

WHAT DO MEMBERS EXPECT FROM CLUSTER MEMBERSHIP? THE CASE OF THE CROATIAN WOOD CLUSTER

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Abstract: The purpose of this paper is to investigate the composition of services and firms in a wood industrial cluster based on members' interests and examine the differences among the groups. Since firms have very different interests when joining the cluster, this paper develops the taxonomy of cluster members based on their expectations regarding services and investigates the differences and similarities among groups in firms' characteristics, their resources, innovative activities, the performance of firms, and perceived cluster performance. The data collected from members of the Croatian wood cluster were explored using factor and cluster analyses. The results revealed three categories of services that the cluster should provide: 1) lobbying; 2) facilitation of networking and cooperation; and 3) supporting joint logistics and joint access to the market. Four groups of members were identified, named as 1) cooperation and lobbying-oriented; 2) market-oriented; 3) purely lobbying-oriented; 4) purely networking and cooperation-oriented. Group 1 (44% of the sample) scores high on all categories of services. It contains more firms that innovate and more high-growth firms. Members in this group evaluate the effects of the cluster better than the other two groups. The study offers new evidence on the alignment of cluster services with the interests of cluster members, indicating different levels of performance among groups in a small cluster in traditional forest-based industries. The findings can help managers not only in the Croatian wood cluster but also in other similar small cluster organisations in Central Eastern and South-Eastern Europe to use their limited resources more efficiently and enhance the competitiveness and performance of the firms/sector.

Keywords: Wood industrial cluster, industrial cluster, cluster organisation, cluster services.

JEL Classification: L14, L21, L23, L26, L68, L73.

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Introduction

Industrial clusters have been considered a successful form of firms' organisation, and an instrument for increasing the competitiveness and growth of the region and firms' performance (Aranguren et al., 2013; Abdesslem & Chiappini, 2016; Stojčić et al., 2019; Pecze, 2019). The idea behind cluster formation

and its promotion is that firms benefit from agglomeration effects due to knowledge and technology spillovers, input and output sharing, and location externalities (Maffioli et al., 2016). Cluster organisations should facilitate collaboration among firms, scientific and public actors, networking, inter-firm linkages, sharing of information, resources, and knowledge to

build new growth opportunities, and overcome coordination failures (Maffioli et al., 2016).

Past research has examined the impact of clusters on firm performance in various industries and the wood industry as well, indicating that cluster membership has a positive impact on firms' survival, innovation activities and performance – exports, productivity, and sales (e.g., Strøjer et al., 2003; Tödting & Tripl, 2004; Wennberg & Lindqvist, 2008; Eisingerich et al., 2010; Abdesslem & Chiappini, 2016; Stojčić et al., 2019). On the contrary, several researchers suggest that clusters might also produce disappointing results and that the development of clusters is challenging in many regions and countries (e.g., Andersson et al., 2004; Hsieh et al., 2012; Rašić Bakarić, 2017; Anić et al., 2019). Several papers further argue that the success of clusters largely depends on cluster management, governance and the services provided by cluster organisations (Sölvell et al., 2003; Ratinho & Henriques, 2010; Hsieh et al., 2012; Lindqvist et al., 2013; Albahari et al., 2019). Firms have different motivations to join cluster organisations (Schretlen et al., 2011; Obadić & Tijanić, 2014), which may provoke conflicts and tensions among members (European Commission, 2013), and impact cluster performance negatively. Different interests require different approaches related to the delivery of cluster services, management, and governance. Therefore, it is important to understand the interests of various actors in clusters and adjust cluster services to members' expectations, which is believed to be the best way to improve their performance in the clusters. Surprisingly, there is little research on this issue and no consensus exists in the literature on the delivery of the right services, although it is well-known that clusters have limited resources and are often valued by the services they provide (Sölvell et al., 2003; Albahari et al., 2019).

Our study fills the gap in the literature on industrial clusters by investigating the composition of services and firms based on members' interests and examining the differences among the groups of firms in a wood industrial cluster in Croatia. It aims at identifying the types of services cluster organisations should provide to members to fulfil their expectations. Those are the services that are the most valued by members and represent the incentive for joining the cluster,

and as such are important for the success of the cluster. Furthermore, the paper develops the taxonomy of cluster members based on their expectations about cluster services and investigates the differences and similarities among groups in firms' characteristics (size and age), their resources (network openness, the access to cluster resources), innovation activities and actual firms' performance, and perceived clusters' performance. The Croatian wood cluster (*hereafter CWC*) was taken as the example for empirical analysis because it is the most significant cluster in the wood-processing and furniture industries in Croatia, and thus can be considered as the representative case for the analysis.

The contribution of our paper is the applied methodology for examining the expectations of members of the cluster services in relation to their business and innovative performance. The paper offers new evidence related to the type of services cluster organisations in traditional forest-based industries should deliver to meet members' expectations. We also develop the typology of members based on the perceived importance of cluster services. As the theory suggests, firms face various challenges, do not benefit the same from clusters and have different motivations to join them (Perry, 2007; Barbero et al., 2012), we expect to find distinct groups of members with the same interests and requirements. Surprisingly, such research is very limited, although members' expectations can largely influence the performance of the cluster. Moreover, our analytical framework examines the differences and similarities among the group of members with respect to several variables that can explain the success and failure of industrial clusters, which has not been researched in such way.

Our final contribution is the setting. This paper analyses the case of the Croatian wood cluster, which is a very small cluster in the wood-processing and furniture traditional industries that operates in a very challenging environment. Namely, wood processing industries were hit badly by the 2008 financial crisis, and after a period of slow recovery, the 2020 COVID-19 crisis had a negative effect on sectors' performance (Croatian wood cluster, 2020a). We argue that wood-based industries need to find new growth opportunities and enhance the value-added of their products using the industrial clusters as an effective platform

for achieving these goals (e.g., Kersan-Škabić, 2014; Stojčić et al., 2019).

The findings of our study might help small clusters not only in Croatia but also clusters in *Central Eastern and South-Eastern Europe* to gain new knowledge on how to design cluster services in line with members' expectations more effectively, considering different interests and performance of heterogeneous population in clusters.

The remainder of the paper is structured as follows. The literature review is presented in Section 1, followed by the context of the study in Section 2. Section 3 describes the methodology, followed by the results in Section 4, and conclusions in Section 5.

1. Literature Review

Industrial clusters can be defined as the geographic concentration of interconnected companies and institutions in a particular field (Porter, 1998), that cooperate and develop linkages with other actors to improve competitiveness (Andersson et al., 2004; Mrosek et al., 2010). They are a form of organising value chain (Hsieh et al., 2012), focusing on creating value, which affects the decision of actors to enter and stay in the cluster and business networks (Hazley, 2000; Hsieh et al., 2012; Albahari et al., 2019). According to agglomeration theory, in clusters economies of specialization, labour market economies, and knowledge spillovers drive firms to group geographically, reduce costs, increase investments and business performance (Marshall, 1920; Shaver & Flyer, 2000; Andadari et al., 2012; Lazzareti et al., 2014; Abdesslem & Chiappini, 2016; Pecze, 2019). In clusters, firms rely on cooperation, share the costs, and seek joint access to foreign markets (Aranguren et al., 2013). A special type of cluster is a cluster organisation with established cluster management and formal membership. Such cluster organisations were established in several industries and have been supported with the aim to solve coordination failures and increase the competitiveness of firms/regions/sectors by facilitating public-private collaboration, innovations, knowledge, and technology transfer (e.g., Maffioli et al., 2016). Such cluster organisations encompass various actors, including firms and supporting institutions, education and research organizations, capital providers, government, and public institutions (Lindqvist et al., 2013). This form of the

cluster is the most valued by the provision of services, which help members to overcome the obstacles they encounter and increase the competitiveness in such a way (Lindqvist et al., 2013). Common services provided by cluster organisations are lobbying and creating a dialogue between actors, providing support for networking commercial cooperation, innovation and technology transfer, and human resources upgrading (Sölvell et al., 2003; Lindqvist et al., 2013). Clusters help firms to access cluster resources more effectively, which influences business performance (Hervás-Oliver & Albors-Garrigós, 2007; Prim et al., 2016). Clusters are also often seen as political organisations that engage in lobbying with local, national and EU governments to articulate cluster needs, obtain a better position on the market and regulatory protection for the sector (Perry, 2007; Schretlen et al., 2011).

One stream of literature has examined the effects of cluster development programs and cluster organisations on firms in the cluster, measuring its effects on coordination and linkages, resource allocation and investment decisions, business practices and technologies, and business performance. Cluster effects can be short- and long-term (Maffioli et al., 2016). Most papers suggest that the effects of cluster membership on firms are positive (e.g., Strøjer et al., 2003; Tödtling & Trippel, 2004; Wennberg & Lindqvist, 2008; Eisingerich et al., 2010; Abdesslem & Chiappini, 2016; Stojčić et al., 2019), although there are studies indicating that clusters might also fail (e.g., Andersson et al., 2004; Rašić Bakarić, 2017). One reason for this might be the conflicting interests of members that are not considered efficient enough by cluster management and governance.

Literature also suggests that firms have various interests to join the clusters. To succeed cluster organisations must fulfil their expectations. Cluster services were shown to be particularly interesting for small- and medium-sized companies that have limited resources because through clusters they might reduce transaction costs, gain new knowledge and technology, and support their businesses through lobbying (Stojčić et al., 2019). Firms might be also motivated to participate in clusters to improve their access to inputs, skilled workers, public infrastructure, and research, and increase the ability to innovate and decrease costs (Porter, 2000; Pecze, 2019).

Small companies might seek to improve their market position through cooperation with more established firms, while firms from high-growth emerging industries are mostly innovation-oriented and might look for these services when joining the clusters (Anić et al., 2019). On the other hand, large firms, as compared to small ones and firms operating in declining, old, and traditional industries, were shown to be the most interested in lobbying (Fontagné et al., 2010; Martin et al., 2011; Abdesslem & Chiappini, 2016), and might join clusters to achieve this (Anić et al., 2019). For firms operating in uncertain environments (Eisingerich et al., 2010; Mrosek et al., 2010; Andadari et al., 2012), fostering networking and cooperation, especially with foreign firms, is crucial. Strong networks facilitate organisational learning and enhance innovation potential by providing the access to resources through interactions, which maximizes the synergies, increases trust and knowledge transfer (Pikul-Binieć, 2009; Eisingerich et al., 2010). Although wood-processing and furniture industries belong to low-tech industries (Organisation for Economic Cooperation and Development, 2011) with a low level of innovativeness, several papers report that some firms operating in the wood sector are also innovative and use modern technologies, whereas cluster membership has a positive effect on innovativeness (Hazley, 2000; Ukrainski & Varblane, 2005; Ng et al., 2012; Grzegorzewska et al., 2014).

One stream of the literature suggests that the members' common and private interests impact the alliance's performance. Common benefits are generated by collective processes shared by all members, while private benefits refer to the distribution of common benefits to individual partners. If there is a higher ratio of common interests to private interests in an alliance, behaviour tend to be cooperative and resource allocation will converge to optimal (e.g., Khanna et al., 1998; Lavie, 2007). This concept can be also applied to clusters. From the literature, it is, however, not clear how cluster services are aligned with the interests of various members in the cluster, and how is this related to differences among members in performance.

2. Study Context

The forest sector consists of vertically linked industries and activities, ranging from forestry,

and wood supply to industry, forest-based industrial production, and trade (Hazley, 2000; Mrosek et al., 2010). This sector, and in particular wood-processing (C16) and furniture industries (C31) are very important for the Croatian economy, as they accounted in 2017 for 62.7% of the gross value added of the wood sector; 13.3% of firms and 10.7% of employment in manufacturing industry (Eurostat, 2020). These industries consist mostly of micro, small and medium-sized companies. There were only 15 large companies with more than 250 employees in the sector. Croatian wood-processing and furniture industries were hardly hit by the 2008 financial crisis. In the post-crisis 2011–2017 period, the number of companies decreased by 11.8%, but employment grew by 5.9%. The wood sector in Croatia is export-oriented and largely depends on access to international markets. The data show that during that period production value increased by 64.4%, and exports by 65%. However, the exports of the wood sector consist predominately of raw wood material and semi-finished goods, low value-added products. The share of wood-processing and furniture industries in gross value added was in Croatia only 0.9%, as compared to 3.4% of the EU average (Eurostat, 2020; Croatian Bureau of Statistics, 2012–2020). COVID-19 pandemic profoundly hit the Croatian wood-processing industry. Official data of the Croatian Bureau of Statistics show that in 2020 in this sector industrial production decreased by 6.7% and exports by 7.9%.

Clusters are an important tool of the Croatian development policy (Obadić & Tijić, 2014; Stojčić et al., 2019), which objectives are to strengthen the development of clusters, support exports, and ensure efficient use of EU funds (Croatian government, 2011). The main goal of the formation of industrial clusters is to facilitate innovations, transfer of technologies, competitiveness, and growth. Existing clusters in Croatia are very small and work as legal entities involving cluster organisations to promote joint private-public interests (Croatian government, 2011).

The Croatian wood cluster is one of the most important industrial clusters in Croatia. It operates in the wood sector and was formally established in 2013 as an association with voluntary membership. The cluster expanded from 61 members in 2017 to 77 members in 2020. Most firms (78%) are small and

medium-sized companies that operate in the wood-processing and furniture industries. Other members are providers of specialized inputs, machinery and associated services, and there are seven research and educational organisations, and technology centres (Croatian wood cluster, 2020b).

The main objectives of CWC are strengthening the competitiveness of the whole wood-processing sector by encouraging activities in the field of research and development, technology development, commercialization of innovation and infrastructure investments, and other related activities. The cluster provides several services to its members, including access to public support and lobbying, advisory services, facilitation of collaboration between members and cross-sectorial cooperation, promotion of cluster and marketing activities (European cluster collaboration platform, 2020). CWC is very active in marketing, organizing sectoral events and international conferences, study visits, training, and providing help related to EU projects and efficient use of EU funds. CWC is financed through membership fees, projects, and the organisation of different events (Croatian wood cluster, 2020b).

3. Research Methodology

The questionnaire was carried out in 2017 among CWC members to collect the data. It was developed based on literature review and face-to-face interviews with cluster management and professionals. Pre-testing included five respondents. The data was collected using Computer-Assisted Web Interviewing method

(CAWI) from May to September 2017. The questionnaire was sent to 61 members of CWC (53 firms were evaluated as active members of cluster). The target group were owners of the companies and professionals in managerial positions, who were able to respond to the questionnaire. Additionally, a professional interviewer was hired to remind the respondents to complete the questionnaire. After sending 3 reminders, 39 questionnaires were collected, which makes a response rate of 63.9%. After eliminating 2 duplicates, 37 questionnaires were usable for the analysis. The characteristics of our sample are presented in Tab. 1.

The sample consists mostly of firms operating in C16 and C31 industries (78.4%). Supporting industries in the sample are the manufacturing of metal products industries, energy supply, trade sectors, consulting activities, and professional organisations. Members were predominantly small companies (51.4%), private companies (97.3%), and domestically owned companies (91.9%). On average, they were relatively young (22 years) and had sales revenues of HRK 52.0 million.

The data was analysed using exploratory factor analysis (EFA), cluster analysis, one-way analysis of variance (ANOVA) and chi-square test. Since the number and names of factors were not known prior to research, the use of factor analysis in this study was purely exploratory and it was performed to identify a smaller set of variables within the dataset. As clustering variables, we used members' perceptions of the importance of cluster services. In the questionnaire, we

Tab. 1: Characteristics of the sample, n = 37

Characteristics	n	%
Main company activity, %		
16 Manufacture of wood and of products of wood and cork	23	62.2
17 Production of paper and paper products	1	2.7
31 Manufacture of furniture	6	16.2
Supporting activities	7	18.9
Company size		
Micro companies	4	10.8
Small-sized companies	19	51.4
Medium-sized companies	14	37.8

Source: own; Poslovna Hrvatska

asked the respondents to rate the importance of 25 activities that CWC should pursue and coordinate for their members on a Likert scale, ranging from 1 (totally unimportant service) to 5 (extremely important service). These activities represent the services and priority objectives CWC should carry to achieve its goals related to competitiveness and sector growth. As such, they also represent the drivers of cluster development. These items were taken from the Annual report of the Croatian wood cluster (2014), Sölvell et al. (2003), and Lindqvist et al. (2013), while some items were developed by authors after consultation with professionals in the CWC cluster.

We analysed two categories of performance as response variables – actual firms' sales growth (*firms' growth*) and perceived impact of CWC on members' performance (*cluster impact*). For measuring members' actual performance, we used the data on sales revenues for the period of 2015–2017 from the business portal Poslovna Hrvatska. Firms' sales growth was coded as 0 (the firm had a decline in sales or a smaller, insignificant sales growth), and 1 (the firm had sales growth more than the median). To capture the innovation activity of members, respondents were asked to indicate how many new products and services they introduced to the market in the last three years, and then companies were grouped and coded as 0 (zero innovations) and 1 (the company introduced at least one new product).

Regarding perceived cluster effects (cluster impact), respondents indicated how much CWC affected the performance of firms concerning internal business processes, market performance, collaboration, trust, transfer of knowledge and new technologies on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Those items were developed by the authors. Exploratory factor analysis (EFA) was used to decrease the number of performance items. Three factors were generated, labelled as cluster impact on internal business performance and innovations; cluster impact on market performance; and cluster impact on cooperation, which were used in further analysis (see Tab. A3 in Appendix).

To further examine the characteristics of the firms in the cluster, we used several additional variables, including age and size of the firms, the degree of members' networking, access to cluster resources, and the introduction of

new products and services. Questions related to the degree of networking were taken from Eisingerich et al. (2010). The respondents evaluated the degree of their cooperation with other actors in the cluster (network strength) and the degree of external linkages existing outside the cluster (network openness) on the Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Respondents were also asked to indicate how much local institutional and network cluster resources contribute to their competitiveness. These items were taken from Prim et al. (2016), were measured by a Likert scale ranging from 1 (not at all) to 5 (completely), and were analysed separately as the access to institutional, local, and business resources. Those items show how much cluster resources are useful for them. Items are presented in Tab. A1 and Tab. A2 in Appendix.

4. Empirical Analysis

Exploratory factor analysis was performed on 25 items indicating the perceived importance of cluster services. Due to an extremely small sample, we removed questions that had significant cross-loadings and/or low loadings (Hair et al., 2009). Further analysis continued with ten items. Kaiser Meyer Olkin's measure confirmed the sampling adequacy, whereas Bartlett's test of sphericity suggests that correlations between items were adequate for conducting factor analysis (KMO = 0.749; chi-squared = 254.724; degrees of freedom = 45; $p < 0.000$) (Hutcheson & Sofroniou, 1999; Field, 2009). The principal component analysis and Varimax rotation were used, considering only factors with Eigenvalue greater than 1 in cases when the obtained factors are used as the basis for calculating factor scores as input variables for further analysis (Johnson & Wichern, 1992).

Three factors emerged from the analysis labelled according to the dominant items as follows: 1) joint logistics and market access; 2) lobbying; and 3) networking and cooperation. A three-factor solution with factor loadings ranging from 0.64 to 0.95 explained 80.5% of the total variance. Cronbach's alpha coefficients were used to assess internal consistency and suggest that the items produced adequate and high scores for those scales (Cronbach's alpha for Factor 1 = 0.896; Cronbach's alpha for Factor 2 = 0.858; Cronbach's alpha for Factor 3 = 0.843). Tab. 2 shows factor loadings after rotation.

Tab. 2: Factor analysis on the perceived importance of shared cluster services and factor loadings, n = 36

Shared cluster services	Factor 1: Joint logistics and market access	Factor 2: Lobbying	Factor 3: Networking and cooperation
Joint warehousing	0.9487	0.0496	0.0570
Joint transportation	0.9390	0.1263	0.0292
Co-ordinating public-private investments	0.7477	0.1844	0.4178
Joint selling activities	0.7305	0.3681	0.0435
Cooperation of the industry with suppliers for inputs	0.0420	0.8560	0.2732
Lobbying for the sector at the government	0.1460	0.8422	0.2024
Making proposals and lobbying for laws at the government	0.3116	0.8377	0.1580
Networking and promotion of cluster	0.1220	0.0647	0.8941
Cooperation and exchange of experience with partners	0.0382	0.3865	0.8522

Source: own

The joint logistics and market access factor accounts for 30.4% of the total variance and is explained by four items related to joint warehousing and joint transportation, but also by the coordination of public-private investments and joint selling activities. Lobbying, the second factor, explains 27.6% of the variance and includes items related to the promotion of the industry through cooperation with suppliers for inputs (i.e., lobbying at suppliers of inputs) and lobbying for laws and industry interests at the national government. The networking and cooperation factor explains 22.5% of the variance and includes networking and promotion of clusters through conferences, fair trades, cluster's webpage, joint advertising in media, and membership in leading associations. The most important service appeared to be lobbying, followed by networking and cooperation, whereas joint logistics and market access seem to be less important.

We performed hierarchical and non-hierarchical cluster analyses to identify the groups of firms with similar goal orientations. The factor scores for each of the three factors were calculated and then submitted to hierarchical cluster analysis to avoid multicollinearity (Hair et al., 2009). The theory suggests the application of orthogonal factor rotation – varimax rotation in cases when the

obtained factors are used as the basis for calculating factor scores as input variables for further analysis (Johnson & Wichern, 1992). According to the theory, a factor score indicates the extent to which each firm has a high score on a group of characteristics that have a high loading on a relevant factor. Ward's method with the Squared Euclidean distance was applied to identify the number of clusters (groups) within the sample of members. After we explored the agglomeration matrix and the dendrogram, a four-cluster solution was identified to be appropriate. After that, the non-hierarchical K-means cluster algorithm confirmed four groups of members with distinct and significant differences between groups on the perceived importance of cluster services. Groups were named according to the dominant features as follows: Group 1) Cooperation- and lobbying-oriented; Group 2) Purely market-oriented; Group 3) Purely lobbying-oriented; Group 4) Purely networking- and cooperation-oriented. Tab. 3 and Tab. 4 show the results.

Group 1 (cooperation- and lobbying-oriented) is the largest segment and has high factor scores on networking, cooperation, and lobbying factors. Members in this group are the most interested in networking and cooperation and perceive lobbying activities with the government and suppliers as very important. Group 2 (market-oriented) is the second-

Tab. 3: Characteristics of the groups of CWC members, average factor scores

Constructs	Group 1: (n = 16)	Group 2: (n = 11)	Group 3: (n = 5)	Group 4: (n = 4)
Joint logistics and market access	-0.18	0.86	-0.87	-0.57
Lobbying	0.54	-0.30	0.42	-1.88
Networking and cooperation	0.71	-0.50	-1.77	0.74

Source: own

Tab. 4: Profile of the four groups of CWC members, mean values, M (SD)

One-way ANOVA	Group 1: (n = 16)	Group 2: (n = 11)	Group 3: (n = 5)	Group 4: (n = 4)	Sample (n = 36)	F	P
Joint logistics and market access	3.16 (1.01)	3.86 (0.7)	2.05 (1.05)	2.25 (0.20)	3.12 (1.06)	6.45	0.002
Lobbying	4.50 (0.46)	3.64 (0.74)	3.67 (1.18)	2.17 (0.84)	3.86 (0.99)	12.34	0.000
Networking and cooperation	4.58 (0.38)	3.39 (0.49)	2.33 (0.78)	3.75 (0.56)	3.75 (0.93)	30.11	0.000

Source: own

largest group that includes members who have relatively high scores on joint market-based activities, including joint logistics and selling products, and require from CWC to facilitate these activities. The third and the fourth groups contain a very small number of members. While members in the third group (purely lobbying-oriented) are interested in lobbying significantly more than in other activities, the fourth group (purely networking and cooperation-oriented) are the most interested in the facilitation of networking and cooperation activities.

To examine the differences and similarities among groups we used actual firms' growth performance, innovation activities and cluster impact as dependent variables, while four

groups of CWC members were taken as independent variables in Pearson's chi-squared test χ^2 analysis and one-way analysis of variance (ANOVA). Findings are presented in Tab. 5 and Tab. 6.

The differences among groups were significant in sales growth and innovation activities. Members of Group 1 are more oriented towards innovation activities and most of them are high-growth firms. Group 2 follows in terms of the frequency of high-growth firms and firms that pursue innovation activities in the forest sector. Group 3 and Group 4 are the worst regarding the presence of firms that pursued innovation activities, and there are no firms that experienced fast growth in the previous period.

Tab. 5: Performance of group members in CWC, the percentage of companies

Chi-squared test	Group 1: (n = 16)	Group 2: (n = 11)	Group 3: (n = 5)	Group 4: (n = 4)	Sample (n = 36)	χ^2	d.f.	P
Sales growth*	56.25	36.36	0	0	38.24	6.548	3	0.088
New products introduced**	85.71	90.0	33.33	0	73.33	13.222	3	0.004

Source: own

Note: * significant at 0.1 level; **significant at 0.05 level.

Tab. 6: Perceived impact of CWC on the performance of companies by groups of clusters with mean values, ANOVA

Cluster impact	Group 1: (n = 16)	Group 2: (n = 11)	Group 3: (n = 5)	Group 4: (n = 4)	Sample (n = 36)	F	P
Internal business performance and innovations	2.47	2.36	1.74	2.15	2.29	0.72	0.547
Market performance**	2.40	1.92	1.13	2.29	2.07	2.98	0.047
Cooperation	2.91	2.29	2.33	2.83	2.64	1.10	0.36

Source: own

Note: ** significant at 0.05 level.

Regarding cluster impact, significant differences exist only in the impact of the cluster on market performance, whereas groups do not differ in terms of cluster impact on internal business performance, innovation, and cooperation factor. In general, members perceive that the contribution of CWC to performance was very low and that the cluster did not do enough to help them improve their performance. Members in Group 1 perceive

cluster effects on a market performance better than the other groups, whereas the members in Group 3 – purely lobbying-oriented, had the worst opinion about CWC.

To examine other characteristics of groups, several variables important for cluster success were considered in the analysis, including age and size of the firm, the degree of networking and access to cluster resources. Results are shown in Tab. 7 and Tab. 8.

Tab. 7: Characteristics of group of CWC members in terms of firm size and age, the percentage of firms

Chi-squared test	Group 1: (n = 16)	Group 2: (n = 11)	Group 3: (n = 5)	Group 4: (n = 4)	Sample (n = 36)	χ^2	d.f.	P
Younger firms	50.00	54.55	60.00	25.00	50.00	1.291	3	0.731
Small firms	56.25	72.73	60.00	75.00	63.89	4.191	6	0.651

Source: own

Note: The age of the company was split into two halves representing below the average value and above-average value, categorized as 1 (younger firms up to 22 years, below-average value) and 2 (older firms with more than 22 years, above-average value). Size includes the percentage of small and micro firms.

Tab. 8: Characteristics of groups of CWC members in terms of the degree of networking and cluster resources, mean values

One-way ANOVA	Group 1: (n = 16)	Group 2: (n = 11)	Group 3: (n = 5)	Group 4: (n = 4)	Sample (n = 36)	F	P
Network strength**	3.35	2.83	2.73	3.08	3.09	2.77	0.050
Network openness**	3.48	3.03	2.55	3.50	3.22	4.23	0.013
Institutional resources*	3.31	2.87	2.00	2.92	2.94	2.67	0.065
Local resources**	3.19	2.86	1.48	2.75	2.76	4.46	0.011
Business resources**	3.21	2.83	1.83	2.75	2.84	3.86	0.019

Source: own

Note: * significant at 0.1 level, ** significant at 0.05 level.

The differences are significant between groups in terms of the degree of networking and access to cluster resources. Members in Group 1 cooperate more and have strong and long-term contacts with other partners in the cluster and are also more open to actors outside the cluster. Members in this group also rated the best the impact of institutional, local, and business resources on their competitiveness. Members in Group 4 indicated that they have stronger cooperation with actors inside and outside the cluster but rated less favourably the impact of cluster resources on their competitiveness. Group 2 and Group 3 indicated that they cooperate less and rated low the impact of cluster resources on their competitiveness. Our analysis also showed that groups of members do not differ significantly in firms' age and size, indicating that the groups are formed of firms of similar size and age. Small firms are the majority in all groups.

Conclusions

Although the main idea behind industrial clusters is to increase competitiveness by providing services, it is not clear how cluster organisations can do this and what type of services they should provide to fulfil members' expectations in different settings. Our paper fills the gap in the literature by investigating how cluster services are aligned with the expectations of members, and how is this related to differences in members' characteristics, innovative activities and performance, and perceived performance of the cluster. The analysis was carried out in one small Croatian wood cluster with limited resources.

Our paper contributed to the literature by identifying three categories of services that CWC should deliver to fulfil members' expectations. Lobbying is the most important service category, followed by facilitation of networking and cooperation, joint logistics and market access. It seems that members enter the cluster primarily because they expect CWC to lobby the government, EU institutions and suppliers of inputs to improve regulations in the forest sector, get EU funding, and negotiate better purchasing terms with suppliers. The literature recognises that lobbying is an important cluster activity because in this way members can try to interact with the government to trigger policy actions in their favour and enhance their competitiveness (Sölvell et al., 2003; Meyer-

Stamer & Harnes-Liedtke, 2005). Lobbying, however, involves mostly private interests and benefits. Konstantynova and Lehmann (2017) suggest that the intensity of lobbying is associated with the state of the political and legal environments and the development of institutions. As such, ICT clusters in Serbia and Ukraine use political lobbying heavily to influence the government to introduce measures that will improve the businesses of their members. In contrast, cluster activities in more developed Western countries (like Austria and Germany) focus more on raising firms' capabilities and strengthening the cooperation between firms, research, and the public sector.

Further important service that CWC should deliver is support for networking and cooperation. This activity might enable firms to gain access to relevant information, learn about expansion opportunities, establish new business relationships, and through joint projects and mutual learning enhance their competitiveness (e.g., Albahari et al., 2019). This type of service might also indicate the existence of coordination failure that should be solved jointly through a cluster platform.

The third category of services relates to cluster support to joint logistics and market access. Given that CWC operates in low-tech and export-oriented wood-processing and furniture industries, we can assume that small firms tend to rely more on cluster resources to improve their competitiveness. To succeed in today's challenging market environment, firms in these industries need better access to wood and raw materials, warehousing, transportation and logistics, and better access to foreign markets. As small companies face difficulties to perform these activities alone, they join the cluster and seek help from cluster organisations. This activity involves common interests and benefits, as it is carried out with the aim to help all members of the cluster.

A further contribution of our paper is the identification of four groups of members with similar goal-orientation in the cluster named as 1) cooperation- and lobbying-oriented members; 2) market-oriented members; 3) purely lobbying-oriented members; 4) purely networking- and cooperation-oriented members. The first group contains the best performing members that evaluated the best cluster effects in the sample, cooperate more and have better access to cluster resources. These members demand

from CWC all three types of services. They evaluated the best support for networking and cooperation and lobbying activities with the government and suppliers. This might indicate that they experience coordination failure problems, and want to solve them through cluster platform, but also want the cluster to lobby the government. For the members in Group 2, the most important services are support to joint logistics and market access, although they provided high scores also for other factors. This signals that they face problems related to infrastructure development and difficulties related to market access, but also want CWC to solve jointly these issues. They are driven by common interests that benefit all members, but also by private interests related to lobbying. On the other hand, Groups 3 and 4 contain low-performing firms that evaluated the best lobbying (Group 3) and networking and cooperation (Group 4) and evaluated worse cluster performance and have worse access to cluster resources, which indicates the existence of private interests or coordination problems. Our results also show that the evaluation of cluster performance corresponds with higher firm performance, a higher degree of networking and better access to cluster resources. Private interests are aligned with common interests, which suggests our CWC case.

Our findings provide several managerial implications. Considering limited resources, CWC should prioritize and adjust its services to members' expectations. This means that CWC should continue with lobbying, facilitation of networking and cooperation, supporting joint logistics and market access. As one of the major activities, CWC should continue fighting for sectoral interests and benefits and seek to improve public policies related to the forest and wood industry. EU funds are especially important for developing infrastructure, production, energy-efficient and sustainable products, and in this sense, CWC should put more effort to increase the usage of EU funds and coordinating applications to EU-funded projects. CWC should continue to stimulate collaboration between cluster participants. This task might include, for example, fostering the relationships among firms and people outside the cluster, and the facilitation of joint access to specific expertise, organising networking events and meetings, facilitating collaborative research projects with public

research institutions, organising seminars, workshops, and conferences (Schretlen et al., 2011). Commercial activities might include forming export networks, compiling market intelligence, coordinating purchasing, providing marketing training for management (Andersson et al., 2004). All these services must be planned carefully by cluster management and must be more efficient (Albahari et al., 2019). Greater effort must be given to commercial activities, not just to lobbying, which is important for upgrading and future expansion of the cluster.

This study has several limitations. Although this case is very interesting, the generalisability of our results might be limited. The small sample is the restriction on one hand, but the large response rate of 63.9% makes the study even more valuable, on the other hand. In our paper, we analysed a small cluster in a small country, so that the size of a country has a great impact on the size of the cluster in terms of the number of members. Since the population size (total members of CWC) is rather small, the sample size is even smaller. However, for the purpose of this research, the analysis that contains at least 63% of units of a small population will on average provide a satisfactory level of knowledge and information. Despite limitations, the results of our study might be valuable not only for CWC but also for other similar small clusters in the wood industry in the region and countries in Central Eastern and South-Eastern Europe that contain mostly small companies and face similar issues companies, such as limited financial and human resources, coordination, and market access problems, and have difficulties with less developed infrastructure. For example, the Slovenian wood cluster containing 94 active members is very similar to the Croatian one (Stojčić et al., 2019). A further issue is that the questionnaire was conducted at one point in time, while the replication of this study in the post-corona period might reveal different attitudes and patterns of behaviour. Future studies might expand the framework with more management and governance items and actual performance variables. They might also compare the perceptions of managers across clusters operating in different sectors and perform cross-cultural studies. The generalisability of results might be improved by including more clusters and members in the analysis.

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Appendix:

Tab. A1: Network strength and network openness

Network strength scale (Cronbach's alpha = 0.784)

We frequently meet with our exchange partners, cluster members (e.g., suppliers) to share resources and new ideas.

Our company has long-lasting relationships with actors in this cluster.

The contact with our exchange partners in this cluster is not very strong. (R)

Network openness scale (Cronbach's alpha = 0.777)

This cluster readily accepts new members to its network of exchange partners in the cluster.

Linkages with actors in this cluster are very difficult to reconfigure. (R)

We are well-connected with actors outside this cluster.

We are connected to a range of firms, differing in size, age, capabilities, in the industry.

Source: Eisingerich et al. (2010)

Tab. A2: Cluster resources

Institutional resources (Cronbach's alpha = 0.899)

Institutions of technological research (i.e., universities, public institutes).

Professional institutions related to core activity of company (i.e., associations, cooperatives and others).

Institutions that promote cluster governance (e.g., AIK – Croatian Agency for investments and competitiveness).

Local resources (Cronbach's alpha = 0.927)

Local logistic infrastructure (distribution of products and access to the suppliers).

Access to local service.

Access to credit.

Availability of skilled worker in the region (your and surrounding counties).

Reputation of the region (your and surrounding counties).

Business resources (Cronbach's alpha = 0.891)

Relations of horizontal cooperation between companies (the existence of partnerships or companies in the sector/industry network).

Relations of vertical cooperation in the region (existence of partnerships or cooperation networks with suppliers, distributors in the region).

Customers in the region (your and surrounding counties).

Competitors in the region (your and surrounding counties).

Consulting companies.

Fairs and exhibitions.

Source: Prim et al. (2016)

Tab. A3: Exploratory factor analysis on cluster impact items

Items description	Factor 1: Impact on internal business performance and innovations	Factor 2: Impact on market performance	Factor 3: Impact on cooperation
Shorter time of response to clients' requirements.	0.9241	0.1783	0.1228
Improved quality of products and services.	0.8897	0.1318	0.2092
Meeting technological standards.	0.8892	0.0459	0.3293
Improved access to distribution channels and supply.	0.8799	0.1893	0.1042
Sharing costs and resources.	0.8676	0.1472	0.0557
Introduction of new methods of products introduction and distribution channels.	0.8578	0.0975	0.2754
Development of new products and services.	0.8487	0.1873	0.3517
Decreasing the risk of diversification	0.8308	0.2373	0.0924
Introduction of new methods of setting prices of goods and services.	0.8223	0.2807	0.2521
Improved access to new technology.	0.8184	0.0612	0.4140
Cluster has helped the company increase revenues.	0.1521	0.9181	0.1934
Cluster has led to increased employment.	0.2147	0.9110	0.1154
Cluster has improved international competitiveness of company.	0.0136	0.8997	0.0449
Cluster has promoted export of higher value-added products.	0.1065	0.8552	0.2012
Cluster has increased FDI.	0.3653	0.8276	0.2375
The cluster has led to increased collaboration with international companies within global value chains.	0.1203	0.8198	0.2875
Cluster has led to closer industry-academia ties.	0.2013	0.3019	0.8443
The cooperation with other cluster members has led to higher level of trust.	0.3846	0.2780	0.7904
Cluster has led to closer ties with other companies within the cluster.	0.3841	0.3375	0.7422

Source: questionnaire

Note: Three factors explain 83.7% of variance. Cronbach's alpha for cluster impact on internal business performance = 0.978; Cronbach's alpha for cluster impact on market performance = 0.958; Cronbach's alpha for impact on cooperation = 0.892; KMO = 0.783; chi-squared = 763.433; degrees of freedom = 171; p-value = 0.000.