GRANT AGREEMENT
NUMBER — 692191 — SmartEIZ

SmartEIZ – H2020-TWINN-2015

Strengthening scientific and research capacity of the Institute of Economics, Zagreb as a cornerstone for Croatian socioeconomic growth through the implementation of Smart specialisation strategy

Survey on Clusters of Competitiveness in Croatia

Summary of key findings

Authors: Ivan-Damir Anić[1], Zoran Aralica[2] and Katarina Bačić[3]

[1] Dr.sc. Ivan-Damir Anić, Senior research fellow in permanent position, the institute of Economics, Zagreb, danic@eizg.hr .
[2] Dr.sc. Zoran Aralica, Senior research fellow, the institute of Economics, Zagreb, zaralica@eizg.hr.
[3] Dr.sc. Katarina Bačić, Scientific Associate, independent researcher, bacic.keti@gmail.com.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

About the survey

This report is an overview of the results of the Survey on clusters in Croatia that were disseminated through presentations to interested stakeholders and scientific papers. Clusters are an important part of SmartEIZ project and Croatian Smart specialisation strategy. They are viewed as an important driver of innovation and regional economic development, which is important topic in the EU. This report deals with Clusters of Competitiveness in Croatia, which are rather a new phenomenon.[4]

The report presents the findings of online survey carried out among members of 13 Clusters of Competitiveness in Croatia (*thereafter CCCs*). It explores the perceptions of members towards objectives, processes, setting and performance of their CCCs. In Croatia clusters of competitiveness are designed as non-profit organisations that should serve as platforms for connecting companies, business clusters, professional organisations, and representatives from the public sector and academia, in order to support joint cooperation and actions to improve the competitiveness of selected sectors and industries of strategic importance for the country.[5] In Croatia CCCs' main goal is to strengthen national industries/sectors.

Computer-Assisted Web Interviewing Method (Google forms) was used to collect the data in 2017. Target sample included 621 members of CCCs' assemblies, including 112 members of CCCs' governing boards. 279 questionnaires were completed, with the response rate of 44.9%. After removing questionnaires with missing data and duplicates, a sample of 250 questionnaires was obtained for further analysis. The final sample included members from private sector, business clusters, professional organisations and associations, academic and research organisations, and members from the public sector. The majority of companies in

[4] There are many definitions of clusters of competitiveness. Similar associations/networks that exist in the world are called cluster initiatives and they denote cluster development projects, cluster organizations and are described as organized efforts to enhance the competitiveness of clusters within a region.

[5] In Croatia, 13 CCCs has been established so far in the following domains of economic activity: automotive, wood-processing, food-processing industry, defence, chemical, electro and production machinery and technologies, ICT, maritime, construction, textile, health, personalized medicine, creative and cultural industries.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

the sample were small and medium companies, domestic companies (although there were also foreign-owned companies), and companies that were founded after 1991. In the sample there were 42.7% of companies that experienced growth in employment and 55.0% of companies that had growth in revenues during the period of cluster operation 2013-2016.

The questionnaire was designed based on literature review and interviews with the experts. Main objectives of the questionnaire were to examine the performance of CCCs, to explore if they accomplished their goals set for the period, to identify factors that influence CCCs' performance and to understand how Croatian CCs are performing compared to similar organisations/networks in the world.

Key messages

- There is general consensus among respondents that progress/performance of CCCs is not strongly visible, and that CCCs underperformed compared to expectations.
- Roughly 60% of respondents agree that their CCCs did not develop enough strength to be sustainable, which should raise concern among policy makers regarding the current model of cluster development.
- There are several factors that negatively affect perceived performance, and the most important ones are weaknesses inherited in cluster development framework, poor implementation of activities, inadequate resources for pursuing more ambitious objectives, lack of consensus and weaknesses in strategy formulation.
- Croatian CCs are lagging behind successful CIs in the world in their performance as they do not have a stable sources of financing, professional managers and adequate resources to pursue more ambitious goals and activities.
- Croatian CCCs are limited in their actions and resources in accomplishing their mission, which calls for a revision of the current framework of CCCs' development.
- Practices and experiences of similar international associations can be very useful in designing more effective development framework in Croatia.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

Objectives of Croatian Clusters of Competitiveness

Objectives of CCCs are defined in their Statues and they are broadly defined and unquantified. In the survey, respondents were asked to rank the most important objectives defined in their CCC Statute and the results are given in table 1.

Table 1: THE MOST IMPORTANT OBJECTIVES, n=250

Objectives	**n**	**%**
Collaboration between public, private and science sectors.	99	39.6
Enhancing competitiveness and increasing new added value in the sector.	78	31.2
Efficient usage of funds and obtaining aid and new sources of financing from state budget and the EU.	26	10.4
Lobbying for the sector at the national and the EU level.	16	6.4
Attracting domestic and foreign investments in the sector.	6	2.4
Development of human resources and their training.	6	2.4
Development of business and research infrastructure.	5	2.0
Collaboration among business sectors and internationalisation of the sector.	5	2.0
Creating brands and promotion of the sector.	4	1.6
Enhancing the attractiveness of regions and sustainable regional development.	2	0.8

Notes: Assess the following ten general objectives defined in the Statues of CCCs. Identify five most important objectives by ranking them from 1 to 5, where 1 is the most important objective, and 5 the least important objective“. Rank 1.
Source: Authors’ calculations based on survey data.

As perceived by their members, the most important objectives are collaboration between public, private and science sectors and enhancing competitiveness and increasing new added value in the sector. Efficient usage of funds and obtaining aid and new sources of financing from state budget and the EU is also considered to be very important. All other objectives received little attention from respondents. Given the broad definition of these objectives, respondents were also asked to identify the most important objectives that their CCCs should pursue. Most highly regarded goals are related to innovation/technology and public support and policies, such as: promoting innovation and new technologies (87.6% respondents agree), followed by facilitating higher innovativeness (84.4%), improvement of regulatory policy (83.6%), lobbying government for infrastructure (83.2%), diffusion of

This project has received funding from the European Union’s Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

technology within the sector (83.2%), lobbying for subsidies (76.4%) and studying and analysing the sector (72.8%).

It can be concluded that respondents are aware of the role their CCC can have in the development of the sector and think that CCCs should pursue more ambitious goals.

Perceived performance of Croatian Clusters of Competitiveness

Perceptions of perceived performance of CCCs are presented in Table 2.

Table 2: PERCEPTIONS OF CCCS' PERFORMANCE, n=250, %

Performance items	**Do not agree (1)**	**Indifferent (2)**	**Agree (3)**
CCC has increased foreign direct investment (FDI) into the sector.	67.2	21.2	11.6
CCC helped the sector/industry develop new specialisations.	63.6	23.6	12.8
CCC has led to increased employment in the sector.	63.2	22.0	14.8
New technologies have emerged through CCC.	62.4	22.0	15.6
CCC has led to product/process upgrading.	62.0	24.8	13.2
CCC has led to increased collaboration with international companies within global value chains.	60.8	21.2	18.0
CCC has helped the sector increase revenues.	59.2	22.8	18.0
CCC promoted export of the sector/industry.	56.4	24.0	19.6
CCC has improved international competitiveness of the sector.	54.8	24.4	20.8
CCC has attracted new firms to the sector/industry.	51.2	23.2	25.6

Note: Assess the performance of your CCC in the previous period. Do you agree with the following statements, where 1-disagree completely - 7 agree completely? Grouping of Likert scales was as follows: (1) do not agree (1,2,3), indifferent (4), agree (5,6,7).
Source: Authors' calculations based on survey data.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

There is general consensus among respondents that progress/performance of CCCs is not strongly visible, as expected at this stage of CCC's development. This is particularly the case with results that can be clearly quantified such as growth of employment and surge in FDI volume. On the other hand, promotional and networking activity was most favourably ranked, as 25.6% of respondents agree that CCCs have attracted new firms to the sector/industry and 40.8% respondents agree that CCCs have led to closer industry-academia ties.

Majority of respondents strongly agree that their CCCs did not provide benefits for cluster members (i.e. higher sales, employment, exports, innovations, process upgrading), which may indicate some underperformance compared to expectations. Roughly 60% of respondents agree that CCCs did not develop enough strength to be sustainable, which is in the light of curbing public financing, a rather unfavourable internal condition and should raise concern among policy makers regarding the current CCC model.

Cluster management and development process

Perceptions on cluster management and development process are presented in table 3. More respondents agree than disagree that some effort was placed into designing the CCCs' model, that the vision of their CCCs was formulated and that there was an agreement on activities which should be carried out. However, objectives were not quantified enough and CCCs have been slow in implementation of major strategic documents.

CCCs have received national funding for day-to-day work from government funding, and the majority of respondents said that their CCCs do not have sufficient budget for implementation of important projects (78.4%), and thus they need extra funding for the projects. While cooperation, networking and lobbying are affected by budget constraints to a lesser degree, some activities such as training, technology diffusion, promotion, infrastructure projects, expansion of firms require a higher budget.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

Table 3: CLUSTER MANAGEMENT & DEVELOPMENT PROCESS, n=250, %

	Do not agree (1)	Indifferent (2)	Agree (3)
I. Strategy and consensus about activities			
We invested a lot of effort and time in presentation of our model of cooperation.	34.8	22.8	42.4
The vision of CCC is formulated clearly.	32.0	22.0	46.0
The objectives of CCC are quantified.	42.8	23.6	33.6
There is an agreement on which activities will be carried out.	32.4	22.8	44.8
II. The implementation of major strategic documents			
Strategic plan of sector development with goals, priorities and action plan is done.	38.4	24.0	37.6
Communication strategy for the sector/industry with action plan is done and implemented.	46.4	20.8	32.8

Note: Assess cluster development process on the scale from 1 (disagree completely) to 7 (agree completely). Grouping of Likert scales was as follows: (1) do not agree (1,2,3), indifferent (4), agree (5,6,7).
Source: Survey and authors' calculations.

Setting in which CCCs operate

Perceptions about the setting in which CCCs operate are presented in table 4. The majority of respondents agree that the sector CCCs serve has long history. Fierce competition in sectors/industries prevails, accompanied by low level of trust among companies. Recent changes with respect to employment and revenues of companies operating in the sector are expected to have strong effect on perceptions of performance. Respondents coming from growing sectors are more likely to have more favourable perceptions of performance than respondents coming from stagnant or declining sectors. Success of CCCs strongly depends on trust, which is a driver of cooperation among firms and innovations. As the findings suggest, firms are the least likely to trust each other in declining industries.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

Table 4: ASSESSMENT OF SETTING, n=250

Setting items	Do not agree (1)	Indifferent (2)	Agree (3)
Sector characteristics			
The sector/industry that your CCC serves is internationally competitive.	26.8	18.0	55.2
The sector/industry that your CCC serves is comprised of large numbers of companies.	30.4	20.0	49.6
The sector/industry that your CCC serves is characterized by intense competition among companies.	25.2	26.0	48.8
The sector/industry that your CCC serves is characterized by tight buyer-supplier networks.	33.2	25.6	41.2
Government policy			
Croatian government promotes science and innovation policy.	63.6	16.8	19.6
Government policy is stable and predictable.	79.6	10.8	9.6
Companies typically have trust in government initiatives.	75.6	14.8	9.6

Note: Assess the business and economic setting in Croatia in which your CCC works. Do you agree with the following statements, where 1-disagree completely - 7 agree completely? Grouping of Likert scales was as follows: (1) do not agree (1,2,3), indifferent (4), agree (5,6,7).
Source: Authors' calculations based on survey data.

Findings also show that the majority of respondents had negative perceptions about current government policy and they predominantly do not trust government initiatives. A lack of government commitment, reduced national funding and poor implementation of the program diminish the trust in the longevity of government initiatives.

Drivers of perceived CCCs' performance

Multiple regression analysis was performed in order to statistically determine which factors influence perceived CCCs' performance. *Perceived performance* as a variable of interest was used as a dependent variable in the model, while independent variables in the model

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

represent *objectives, process and setting*. The results of regression analysis indicate that the desired objectives related to innovations, cluster process and government policy are factors that have an effect on perceived performance. The adjusted R^2 was satisfactory at 0.47.

Internal cluster processes was found to be the most important explanatory factors of perceived performance, with high regression coefficients. Strategy, consensus about activities and strategic implementation are highly important factors that positively influence perceived performance. This finding suggests that internally-driven activities are important in forming opinions about cluster results. CCs that undertake more dynamic activity will have had their overall performance better evaluated among members, and importantly, are in also a better position to obtain public financing of their activities. This shows that strategic issues and their implementation play an important role among cluster members and represent an important route of influence both at cluster level and externally.

Desired objectives related to innovations also influence perceived performance, thus supporting the established conclusion that cluster members have relatively high expectations with regard to CCCs' performance – the CCCs' impact to the sector/industry is either insufficiently visible or is occurring slowly. The results further suggest that improvements in policy framework can positively influence the opinions of possibilities to improve sectoral/industrial competitiveness among important actors from science, industry and regional/local government.

Comparison of Croatian clusters of competitiveness with world's practice

Comparison between Croatian CCs and similar organisations/networks in the world was made based on other surveys carried out in the world and the results are presented in table 5.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

Table 5: COMPARISON OF PERCEIVED PERFORMANCE OF CIs and Croatian CCs

Similar organisations/networks in the world	**Croatian CCs**
Perceived performance	
CI/CCC has met its goals (81%).	CA: 25.6%; CB: 36.6%.
CI/CCC developed enough strength to be sustainable (56%).	CA: 20.9%; CB: 24.0%
CI/CCC has led to closer industry-academia ties (84%).	CA: 38.4%; CB: 47.9%
New technologies have emerged through CI/CCC (58%)	CA: 15.6%; CB: 9.7%
CI/CCC has attracted new firms to the region (60%)	CA:10.4%; CB: 14.0%
CI/CCC has led to increased employment in the sector. (59%)	CA: 14.8%. CB: 19.7%
CI/CCC has improved international competitiveness of the sector (66%).	CA: 20.8%; CB: 28.1%
Process	
The vision of CI/CCC is formulated clearly (84%).	CA: 46.0%, CB: 55.0%.
The objectives of CI/CCC are quantified (68%).	CA: 33.6%; CB: 39.5%
There is an agreement on which activities will be carried out (83%).	CA: 44.8%; CB: 56.3%
Our CCC has sufficient budget for implementation of important projects (25%).	CA: 7.2%; CB: 7.0%
Setting	
Government promotes science and innovation policy (76%).	CA: 19.6%; CB=32.4%
Government policy is stable and predictable (58%).	CA: 9.6%; CB: 21.1%
Companies typically have trust in government initiatives (39%).	CA: 9.6%, CB: 29.6%
Society is characterized by a high level of trust in business relationships (58%).	CA: 10.0%, CB: 28.2%
The sector/industry that your CI/CCC serves is internationally competitive (66%).	CA: 55.2%; CB: 63.4%
The sector/industry that your CI/CCC serves is characterized by intense competition among companies (43%).	CA: 48.8%; CB: 59.1%
The sector/industry that your CI/CCC serves is characterized by tight buyer-supplier networks (35%).	CA: 41.2%; CB: 52.1%
The sector/industry that your CI/CCC serves has long history (33%).	CA: 64.4%; CB: 71.8%

Notes: CA: Cluster assembly, CB: Cluster governing board. Similar organisations/networks in the world cover CIs. Percentage of affirmative answers ("agree") is given in brackets.
Sources: For worlds' cluster initiatives (1) Lindqvist, G., Ketels, C. and Ö. Sölvell (2013.). "The Cluster Initiative Greenbook 2.0", Stockholm, Ivory Tower; (2) Sölvell Ö., Lindqvist, G., Ketels C. (2003.). "The Cluster Initiative Greenbook", Stockholm, Ivory Tower, and (3) for Croatia: Authors' calculations based on survey data.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

It can be seen that Croatian respondents negatively evaluated the performance of their CCs as compared to respondents in other countries. Worlds' surveys further show that CIs that built a clear, explicit framework are more successful. In Croatia, there is a weak framework and consensus about objectives and activities, which negatively affect perceived performance. In Croatia, objectives of CCs are set broadly, while successful CIs rely more on growth oriented goals, i.e. expansion of the sector, export growth, brand creation, higher innovativeness and diffusion of new technologies, education and training of workers, commercial cooperation.

Furthermore, in promoting cluster competitiveness, CCs with offices and adequate budgets perform significantly better. In the world, on average, most of CIs have 3 or less employees, 87% of CIs have web page, 89% of CIs have cluster manager and 68% of CIs have an office, while in Croatia Croatian Agency for Competitiveness (AIK) provides resources for CCCs that are considered insufficient among cluster members, as this restricts them from pursuing more ambitious goals. On the other hand, in the world, most CIs rely on funding from a mix of financial sources. On average, 34% of world CIs revenues come from primarily private sources, such as membership fees and sales of services; about 54% come from public sources, mainly regional and local public funding; 12% come from other sources.

National public funding decreases with age, but this is compensated for an increase in the international public funding. Regional public funding remains rather constant. For private funding, a drop-in membership fees are compensated by a growth in sales of services. Younger CIs rely more on state national funding, while older CIs rely more on sale of services, international funding and membership fees.

Governance of successful CIs is more in the hands of private sector in the world. In Croatia, the share of private sector in Governing board is 34.8%, while in the worlds' CIs its share is 61%. Croatian CCCs are mostly structured of domestic companies, while the practice shows that CIs that are limited to domestic companies alone perform less efficiently. Successful CIs also undertake formal evaluation of their program. Finally, strong negative perceptions about

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.

government initiatives and a level of trust among companies further reduce the positive performance of CCs in Croatia.

Recommendations

The findings of this survey might help public policy makers (e.g. Croatian Ministry of Economy, Entrepreneurship and Crafts, Croatian Agency for investments and Competitiveness) revise and adjust the existing framework and support mechanisms related to CCCs, while CCCs' management and members can use the results to develop more effective strategies.

In existing circumstances, it is very important for CCCs to find new ways how to develop in the future. In order to strengthen existing CCCs, the Government should develop an enhanced framework for CCs, whereas some clusters can be combined and can become legal entities.

For CCCs to be able to perform more ambitious goals and activities, it is important that they have experienced cluster managers/facilitators, offices and an adequate budget.

CCCs should rely less on the state budget and should find new sources of financing, which implies perhaps membership fees or EU/international funding. Internationalisation of CCCs should be supported.

Regular assessment of CCCs' performance is next recommendation to be drawn from worldwide cluster organisations and policy makers' practice.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 692191.