8%	91	31.1%
4 Agree	38	30.9%	60	35.3%	98	33.4%
5 Strongly agree	25	20.3%	33	19.4%	58	19.8%
Total	123	100.0%	170	100.0%	293	100.0%



More than half (61%) agree or strongly agree that they perceive climate change as an opportunity for their country, 14% disagree or strongly disagree, and 23% neither agree nor disagree with this statement (Table 15). The differences between the two countries are not statistically significant.

Table 15: "I perceive climate change as an opportunity to my country."

B3_3	Austria		Slovenia		Total	
1 Strongly disagree	9	7.3%	9	5.3%	18	6.1%
2 Disagree	11	8.9%	13	7.6%	24	8.2%
3 Neither agree nor disagree	37	30.1%	31	18.2%	68	23.2%
4 Agree	40	32.5%	67	39.4%	107	36.5%
5 Strongly agree	26	21.1%	50	29.4%	76	25.9%
Total	123	100.0%	170	100.0%	293	100.0%

More than half (62%) agree or strongly agree that they perceive climate change as an opportunity for the forest-based sector worldwide, while 15% disagree or strongly disagree and 23% neither agree nor disagree (Table 16). Among the Austrian respondents, a higher percentage neither agree nor disagree (18%), compared to Slovenian respondents (30%) ($\chi^2 = 12.32, p = 0.02$).

Table 16: "I perceive climate change as an opportunity to the forest-based sector worldwide."

B3_4	Austria		Slovenia		Total	
1 Strongly disagree	9	7.3%	4	2.4%	13	4.4%
2 Disagree	14	11.4%	17	10.0%	31	10.6%
3 Neither agree nor disagree	37	30.1%	31	18.2%	68	23.2%
4 Agree	33	26.8%	59	34.7%	92	31.4%
5 Strongly agree	30	24.4%	59	34.7%	89	30.4%
Total	123	100.0%	170	100.0%	293	100.0%

In question B4 respondents were asked to evaluate to what extent they perceive climate change as a threat on a scale from 1 (Strongly disagree) to 5 (Strongly agree) on three different levels. While 37% of respondents neither agree nor disagree that they perceive climate change as a threat to their company, almost a third (32%) strongly disagree or disagree and about the same number (31%) strongly agree or agree that climate change is perceived as a threat to their company (Table 17). Among Austrian respondents, a higher percentage strongly disagree that they perceive climate change as a threat to their company (21%) compared to Slovenian respondents (7%) ($\chi^2 = 18.92, p < 0.01$).

Table 17: "I perceive climate change as a threat to my company."

B4_1	Austria		Slovenia		Total	
1 Strongly disagree	26	21.1%	12	7.1%	38	13.0%
2 Disagree	28	22.8%	27	15.9%	55	18.8%
3 Neither agree nor disagree	41	33.3%	68	40.0%	109	37.2%
4 Agree	16	13.0%	42	24.7%	58	19.8%
5 Strongly agree	12	9.8%	21	12.4%	33	11.3%
Total	123	100.0%	170	100.0%	293	100.0%



Almost half the respondents (49%) agree or strongly agree that they perceive climate change as a threat to the forest-based sector in the country where their company operates, while 25% strongly disagree or disagree and 26% neither agree nor disagree (Table 18). Among Slovenian respondents, a higher percentage agree that they perceive climate change as a threat to the forest-based sector in the country where their company operates (35%), compared to Austrian respondents (23%) ($\chi^2 = 10.86, p = 0.03$).

Table 18: “I perceive climate change as a threat to the forest-based sector in the country where my company operates.”

B4_2	Austria		Slovenia		Total	
1 Strongly disagree	14	11.4%	10	5.9%	24	8.2%
2 Disagree	28	22.8%	21	12.4%	49	16.7%
3 Neither agree nor disagree	31	25.2%	45	26.5%	76	25.9%
4 Agree	29	23.6%	60	35.3%	89	30.4%
5 Strongly agree	21	17.1%	34	20.0%	55	18.8%
Total	123	100.0%	170	100.0%	293	100.0%

Most respondents (58%) agree or strongly agree that they perceive climate change as a threat to the forest-based sector worldwide, while 23% neither agree nor disagree, and 18% disagree or strongly disagree (Table 19). The differences between the two countries are not statistically significant.

Table 19: “I perceive climate change as a threat to the forest-based sector worldwide.”

B4_3	Austria		Slovenia		Total	
1 Strongly disagree	10	8.1%	6	3.5%	16	5.5%
2 Disagree	17	13.8%	20	11.8%	37	12.6%
3 Neither agree nor disagree	27	22.0%	42	24.7%	69	23.5%
4 Agree	36	29.3%	54	31.8%	90	30.7%
5 Strongly agree	33	26.8%	48	28.2%	81	27.6%
Total	123	100.0%	170	100.0%	293	100.0%

3.3 Climate change attitudes and behaviours at the company level

In Section C there are 10 items that cover land ownership, perception of threat, influence, functional fixedness, perceived power, positioning and risk management strategies, all at the company level. Eighty-eight percent responded that their companies do not own a forest or plantation; only 12% do. There are no significant differences between the two countries.

Table 20: “Does your company own forests or plantations?”

C1	Austria		Slovenia		Total	
1 Yes	16	13.0%	19	11.2%	35	11.9%
2 No	107	87.0%	151	88.8%	258	88.1%
Total	123	100.0%	170	100.0%	293	100.0%

Among those who own forests or plantations, 43% own less than 50 hectares, 20% own from 50 to less than 200, 17% own from 200 to less than 2,000, 6% own from 2,000 to less than 20,000, and 11%



of respondents reported that their companies own 20,000 or more, while 3% do not know (Table 21). Among Slovenian respondents, no company owns more than 20,000 hectares; a higher percentage owns less than 50 hectares (63%), compared to Austrian respondents (19%) ($\chi^2 = 11.03, p = 0.05$).

Table 21: “How many hectares?”

C2	Austria		Slovenia		Total	
1 less than 50	3	18.8%	12	63.2%	15	42.9%
2 50 to less than 200	4	25.0%	3	15.8%	7	20.0%
3 200 to less than 2,000	4	25.0%	2	10.5%	6	17.1%
4 2,000 to less than 20,000	1	6.3%	1	5.3%	2	5.7%
5 20,000 or more	4	25.0%	0		4	11.4%
6 I do not know	0		1	5.3%	1	2.9%
Total	16	100.0%	19	100.0%	35	100.0%

In question C3 respondents were presented with a series of six statements that they rated on a scale from 1 (Strongly disagree) to 5 (Strongly agree). Forty-five percent of respondents disagree or strongly disagree with the feeling that climate change is a threat to the existing business model of their company, while 31% neither agree nor disagree and 23% agree or strongly agree (Table 22). Among Austrian respondents, a higher percentage agree with this feeling (24%), compared to Slovenian respondents (7%) ($\chi^2 = 22.10, p < 0.01$).

Table 22: “I feel climate change as a threat to the existing business model of our company.”

C3_1	Austria		Slovenia		Total	
1 Strongly disagree	30	24.4%	12	7.1%	42	14.3%
2 Disagree	41	33.3%	50	29.4%	91	31.1%
3 Neither agree nor disagree	31	25.2%	60	35.3%	91	31.1%
4 Agree	17	13.8%	34	20.0%	51	17.4%
5 Strongly agree	4	3.3%	14	8.2%	18	6.1%
Total	123	100.0%	170	100.0%	293	100.0%

Forty percent of respondents feel or strongly feel that climate change is a threat to the existing supply chain model of their company, while almost a third (32%) disagree or strongly disagree and 28% neither agree nor disagree (Table 23). Among Slovenian respondents a higher share feel there is a threat (46%), compared to Austrian respondents (30%) ($\chi^2 = 22.36, p < 0.01$).

Table 23: “I feel climate change as a threat to the existing supply chain model of our company.”

C3_2	Austria		Slovenia		Total	
1 Strongly disagree	20	16.3%	10	5.9%	30	10.2%
2 Disagree	38	30.9%	27	15.9%	65	22.2%
3 Neither agree nor disagree	28	22.8%	54	31.8%	82	28.0%
4 Agree	30	24.4%	58	34.1%	88	30.0%
5 Strongly agree	7	5.7%	21	12.4%	28	9.6%
Total	123	100.0%	170	100.0%	293	100.0%



Thirty-one percent of respondents neither agree nor disagree that climate change has led their company to adopt new processes regarding supply chain management in recent years. On one hand, 18% strongly disagree and 26% disagree while on the other hand 19% agree and 6% strongly agree with the statement (Table 24). Among Slovenian respondents, a higher percentage agree or strongly agree (28%), compared to Austrian respondents (21%) ($\chi^2 = 9.40, p = 0.05$).

Table 24: “Climate change led our company to adopt new processes regarding supply chain management in recent years.”

C3_3	Austria		Slovenia		Total	
1 Strongly disagree	32	26.0%	21	12.4%	53	18.1%
2 Disagree	30	24.4%	45	26.5%	75	25.6%
3 Neither agree nor disagree	35	28.5%	56	32.9%	91	31.1%
4 Agree	20	16.3%	36	21.2%	56	19.1%
5 Strongly agree	6	4.9%	12	7.1%	18	6.1%
Total	123	100.0%	170	100.0%	293	100.0%

Thirty-nine percent of respondents neither agree nor disagree that their company has sufficient resources to deal with climate change. On one hand 23% disagree and 17% strongly disagree while on the other hand 16% agree and 5% strongly agree (Table 25). The percentage of those who agree or strongly agree is higher among Slovenian respondents (23%) compared to Austrian respondents (8%) ($\chi^2 = 23.72, p < 0.01$).

Table 25: “Our company has sufficient resources to deal with climate change.”

C3_4	Austria		Slovenia		Total	
1 Strongly disagree	10	8.1%	40	23.5%	50	17.1%
2 Disagree	23	18.7%	45	26.5%	68	23.2%
3 Neither agree nor disagree	52	42.3%	62	36.5%	114	38.9%
4 Agree	27	22.0%	19	11.2%	46	15.7%
5 Strongly agree	11	8.9%	4	2.4%	15	5.1%
Total	123	100.0%	170	100.0%	293	100.0%

More than a third (34%) of the respondents neither agree nor disagree that their company does not have the power to change processes along the supply chain. On one hand 16% disagree and 10% strongly disagree while on the other hand 23% agree and 16% strongly agree (Table 26). A higher percentage of Austrian respondents agree or strongly agree (48%), compared to Slovenian respondents (32%) ($\chi^2 = 13.78, p < 0.01$).

Table 26: “Our company does not have the power to change processes along the supply chain.”

C3_5	Austria		Slovenia		Total	
1 Strongly disagree	12	9.8%	18	10.6%	30	10.2%
2 Disagree	16	13.0%	32	18.8%	48	16.4%
3 Neither agree nor disagree	35	28.5%	65	38.2%	100	34.1%
4 Agree	30	24.4%	39	22.9%	69	23.5%
5 Strongly agree	30	24.4%	16	9.4%	46	15.7%
Total	123	100.0%	170	100.0%	293	100.0%



More than a third (35%) neither agree nor disagree that their company is particularly exposed to climate change related effects; 32% disagree and 14% strongly disagree while 13% agree and 5% strongly agree (Table 27). The differences between the two countries are not statistically significant.

Table 27: “Our company is particularly exposed to climate change related effects.”

C3_6	Austria		Slovenia		Total	
1 Strongly disagree	17	13.8%	24	14.1%	41	14.0%
2 Disagree	43	35.0%	52	30.6%	95	32.4%
3 Neither agree nor disagree	41	33.3%	63	37.1%	104	35.5%
4 Agree	15	12.2%	22	12.9%	37	12.6%
5 Strongly agree	7	5.7%	9	5.3%	16	5.5%
Total	123	100.0%	170	100.0%	293	100.0%

Less than a quarter of the respondents (23%) are from companies that do have a risk management strategy, while most (60%) do not and 16% do not know (Table 28). The highest percentage of those with a risk management strategy are Slovenian respondents (26%), compared to Austrian (19%) respondents ($\chi^2 = 6.12, p = 0.05$).

Table 28: “Does your company have a risk management strategy?”

C4	Austria		Slovenia		Total	
1 Yes	24	19.5%	45	26.5%	69	23.5%
2 No	84	68.3%	92	54.1%	176	60.1%
3 I do not know	15	12.2%	33	19.4%	48	16.4%
	123	100.0%	170	100.0%	293	100.0%

Among those that have a risk management strategy, more than half (52%) explicitly include climate change (mitigation/adaptation), while 42% do not and nearly 6% of respondents do not know (Table 29). The differences between the two countries are not statistically significant.

Table 29: “Does the risk management strategy explicitly include climate change (mitigation/adaptation)?”

C5	Austria		Slovenia		Total	
1 Yes	10	41.7%	26	57.8%	36	52.2%
2 No	11	45.8%	18	40.0%	29	42.0%
3 I do not know	3	12.5%	1	2.2%	4	5.8%
	24	100.0%	45	100.0%	69	100.0%

3.4 Climate change attitudes and behaviours on system level

Section D contains 11 items on shared values, networks, perceived power, role of technology, perceived needs, and effect of policies at the system level.

In question D1 respondents were presented with a series of eight statements that they rated on a scale from 1 (Strongly disagree) to 5 (Strongly agree). Most respondents (62%) agree or strongly agree that they believe the forest-based sector needs to play a pioneering role in climate change adaptation and mitigation; while 12% disagree or strongly disagree, 25% neither agree nor disagree (Table 30).



The percentage of respondents who strongly agree is significantly higher for Austrians (34%) than for Slovenians (20%) ($\chi^2 = 9.81, p = 0.04$).

Table 30: “I believe the forest-based sector needs to play a pioneering role in climate change adaptation and mitigation.”

D1_1	Austria		Slovenia		Total	
1 Strongly disagree	0		3	1.9%	3	1.1%
2 Disagree	14	13.2%	16	9.9%	30	11.2%
3 Neither agree nor disagree	21	19.8%	47	29.2%	68	25.5%
4 Agree	35	33.0%	62	38.5%	97	36.3%
5 Strongly agree	36	34.0%	33	20.5%	69	25.8%
Total	106	100.0%	161	100.0%	267	100.0%

Almost two-thirds of the respondents (66%) agree or strongly agree that dealing with climate change adaptation/mitigation should be the forest sector's societal responsibility; while only 9% disagree or strongly disagree, 26% of respondents neither agree nor disagree (Table 31). The percentage of respondents who disagree is higher among Austrians (13%) than Slovenians (6%) ($\chi^2 = 9.57, p = 0.05$).

Table 31: “I consider dealing with climate change adaptation/mitigation should be the forest sector's societal responsibility.”

D1_2	Austria		Slovenia		Total	
1 Strongly disagree	3	2.8%	1	0.6%	4	1.5%
2 Disagree	11	10.4%	8	5.0%	19	7.1%
3 Neither agree nor disagree	20	18.9%	48	30.0%	68	25.6%
4 Agree	45	42.5%	74	46.3%	119	44.7%
5 Strongly agree	27	25.5%	29	18.1%	56	21.1%
Total	106	100.0%	160	100.0%	266	100.0%

Most respondents (73%) agree or strongly agree that climate change adaptation/mitigation can be more effective with the collaboration of different stakeholders in the forest-based sector and only 6% disagree or strongly disagree with this, while 21% neither agree nor disagree (Table 32). The differences between the two countries are not statistically significant.

Table 32: “Climate change adaptation/mitigation can be more effective with the collaboration of different stakeholders in the forest-based sector.”

D1_3	Austria		Slovenia		Total	
1 Strongly disagree	2	1.9%	1	0.6%	3	1.1%
2 Disagree	6	5.7%	8	5.0%	14	5.3%
3 Neither agree nor disagree	22	20.8%	34	21.3%	56	21.1%
4 Agree	38	35.8%	75	46.9%	113	42.5%
5 Strongly agree	38	35.8%	42	26.3%	80	30.1%
Total	106	100.0%	160	100.0%	266	100.0%

Forty-six percent of respondents agree or disagree that only big companies within the forest-based sector have the power to change processes along the supply chain, while almost a quarter (23%)



disagree or strongly disagree and almost a third (31%) neither agree nor disagree (Table 33). The differences between the two countries are not statistically significant.

Table 33: “I think only big companies within the forest-based sector have the power to change processes along the supply chain.”

D1_4	Austria		Slovenia		Total	
1 Strongly disagree	10	9.4%	12	7.5%	22	8.3%
2 Disagree	17	16.0%	22	13.8%	39	14.7%
3 Neither agree nor disagree	28	26.4%	55	34.4%	83	31.2%
4 Agree	31	29.2%	53	33.1%	84	31.6%
5 Strongly agree	20	18.9%	18	11.3%	38	14.3%
Total	106	100.0%	160	100.0%	266	100.0%

More than half the respondents (53%) agree or strongly agree that they believe there are enough suitable technologies available to foster climate change adaptation and mitigation in the forest-based sector, while 13% disagree or strongly disagree and 34% neither agree nor disagree (Table 34). The differences between the two countries are not statistically significant.

Table 34: “I believe there are enough suitable technologies available to foster climate change adaptation and mitigation in the forest-based sector.”

D1_5	Austria		Slovenia		Total	
1 Strongly disagree	4	3.8%	4	2.5%	8	3.0%
2 Disagree	10	9.4%	16	10.0%	26	9.8%
3 Neither agree nor disagree	29	27.4%	61	38.1%	90	33.8%
4 Agree	47	44.3%	57	35.6%	104	39.1%
5 Strongly agree	16	15.1%	22	13.8%	38	14.3%
Total	106	100.0%	160	100.0%	266	100.0%

Almost half the respondents (48%) perceive or strongly perceive that research organisations support climate change adaptation and mitigation in the forest-based sector, while 15% disagree or strongly disagree and 36% neither agree nor disagree (Table 35). The differences between the two countries are not statistically significant.

Table 35: “I perceive that research organisations support climate change adaptation and mitigation in the forest-based sector.”

D1_6	Austria		Slovenia		Total	
1 Strongly disagree	1	0.9%	9	5.6%	10	3.8%
2 Disagree	11	10.4%	20	12.5%	31	11.7%
3 Neither agree nor disagree	34	32.1%	62	38.8%	96	36.1%
4 Agree	42	39.6%	53	33.1%	95	35.7%
5 Strongly agree	18	17.0%	16	10.0%	34	12.8%
Total	106	100.0%	160	100.0%	266	100.0%

Thirty-one percent of respondents agree or strongly agree that most of the customers support climate change adaptation and mitigation in the forest-based sector; more than 26% disagree or strongly



disagree, while as much as 43% neither agree nor disagree (Table 36). The differences between the two countries are not statistically significant.

Table 36: “I observe that most of the customers support climate change adaptation and mitigation in the forest-based sector.”

D1_7	Austria		Slovenia		Total	
1 Strongly disagree	6	5.7%	11	6.9%	17	6.4%
2 Disagree	24	22.6%	27	16.9%	51	19.2%
3 Neither agree nor disagree	45	42.5%	70	43.8%	115	43.2%
4 Agree	24	22.6%	41	25.6%	65	24.4%
5 Strongly agree	7	6.6%	11	6.9%	18	6.8%
Total	106	100.0%	160	100.0%	266	100.0%

Twenty-nine percent of respondents disagree or strongly disagree with the experience that suppliers support climate change adaptation and mitigation in the forest-based sector, while 24% agree or strongly agree but almost half the respondents (47%) neither agree nor disagree (Table 37). The differences between the two countries are not statistically significant.

Table 37: “In my experience, suppliers support climate change adaptation and mitigation in the forest-based sector.”

D1_8	Austria		Slovenia		Total	
1 Strongly disagree	8	7.5%	9	5.6%	17	6.4%
2 Disagree	26	24.5%	33	20.6%	59	22.2%
3 Neither agree nor disagree	51	48.1%	74	46.3%	125	47.0%
4 Agree	18	17.0%	35	21.9%	53	19.9%
5 Strongly agree	3	2.8%	9	5.6%	12	4.5%
Total	106	100.0%	160	100.0%	266	100.0%

In question D2 respondents were asked to rate their agreement with the statement that current climate policies foster innovation in their company on a scale from 1 (Strongly disagree) to 5 (Strongly agree) and at three levels (regional, national, and international). Almost half the respondents (45%) disagree or strongly disagree that current climate policies at regional level foster innovation in their company, while 19% agree or strongly agree and 36% neither agree nor disagree (Table 38). There is a higher percentage of agreement among respondents from Austria (25%) compared to Slovenia (14%) ($\chi^2 = 12.57$, $p = 0.01$).

Table 38: “Current climate policies at regional level are fostering innovation in our company.”

D2_1	Austria		Slovenia		Total	
1 Strongly disagree	17	16.0%	29	18.1%	46	17.3%
2 Disagree	25	23.6%	50	31.3%	75	28.2%
3 Neither agree nor disagree	37	34.9%	58	36.3%	95	35.7%
4 Agree	16	15.1%	21	13.1%	37	13.9%
5 Strongly agree	11	10.4%	2	1.3%	13	4.9%
Total	106	100.0%	160	100.0%	266	100.0%



Forty percent of respondents disagree or strongly disagree that current climate policies at the national level foster innovation in their company, 21% agree or strongly agree, while 39% neither agree nor disagree (Table 39). The differences between the two countries are not statistically significant.

Table 39: “Current climate policies at national level are fostering innovation in our company.”

D2_2	Austria		Slovenia		Total	
1 Strongly disagree	17	16.0%	27	16.9%	44	16.5%
2 Disagree	23	21.7%	40	25.0%	63	23.7%
3 Neither agree nor disagree	35	33.0%	68	42.5%	103	38.7%
4 Agree	24	22.6%	21	13.1%	45	16.9%
5 Strongly agree	7	6.6%	4	2.5%	11	4.1%
Total	106	100.0%	160	100.0%	266	100.0%

Among respondents 43% disagree or strongly disagree that current climate policies at the international level foster innovation in their company, 17% agree or strongly agree, while 41% neither agree nor disagree (Table 40). There is a higher percentage of disagreement among Austrian respondents (27%) compared to Slovenian respondents (13%) ($\chi^2 = 9.92, p = 0.04$).

Table 40: “Current climate policies at international level are fostering innovation in our company.”

D2_3	Austria		Slovenia		Total	
1 Strongly disagree	29	27.4%	21	13.1%	50	18.8%
2 Disagree	23	21.7%	40	25.0%	63	23.7%
3 Neither agree nor disagree	38	35.8%	70	43.8%	108	40.6%
4 Agree	10	9.4%	23	14.4%	33	12.4%
5 Strongly agree	6	5.7%	6	3.8%	12	4.5%
Total	106	100.0%	160	100.0%	266	100.0%

3.5 Innovation strategies and activities

Section E covers innovation strategies, product and process innovation, and engagement in innovation activities in the period from 2016 to 2018 (or 2018 to 2020).

In question E1 respondents were asked to evaluate the importance of five different strategies on a three-point scale (1 – Low, 2 – Medium, 3 – High) but they could also select 4 – Not important. Almost half the respondents (48%) evaluated the importance of improving their existing products as high, 37% as medium, and 10% as low, while about 5% label it as not important (Table 41). The differences between the two countries are not statistically significant.

Table 41: “[...] how important were each of the following strategies? Improving your existing products.”

E1_1	Austria		Slovenia		Total	
1 Low	11	10.5%	14	8.9%	25	9.5%
2 Medium	33	31.4%	64	40.8%	97	37.0%
3 High	58	55.2%	68	43.3%	126	48.1%
4 Not important	3	2.9%	11	7.0%	14	5.3%
Total	105	100.0%	157	100.0%	262	100.0%



Almost half the respondents (48%) evaluated the importance of introducing entirely new products as medium, 24% as high and 21% as low, while about 7% of respondents found this strategy to be not important (Table 42). The differences between the two countries are not statistically significant.

Table 42: “[...] how important were each of the following strategies? Introducing entirely new products.”

E1_2	Austria		Slovenia		Total	
1 Low	25	23.8%	30	19.1%	55	21.0%
2 Medium	51	48.6%	75	47.8%	126	48.1%
3 High	22	21.0%	42	26.8%	64	24.4%
4 Not important	7	6.7%	10	6.4%	17	6.5%
Total	105	100.0%	157	100.0%	262	100.0%

The strategy of reaching new customer groups was given medium importance by half the respondents (50%), while 30% evaluated it as high, 17% as low, and 3% as not important (Table 43). More Austrian (41%) than Slovenian respondents (22%) evaluated it as highly important ($\chi^2 = 15.22, p < 0.01$).

Table 43: “[...] how important were each of the following strategies? Reaching new customer groups.”

E1_3	Austria		Slovenia		Total	
1 Low	11	10.5%	34	21.7%	45	17.2%
2 Medium	50	47.6%	80	51.0%	130	49.6%
3 High	43	41.0%	35	22.3%	78	29.8%
4 Not important	1	1.0%	8	5.1%	9	3.4%
Total	105	100.0%	157	100.0%	262	100.0%

More than half the respondents (51%) ranked customer specific solutions as highly important, 34% as medium, 12% as low, and 2% as not an important strategy (Table 44). More Austrian (65%) than Slovenian respondents (42%) gave it high importance ($\chi^2 = 14.45, p < 0.01$).

Table 44: “[...] how important were each of the following strategies? Customer specific solutions.”

E1_4	Austria		Slovenia		Total	
1 Low	7	6.7%	25	15.9%	32	12.2%
2 Medium	29	27.6%	61	38.9%	90	34.4%
3 High	68	64.8%	66	42.0%	134	51.1%
4 Not important	1	1.0%	5	3.2%	6	2.3%
Total	105	100.0%	157	100.0%	262	100.0%

The importance of a low-cost strategy was evaluated as medium by 42% of respondents, low by 30%, and high by 18%, while almost 10% of respondents labelled it as not important (Table 45). A higher percentage of Slovenians respondents rated it as of low importance (34%), compared to Austrian respondents (24%) ($\chi^2 = 10.40, p = 0.01$).



Table 45: “[...] how important were each of the following strategies? Low-cost.”

E1_5	Austria		Slovenia		Total	
1 Low	25	23.8%	53	33.8%	78	29.8%
2 Medium	52	49.5%	58	36.9%	110	42.0%
3 High	23	21.9%	25	15.9%	48	18.3%
4 Not important	5	4.8%	21	13.4%	26	9.9%
Total	105	100.0%	157	100.0%	262	100.0%

Questions E2, E3, and E4 were about product (goods and services) and process innovations, who developed them, and if they were new only for their enterprise or also for their market. In more than half the cases (54%), the respondent’s company did not introduce new or significantly improved goods, services, or processes, while in 46% of cases it did (Table 46). The differences between the two countries are not statistically significant.

Table 46: “[...] did your enterprise introduce new or significantly improved goods, services or processes?”

E2	Austria		Slovenia		Total	
1 Yes	47	48.0%	69	45.1%	116	46.2%
2 No	51	52.0%	84	54.9%	135	53.8%
Total	98	100.0%	153	100.0%	251	100.0%

Those who responded Yes to question E2 were presented with question E3 that asked who developed the processes, goods, or services. It was possible to select multiple responses. Among respondents whose enterprises did introduce new or significantly improved goods, services or processes, less than a third (30%) were developed by themselves (Table 47). A higher percentage of enterprises in Slovenia developed new processes/goods/services by themselves (38%) compared to Austria (19%) ($\chi^2 = 4.56$, $p = 0.03$).

Table 47: “Who developed these processes/goods/services? Your enterprise by itself.”

E3_1	Austria		Slovenia		Total	
1 Selected	9	19.1%	26	37.7%	35	30.2%
2 Not selected	38	80.9%	43	62.3%	81	69.8%
Total	47	100.0%	69	100.0%	116	100.0%

Among respondents whose enterprises did introduce new or significantly improved goods, services or processes, more than two-thirds (68%) developed them together with other enterprises or organisations (Table 48). The differences between the two countries are not statistically significant.

Table 48: “Who developed these processes/goods/services? Your enterprise together with other enterprises or organisations.”

E3_2	Austria		Slovenia		Total	
1 Selected	32	68.1%	46	66.7%	78	67.2%
2 Not selected	15	31.9%	23	33.3%	38	32.8%
Total	47	100.0%	69	100.0%	116	100.0%



More than four fifths (82%) responded that their enterprise developed these processes/goods/services by adapting or modifying processes originally developed by other enterprises or organisations (Table 49). The differences between the two countries are not statistically significant.

Table 49: “Who developed these processes/goods/services? Your enterprise by adapting or modifying processes originally developed by other enterprises or organisations.”

E3_3	Austria		Slovenia		Total	
1 Selected	39	83.0%	56	81.2%	95	81.9%
2 Not selected	8	17.0%	13	18.8%	21	18.1%
Total	47	100.0%	69	100.0%	116	100.0%

Most respondents (91%) among those whose enterprises did introduce new or significantly improved goods, services, or processes, outsourced their development to other enterprises or organisations on behalf of their enterprise (Table 50). The differences between the two countries are not statistically significant.

Table 50: “Who developed these processes/goods/services? Other enterprises or organisations developed it on behalf of your enterprise.”

E3_4	Austria		Slovenia		Total	
1 Selected	44	93.6%	62	89.9%	106	91.4%
2 Not selected	3	6.4%	7	10.1%	10	8.6%
Total	47	100.0%	69	100.0%	116	100.0%

The respondents who had any product innovations were also presented with question E4 that asked if these innovations were new to their market or were they new only to their enterprise. Most of the innovations (55%) during the three years were not new to the market (Table 51). The differences between the two countries are not statistically significant.

Table 51: “Were any of your product innovations [...] new to your market?”

E4_1	Austria		Slovenia		Total	
1 Selected	18	38.3%	34	49.3%	52	44.8%
2 Not selected	29	61.7%	35	50.7%	64	55.2%
Total	47	100.0%	69	100.0%	116	100.0%

Most of the innovations (57%) were only new to their enterprise (Table 52). The differences between the two countries are not statistically significant.

Table 52: “Were any of your product innovations [...] only new to your enterprise?”

E4_2	Austria		Slovenia		Total	
1 Selected	29	61.7%	37	53.6%	66	56.9%
2 Not selected	18	38.3%	32	46.4%	50	43.1%
Total	47	100.0%	69	100.0%	116	100.0%

Respondents who introduced new or significantly improved goods, services, or processes, were presented with question E5, i.e., if any of the innovations were related to climate change. Most



respondents (61%) were not aware if any of their companies' innovations during the specified three-year period were related to climate change, while 39% were aware (Table 53). The differences between the two countries are not statistically significant.

Table 53: "Are you aware if any of your companies' innovations [...] are related to climate change?"

E5	Austria		Slovenia		Total	
1 Yes	18	38.3%	27	39.1%	45	38.8%
2 No	29	61.7%	42	60.9%	71	61.2%
Total	47	100.0%	69	100.0%	116	100.0%

Those who responded positively to question E5 were presented with question E6 that asked if these innovations were related to the reduction of greenhouse gas emissions, adaptation to climate change, or something else. More than three-fourths (76%) of respondents whose companies had innovations related to climate change answered that the innovations were not related to the reduction of greenhouse gas emissions (Table 54). The differences between the two countries are not statistically significant.

Table 54: "Were these innovations related to: Reduction of greenhouse gas emissions?"

E6_1	Austria		Slovenia		Total	
1 Selected	5	27.8%	6	22.2%	11	24.4%
2 Not selected	13	72.2%	21	77.8%	34	75.6%
Total	18	100.0%	27	100.0%	45	100.0%

More than half of those with innovations related to climate change (62%) answered that innovations were about adaptation to climate change (Table 55). The differences between the two countries are not statistically significant.

Table 55: "Were these innovations related to: Adaptation to climate change?"

E6_1	Austria		Slovenia		Total	
1 Selected	11	61.1%	17	63.0%	28	62.2%
2 Not selected	7	38.9%	10	37.0%	17	37.8%
Total	18	100.0%	27	100.0%	45	100.0%

3.6 Company characteristics

In Section F respondents were asked about their characteristics such as sector, number of employees, turnover, country of head office, and markets.

The largest category (30%) was companies with manufacturing of furniture as their core business, followed by manufacturing of products from wood, cork, straw, and plaiting materials (21%), and construction of buildings (12%), while forestry and logging were the main business in 9% of cases, wholesale of wood, construction materials, and sanitary equipment in 6%, manufacturing of paper and paper product in 5%, and only 1% were electricity, gas, steam, and air conditioning supply. In 15% the core business was something else (Table 56). A higher percentage of companies in Austria have their core business in forestry and logging (14%), compared to Slovenia (6%) ($\chi^2 = 15.88, p = 0.03$).



Table 56: “What is your company’s core business?”

F1	Austria		Slovenia		Total	
1 Forestry and logging	14	13.7%	9	5.8%	23	8.9%
2 Manufacture of products of wood, cork, straw and plaiting materials	18	17.6%	35	22.6%	53	20.6%
3 Manufacture of paper and paper products	9	8.8%	4	2.6%	13	5.1%
4 Manufacture of furniture	35	34.3%	43	27.7%	78	30.4%
5 Electricity, gas, steam and air conditioning supply	1	1.0%	2	1.3%	3	1.2%
6 Construction of buildings	10	9.8%	22	14.2%	32	12.5%
7 Wholesale of wood, construction materials and sanitary equipment	3	2.9%	13	8.4%	16	6.2%
8 Other	12	11.8%	27	17.4%	39	15.2%
Total	102	100.0%	155	100.0%	257	100.0%

In 2018 about two-thirds (67%) of respondents worked in microenterprises (i.e., enterprises with up to 9 employees), while 20% were small (10 to 49 employees), 9% medium, and about 4% large enterprises (250+ employees) (Table 57). A significantly higher percentage of Slovenian respondents worked in microenterprises (78%), compared to Austrian respondents (50%) ($\chi^2 = 31.80, p < 0.01$).

Table 57: “What was the average number of employees in your company in 2018?”

F2	Austria		Slovenia		Total	
1 0 employees	6	5.9%	9	5.8%	15	5.8%
2 1 employee	8	7.8%	46	29.7%	54	21.0%
3 2 to 9 employees	37	36.3%	66	42.6%	103	40.1%
4 10 to 49 employees	30	29.4%	22	14.2%	52	20.2%
5 50 to 249 employees	12	11.8%	10	6.5%	22	8.6%
6 250 or more employees	9	8.8%	2	1.3%	11	4.3%
Total	102	100.0%	155	100.0%	257	100.0%

One-fourth of the respondents (25%) were from companies which had a turnover of less than a hundred thousand euros in 2018 and almost two-thirds (65%) had a turnover below one million euros. In total, 35% had a turnover above one million euros and only 15% above 5 million euros (Table 58). In 2018, a significantly higher percentage of Slovenian companies had a turnover of less than a hundred thousand euros (36%), compared to Austrian companies (7%) ($\chi^2 = 40.09, p < 0.01$).



Table 58: “What was your company’s turnover in 2018?”

F3	Austria		Slovenia		Total	
1 Less than €100,000	6	7.3%	51	35.9%	57	25.4%
2 100,000 to less than €250,000	5	6.1%	21	14.8%	26	11.6%
3 250,000 to less than €500,000	6	7.3%	16	11.3%	22	9.8%
4 500,000 to less than €1 Mill.	18	22.0%	22	15.5%	40	17.9%
5 1 mil. To less than €5 Mill.	26	31.7%	19	13.4%	45	20.1%
6 €5,000,000 or more	21	25.6%	13	9.2%	34	15.2%
Total	82	100.0%	142	100.0%	224	100.0%

Majority of the Austrian respondents had their head offices located in Austria (95%) and an even higher percentage of Slovenian respondents had their head offices in Slovenia (97%). While no Austrians had head offices in Slovenia, there was one Slovenian respondent working at an enterprise with head offices in Austria. Another had offices in Denmark. Moreover, some Austrian respondents had head offices in Germany, Sweden, Great Britain, and other countries inside Europe (Table 59). The difference between the two countries is, of course, statistically significant ($\chi^2 = 250.08$, $p < 0.01$).

Table 59: “In which country is the head office of your company located?”

F5	Austria		Slovenia		Total	
A1 Austria	97	95.1%	1	0.6%	98	38.1%
A11 Germany	1	1.0%	0		1	0.4%
A25 Slovenia	0		151	97.4%	151	58.8%
A27 Sweden	1	1.0%	0		1	0.4%
A28 Great Britain	1	1.0%	0		1	0.4%
A29 Other (Inside Europe)	1	1.0%	0		1	0.4%
A7 Denmark	0		1	0.6%	1	0.4%
N/A	1	1.0%	2	1.3%	3	1.2%
Total	102	100.0%	155	100.0%	257	100.0%

In question F7 respondents were asked in which geographic markets they were selling their products in the specified three-year period and in question F8 which of these areas was the largest in terms of turnover. Three-quarter of respondents (75%) did not sell goods and/or services in local/regional geographic markets within their country in the specified three-year period (Table 60). The differences between the two countries are not statistically significant.

Table 60: “In which geographic markets did your enterprise sell goods and/or services [...]? Local/regional within your country.”

F7_1	Austria		Slovenia		Total	
1 Selected	17	18.5%	43	29.3%	60	25.1%
2 Not selected	75	81.5%	104	70.7%	179	74.9%
Total	92	100.0%	147	100.0%	239	100.0%

More than half the respondents (53%) were selling goods and/or services in national geographic markets (Table 61). In Slovenia a higher percentage of companies sold products in national geographic markets (61%), compared to Austria (40%) ($\chi^2 = 9.38$, $p < 0.01$).



Table 61: “In which geographic markets did your enterprise sell goods and/or services [...] National (other regions of your country).”

F7_2	Austria		Slovenia		Total	
1 Selected	37	40.2%	89	60.5%	126	52.7%
2 Not selected	55	59.8%	58	39.5%	113	47.3%
Total	92	100.0%	147	100.0%	239	100.0%

Most respondents (60%) were selling goods and/or services in other European Union or associated countries (Table 62). The differences between the two countries are not statistically significant.

Table 62: “In which geographic markets did your enterprise sell goods and/or services [...]? Other European Union or associated countries.”

F7_3	Austria		Slovenia		Total	
1 Selected	60	65.2%	82	55.8%	142	59.4%
2 Not selected	32	34.8%	65	44.2%	97	40.6%
Total	92	100.0%	147	100.0%	239	100.0%

Most respondents (89%) were selling goods and/or services in other countries (Table 63) but the differences between Austria and Slovenia are not statistically significant.

Table 63: “In which geographic markets did your enterprise sell goods and/or services during the three years 2016 to 2018? All other countries.”

F7_4	Austria		Slovenia		Total	
1 Selected	78	84.8%	134	91.2%	212	88.7%
2 Not selected	14	15.2%	13	8.8%	27	11.3%
Total	92	100.0%	147	100.0%	239	100.0%

For more than half the respondents (53%) the largest market in terms of turnover was the local/regional geographic area, while the national geographic area was 27%, for other European Union or associated countries it was 19%, and 1% for all other countries (Table 64). The differences between the two countries are not statistically significant.

Table 64: “Which of these geographic areas was your largest market in terms of turnover [...]?”

F8	Austria		Slovenia		Total	
1 Local / regional [within your country]	47	51.6%	79	54.1%	126	53.2%
2 National (other regions [of your country])	31	34.1%	33	22.6%	64	27.0%
3 Other European Union or associated countries*	12	13.2%	32	21.9%	44	18.6%
4 All other countries	1	1.1%	2	1.4%	3	1.3%
Total	91	100.0%	146	100.0%	237	100.0%



3.7 Respondent characteristics

In Section G respondents were asked about their job title, gender, and how long they were in the company. Seventy-three percent of the respondents (73%) had the CEO job title, while 4% worked in R&D management or production management, 1% in sustainability management, and the remaining 18% had a different position (Table 65). The differences between the two countries are not statistically significant.

Table 65: “What is your job title?”

G1	Austria		Slovenia		Total	
1 CEO	76	75.2%	107	70.9%	183	72.6%
2 R&D Management	4	4.0%	7	4.6%	11	4.4%
3 Sustainability Management	3	3.0%	0		3	1.2%
4 Production Management	1	1.0%	8	5.3%	9	3.6%
5 Other	17	16.8%	29	19.2%	46	18.3%
Total	101	100.0%	151	100.0%	252	100.0%

Almost three-quarter of the respondents were male (74%), while about 26% were female and one identified as nonbinary (Table 66). The differences between the two countries are not statistically significant.

Table 66: “What is your gender?”

G2	Austria		Slovenia		Total	
1 Female	22	21.8%	43	28.5%	65	25.8%
2 Male	78	77.2%	108	71.5%	186	73.8%
3 Nonbinary	1	1.0%	0		1	0.4%
Total	101	100.0%	151	100.0%	252	100.0%

Most respondents (70%) have been working in the company for 10 years or more, 18% for 5 years to less than 10 years, 12% from 1 year to less than 5 years, while only about 1% of respondents have been working in the company for less than 1 year (Table 67). In Austria a higher percentage worked in the company less than 5 years (17%), compared to Slovenia (10%) but also a higher percentage worked 10 or more years at the company (72%), compared to Slovenia (67%) ($\chi^2 = 11.52, p < 0.01$).

Table 67: “How long have you been working in the company?”

G4	Austria		Slovenia		Total	
1 Less than 1 year	3	3.0%	0		3	1.2%
2 1 year to less than 5 years	14	14.1%	15	10.0%	29	11.6%
3 5 years to less than 10 years	10	10.1%	35	23.3%	45	18.1%
4 10 years or more	72	72.7%	100	66.7%	172	69.1%
Total	99	100.0%	150	100.0%	249	100.0%



4 Conclusions

In total, 293 enterprises participated in our online survey about innovation activities in the forest-based sector in Austria and Slovenia. The study shows some interesting results regarding the perceptions and attitudes of Slovenian and Austrian companies towards climate change and its impact on their business activities.

Respondents in Slovenia were more concerned about climate change and more likely to support climate change mitigation and adaptation measures in their company. They also had a stronger perception that their colleagues want the company to support innovation to address climate change issues. While they had a weaker perception on climate change as a threat to their company, they also strongly perceived it as an opportunity. They were also more likely to consider dealing with climate change adaptation and mitigation as the forest sector's societal responsibility.

Austrian respondents were more likely to agree that they had the possibility and access to the necessary resources required to implement climate change adaptation and mitigation measures, which makes sense as they are more likely to own larger areas of forests or plantations. However, Austrian respondents were more likely to believe climate change is a threat to the existing business model of their company, and that their company does not have the power to change processes along the supply chain. More Austrian respondents agreed that current climate policies at the regional level fostered innovation in their company, but they did not agree that current climate policies at the international level fostered innovation in their company. Furthermore, Austrian respondents were more likely to agree that the forest-based sector needed to play a pioneering role in climate change adaptation and mitigation, and their perception of climate change as an opportunity was strongest on the worldwide level.

In Slovenia, more respondents perceived climate change as a threat to the forest-based sector in their country, and for the existing supply chain model of their company. Moreover, they were also more likely to agree that climate change had led their company to adopt new processes regarding the supply chain management in recent years and their company has sufficient resources to deal with climate change related issues. Interestingly, companies in Slovenia were also more likely to have a risk management strategy in place.

The differences between the two countries might be also explained by the different structure of enterprises. In fact, among participating Austrian companies there were more small, medium, and large enterprises than in Slovenia where microenterprises prevail, and turnovers are much smaller than in Austria. An important difference is that Slovenian companies tend to sell their products in national geographic markets, while more Austrian companies gave a high importance to reaching new customer groups and customer specific solutions. Nevertheless, even accounting for these factors does not explain the differences between the two countries.

The data from the study was deposited in the Slovenian Social Science Data Archives (Slavec et al. 2022) where it can be accessed by other interested researchers for further research on factors that affect the innovation activities of enterprises in relation to climate change.



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